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heated chromium alloy steel strip in a protective atmosphere containing at least 95% by volume hydrogen having a dew point no greater than 0°F (-18°C), passing the strip through a snout containing a protective atmosphere containing at least 97% by volume hydrogen having a dew point no greater than -20°F (-29°C), and then dip the strip into the aluminum coating metal.



KEH/342f

Advantages of the invention are elimination of uncoated areas and improved adherence to ferritic chromium alloy steel strip cleaned in a direct fired furnace and continuously hot dip coated with aluminum.

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BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a schematic view of a ferrous base strip being processed through a hot dip aluminum coating line incorporating the present invention;

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FIG. 2 is a partial schematic view of the coating line of FIG. 1 showing an entry snout and coating pot.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

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Referring now to FIG. 1, reference numeral 10 denotes a coil of steel with strip 11 passing therefrom and around rollers 12, 13 and 14 before entering the top of first furnace section 15. First furnace section 15 is a direct fired type heated by the combustion of fuel and ~~air~~. The ratio of fuel and air is in a proportion so that the gaseous products of combustion have no free oxygen and preferably at least 3% by volume excess combustibles. The atmosphere in furnace 15 is heated preferably to greater than 2400°F (1316°C) and strip 11 maintained at sufficient speed so that the strip surface temperature is not ^{excessively} ~~excessively~~ oxidizing to chromium while removing surface contaminants such as rolling mill oil films, dirt, iron oxide, and the like. Except for a brief period of time as explained in detail later, the strip

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should not be heated to a temperature above about 1200°F (649°C) and
^{preferably}
~~preferably~~ not above about 1150°F (621°C) while in furnace 15.

5 The second section of the furnace denoted by numeral 16 may be of a
radiant tube type. The temperature of strip 11 is further heated to at least
about the melting point of an aluminum coating metal, i.e. 1200°F (649°C),
and up to about 1750°F (955°C) reaching a maximum temperature at about
point 18. A protective atmosphere including at least about 95% by volume
hydrogen preferably is maintained in furnace section 16 as well as
10 succeeding sections of the furnace described below.

Sections 20 and 22 of the furnace are cooling zones. Strip 11 passes
from furnace portion 22, over turndown roller 24, through snout 26 and into
coating pot 28 containing molten aluminum. The strip remains in the coating
15 pot a very short time, i.e. 2-5 seconds. Strip 11 containing a layer of coating
metal on both sides is vertically withdrawn from coating pot 28. The coating
layers are solidified and the coated strip is passed around turning roller 32
and coiled for storage or further processing as a coil 34. As noted above,
furnace sections 20, 22 and 26 contain the protective hydrogen atmosphere.

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Referring now to FIG. 2, snout 26 is protected from the atmosphere by
having its lower or exit end 26a submerged below surface 44 of aluminum
coating metal 42. Suitably mounted for rotation are pot rollers 36 and 38
and stabilizer roller 40. The weight of coating metal 42 remaining on strip 11
25 as it is withdrawn from coating pot 28 is controlled by finishing means such
as jet knives 30. Strip 11 is cooled to a temperature near or slightly above
the melting point of the aluminum coating metal in furnace portions 20, 22



and 26 before entering coating pot 28. This temperature may be as low as 1150°F (620°C) for aluminum alloy coating metals, e.g. Type 1 containing about 10% by weight silicon, to as high as about 1350°F (732°C) for commercially pure aluminum coating metal, e.g. Type 2.

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The apparatus shown in FIG. 2 is for two-side coating using air finishing. As will be understood by those skilled in the art, finishing using a sealed enclosure containing a nonoxidizing atmosphere may also be used.

- 10 Hydrogen gas of commercial purity may be introduced into the furnace sections through inlets 27 in snout 26 ^{preferably} ~~preferably~~ to achieve a protective hydrogen atmosphere containing less than about 200 ppm oxygen and having a dew point no greater than +40°F (+4°C). Depending upon factors such as hydrogen flow rate and furnace volume, additional
- 15 hydrogen inlets may be required in furnace sections 16, 20 and 22.

- Ferritic chromium alloy steels as defined herein include iron based magnetic materials characterized by a body centered cubic structure and having about .5 weight % or more chromium. For example, the present
- 20 invention has particular usefulness for hot dip aluminum coated ferritic stainless steel having up to about 35% by weight chromium and is used in automotive exhaust applications including heavy gauge engine exhaust pipes having thicknesses of 1.2 mm or more, foil having thicknesses less than .25 mm cold reduced from aluminized strip used as catalyst supports for
- 25 catalytic converters, and fully annealed strip deeply drawn into parts requiring light weight aluminum coatings, e.g. no greater than 185 gm/m² total both sides, such as manifolds, muffler parts, catalytic converters,



resonators, and the like. By full annealing is meant the strip is heated to at least about 830°C in furnace 16 and will have at least about 25% elongation as measured in a tensile test. Type 409 ferritic stainless steel is particularly preferred as the starting material for the present invention. This steel has a nominal composition of about 11% by weight chromium, about 0.5% by weight silicon, and remainder essentially iron. More broadly, a ferritic steel containing from about 10.0% to about 14.5% by weight chromium, about 0.1% to 1.0% by weight silicon, and remainder essentially iron, is preferred.

10 The following are nonlimiting examples illustrating the invention:

Example 1

15 A 1.02 mm thick by 122 cm wide Type 409 stainless steel strip was coated with pure molten aluminum coating (Type 2) at a temperature of 699-704°C using the coating line in FIGS. 1 and 2. Hydrogen of commercial purity was flowed at a rate of about 380 m³/hr into snout 26 and an atmosphere of 75% by volume nitrogen and 25% by volume hydrogen was maintained in furnace portion 16. The dew point of the pure protective hydrogen atmosphere in snout 26 was initially +48°F (+9°C). The fuel to air ratio in direct fired furnace portion 15 was controlled to have about 5% by volume excess combustibles. For various strip speeds and temperatures, the following visual observations were made:

	<u>Sample</u>	<u>Speed (m/min)</u>	<u>DEF(°C)*</u>	<u>RT(°C)**</u>	<u>Oxide***</u>	<u>Coating Condition</u>
5	A	37	760	917	Dark Blue	random un-coated areas
10	B	46	704	917	Light Blue	random un-coated areas
15	C	55	649	871	Gold	uncoated strip edge only
	D	37	649	871	Gold	good coating

20 * Strip temperature in furnace portion 15.

** Strip temperature in furnace portion 16

25 *** Surface appearance as strip 11 passed from furnace 15

30 As demonstrated above, a ferritic chromium alloy steel is oxidized when heated to a temperature of at least 649°C in an atmosphere of combustion products having no free oxygen. The dew point of the hydrogen atmosphere in snout 26 increased to a maximum of about +58°F (+14°C) as a result of at least some of the iron and/or chromium oxide being reduced to metal and water by the hydrogen atmosphere. Samples A and B heated to at least 704°C in the direct fired furnace were excessively oxidized and not properly wetted by the aluminum coating metal. The amount of oxidation to the strip when heated to 649°C in the direct fired furnace was marginally excessive as demonstrated by poor coating wetting along one edge of

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Sample C. Using a very dry protective hydrogen atmosphere, e.g. dew point no greater than 0°F (-19°C), throughout furnace portions 16, 20, 22 and snout 26 probably would have sufficiently removed the oxide on Sample C to result in better wetting of the aluminum coating metal. Contrary to
5 conventional wisdom for low carbon steel, ferritic chromium steel is readily oxidized in an atmosphere having no free oxygen and excess combustibles when heated to at least 649°C.

Example 2

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A 1.64 mm thick by 94 cm wide coil of Type 409 stainless steel was coated with 183 gm/m² of Type 2 aluminum (total both sides) under similar conditions to that of Example 1 except the pure protective hydrogen atmosphere also was maintained in furnace portion 16 and cooling zones
15 20, 22. Prior to passing this coil through the coating line, the dew point of the hydrogen atmosphere in snout 26 was -9°F (-23°C). The following coating observations were made for various strip temperatures:

Sample	DFF(°C)	RT(°C)	Coating Appearance
20 A	817	908	poor, frequent uncoated spots
B	620	841	good, infrequent uncoated spots

Example 3

Three coils of Type 409 stainless steel were processed and coated with 137 gm/m² Type 2 aluminum (total both sides) under similar conditions as in Example 2 except the dew point of the hydrogen atmosphere in snout 26 was -50°F (-46°C) and the dew point in radiant tube furnace portion 16 was -4°F (-20°C). The following coating observations were made for various strip temperatures:

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	<u>Sample</u>	<u>Thickness (mm)</u>	<u>Width (cm)</u>	<u>DFF (°C)</u>	<u>RT (°C)</u>	<u>Coating Appearance</u>
15	A	1.4	117	676	892	Some uncoated spots
	B	1.3	91	677	902	Scattered uncoated spots esp. 10 cm from one edge
20	C	1.4	76	604	871	No uncoated spots

As clearly demonstrated in Examples 1-3, heating the strip to temperatures of at least 676°C in the direct fired furnace caused excessive oxidation of the strip. Using a very dry protective hydrogen atmosphere throughout the furnace portions 16, 20, 22 and snout 26 did not sufficiently remove the oxides to achieve good coating metal wetting. On the other hand, heating the strip to no greater than about 650°C in the direct fired furnace and further heating the strip to temperatures greater than about 830°C in the radiant tube furnace resulted in adherent aluminum coatings having minimal uncoated areas on a fully annealed strip capable of being deeply drawn without flaking or crazing the coating.

Example 4

5 A 1.08 mm thick by 76 cm wide Type 409 stainless steel coil was also successfully continuously hot dip coated with 119 gm/m² (total both sides) of an aluminum alloy (Type 1) containing 9% by weight silicon. Operating conditions were the same as in Example 2. The strip was heated to about 627°C in furnace portion 15 and to 829°C in furnace portion 16. Very few uncoated areas were observed.

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Examples 5-10

Examples 5 through 10 are for .38 mm thick by 12.7 cm wide strip for ferritic, low carbon, titanium stabilized steels containing 2.01, 4.22 and 15 5.99% by weight chromium. These samples were continuously hot dip aluminum coated (Type 2) on a laboratory coating line similar to that shown in FIGS. 1 and 2 and under conditions similar to those for Example 2. Weights of coating were not measured.

20	<u>No.</u>	<u>% Cr</u>	<u>Speed</u> <u>(m/min)</u>	<u>DFF*</u> <u>(°C)</u>	<u>% H₂**</u>	<u>Condition</u>
	5	2.01	7.6	1204	25	Poor Coating
25	6	4.22	12.2	1093	25	Poor Coating
	7	5.99	12.2	1193	25	Poor Coating
30	8	2.01	9.1	1227	100	Very good coating



	<u>No.</u>	<u>% Cr</u>	<u>Speed (m/min)</u>	<u>DFF* (°C)</u>	<u>% H₂**</u>	<u>Condition</u>
5	9	4.22	9.1	1238	100	Good coating
	10	5.99	9.1	--	100	Good coating

* Furnace Zone temperatures

10 ** Hydrogen content in protective atmosphere

While strip temperatures out of the direct fired furnace were not measured, the data clearly supports the use of a 100% by volume hydrogen atmosphere in all areas of the furnace except the direct fired portion. Since the chromium content was lowered in Examples 5-10 from previous examples (11% by weight), it is reasonable to expect less dependence on direct fired furnace strip exit temperature with the lower chromium alloys (2, 4, 6% by weight). In other words, there would be less oxidation potential with less chromium content.

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As noted above, a direct fired atmosphere of the gaseous products of combustion of fuel and air having no free oxygen is oxidizing to ferritic chromium alloy steel at about 1200°F (649°C). Accordingly, the strip temperature in direct fired furnace 15 should not exceed this temperature, particularly for ferritic stainless steel having chromium content of 10% by weight or more. Preferably, this strip cleaning temperature should not exceed about 1150°F (621°C). Nevertheless, the strip temperature on occasion will exceed 649°C resulting from strip width and/or gauge changes. Brief excursions, i.e. less than 10 minutes of temperature about or slightly above 649°C, can be tolerated by carefully controlling the protective

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atmosphere conditions throughout furnace portion 16, cooling zones 20, 22 and snout 26. By maintaining a protective atmosphere containing at least about 95% by volume hydrogen in furnace portion 16, cooling zones 20, 22 and snout 26, minimal ^{oxidation} ~~oxidization~~ of strip 11 in furnace portion 15 can be removed. In this regard, we have determined it to be especially beneficial to maintain extremely low dew points in the protective hydrogen atmosphere to compensate for water formation as iron and/or chromium oxide is reduced by hydrogen in the protective atmosphere. Preferably, the protective atmosphere in snout 26 contains at least 97% by volume hydrogen and the dew point should not exceed about -20°F (-29°C). A dew point of 0°F (-18°C) preferably should be maintained in furnace portion 16 and cooling zones 20, 22.

As disclosed in U.S. patent 4,675,214, the reactivity of the aluminum coating metal increases at elevated temperatures. Accordingly, maintaining the aluminum coating at 1280-1320°F (693-716°C) also helps to remove any residual surface oxide not removed by the protective atmosphere. However, removal of oxide from the strip surface while submerged in the aluminum coating metal bath is undesirable because the reduced oxide forms aluminum oxide (dross) on the surface of the coating bath. Aluminum oxide can also cause uncoated areas by attachment as fragments to the strip as it emerges from the coating pot preventing metallurgical bonding of the aluminum coating metal to the steel strip.

The teachings of the present invention are especially important when high strip temperatures, e.g greater than 830°C, are required for full annealing to produce deep drawing strip for high formability products. For



high temperature annealing for low carbon steel strip, up to about 90% of the total heat input to the strip is accomplished in the direct fired portion of the furnace. The tables below show the percent of total thermal content achieved in the direct fired furnace portion for low carbon steel (prior art) and

5 for ferritic chromium alloy steel (invention).

Prior Art

	<u>t(mm)</u>	<u>w(cm)</u>	<u>t X w</u>	<u>s(mpm)</u>	<u>T₁(°C)</u>	<u>T₂(°C)</u>	<u>MW/Hr. To T₁</u>	<u>MW/Hr. To T₂</u>	<u>% T₂*</u>
10	.81	76	62	95	760	857	3.9	4.4	88.4
	1.40	76	106	64	749	857	4.4	5.0	87.0
15	1.75	86	151	43	760	857	4.3	4.9	88.4

Invention

20	.81	76	62	64	624	831	2.1	2.9	74.5
	1.40	76	106	40	628	832	2.3	3.1	74.8
	1.75	86	151	33	631	849	2.8	3.8	73.6

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t = strip thickness

w = strip width

s = strip speed through furnace

T₁ = strip temperature in direct fired furnace

30 T₂ = strip temperature in radiant tube heated furnace

* = % total thermal content

As demonstrated above, nearly 90% of total thermal content for fully annealed low carbon steel is achieved in the direct fired portion of the furnace while less than 80% of total thermal content for fully annealed hot dip aluminum coated chromium alloy steel can be achieved in the direct fired portion of the furnace if excessive oxidation is to be avoided. In other words, for fully annealed strip of the invention, the maximum allowed direct fired furnace strip temperature must be less than that necessary to provide at least 80% of total thermal input.

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Various modifications can be made to the invention without departing from the spirit and scope of it so long as the chromium alloy steel strip is not heated to a temperature excessively oxidizing to the strip in a direct fired furnace and is passed through a protective atmosphere containing at least about 95% by volume hydrogen prior to entry into the coating metal bath. For example, the hydrogen atmosphere can be used throughout any heating and cooling portions of the coating line between the direct fired furnace and the coating pot delivery duct. The coating metal can include pure aluminum and aluminum base alloys. The coating metal weight may be controlled by finishing in air or a sealed enclosure. Therefore, the limits of the invention should be determined from the appended claims.

The claims defining the invention are as follows:

1. A method of continuous hot dip coating a steel strip with aluminium, comprising the steps of:
 - heating a ferritic chromium alloy steel strip to a temperature
5 no greater than about 650°C by direct combustion of fuel and air
wherein the gaseous products of said combustion have no free
oxygen,
further heating said strip to a temperature of at least about
830°C,
10 cooling said strip to a temperature no less than the melting
point of an aluminium coating metal,
passing said strip through a protective atmosphere having at
least about 95% by volume hydrogen,
dipping said strip into a molten bath of said coating metal to
15 deposit a coating layer on said strip,
said coating layer being substantially free of uncoated areas
and tightly adherent to said strip.
 2. The method of claim 1 wherein said strip is heated to no greater
than about 621°C by said direct combustion of fuel and air.
 - 20 3. The method of claim 1 or claim 2 wherein said strip is further
heated to a temperature of 845°C to 955°C in said atmosphere.
 4. The method of any one of claims 1 to 3 wherein said strip is
cooled in said atmosphere.
 5. The method of any one of claims 1 to 4 wherein said atmosphere
25 has less than about 200 ppm oxygen and a dew point of less than about +4°C.
 6. The method of any one of claims 1 to 5 wherein said coating
metal is substantially pure aluminum.
 7. The method of any one of claims 1 to 6 wherein said strip
includes at least 10% by weight chromium.
 - 30 8. A method of continuous hot dip coating a steel strip with
aluminium, which method is as defined in claim 1 and substantially as
herein described with reference to any one of Sample D of Example 1, Sample
B of Example 2, Sample C of Example 3, or Example 4.
 9. A method of continuous hot dip coating a steel strip with



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aluminium, which method is as defined in claim 1 and substantially as herein described with reference to Figures 1 and 2.

10. A coated steel strip when prepared by the method of any one of claims 1 to 9.

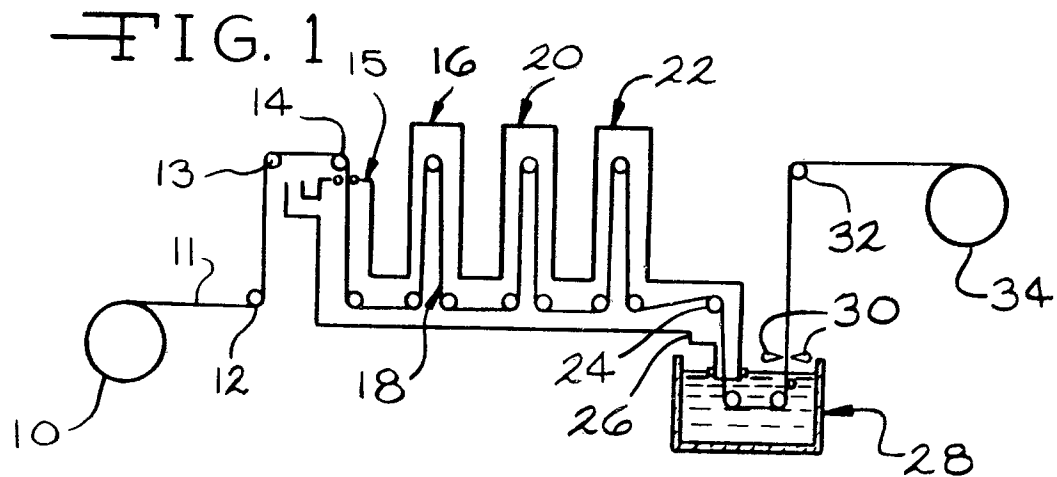
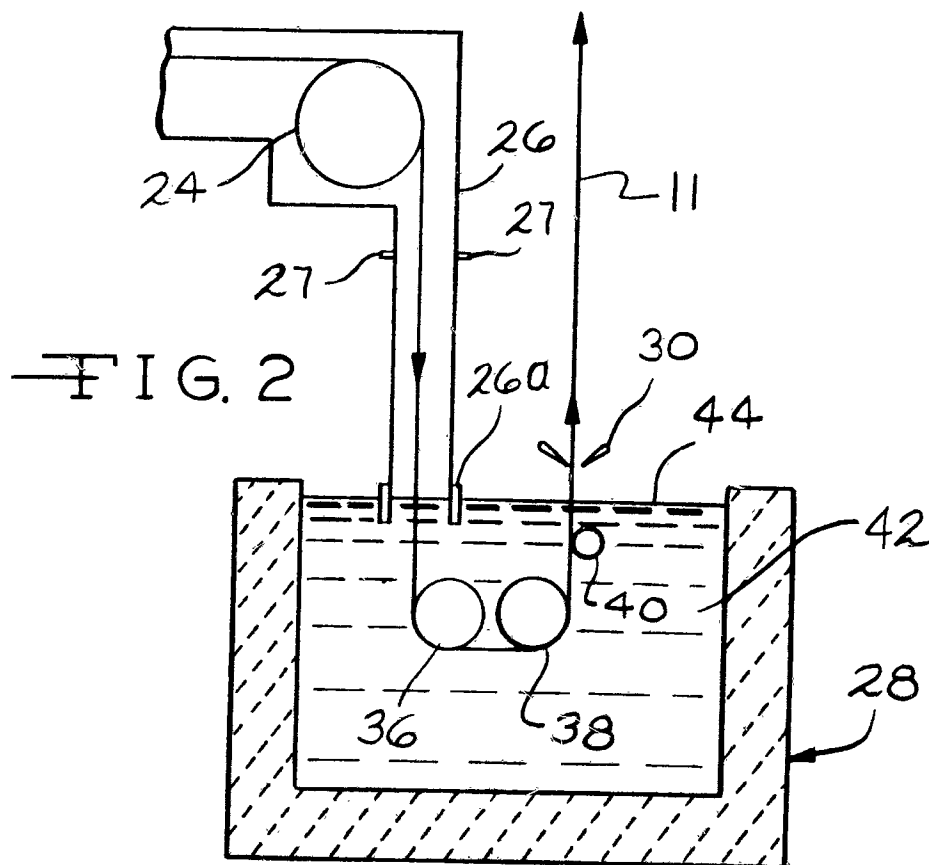
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A K Management Corporation

Patent Attorneys for the Applicant

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CLAIMS JPH08144037A

1.

In a method for producing a molten aluminum-zinc alloy plated steel sheet in which spangles are suppressed, which is performed after hot-dip plating and immediately before solidification of the hot-dip plating layer, the surface temperature distribution of the steel sheet in the longitudinal direction is measured and refined after hot-dip plating. Spangle suppression, which is characterized by determining the treatment point, measuring the change in the amount of plating adhesion in the width direction, and overcooling the thickened region where the amount of adhesion is larger than the average value prior to the miniaturization treatment. A method for manufacturing a hot-dip aluminum-zinc alloy plated steel sheet.

2.

On the hot-dip galvanizing bath outlet side, a surface temperature measuring means in the longitudinal direction of the hot-dip galvanized steel sheet, a plating adhesion amount measuring means for measuring the plating adhesion amount in the plate width direction, and a region designated as a thickening area by the plating adhesion amount measuring means. A cooling means capable of selectively overcooling, a movable micronization treatment means provided downstream of the cooling means, and the cooling means and the cooling means based on the temperature distribution of the steel plate in the longitudinal direction and the amount of plating adhered in the plate width direction. An apparatus for producing a hot-dip aluminum-zinc alloy plated steel sheet in which spangles are suppressed, which comprises an arithmetic apparatus for controlling the micronization processing means.

3.

The molten aluminum according to claim 2, further comprising a heating means and another cooling means for the plated steel sheet upstream of the cooling means on the hot-dip galvanizing bath side, and these heating means and the cooling means are also controlled by the arithmetic unit. -Zinc alloy plated steel sheet manufacturing equipment.



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DESCRIPTION JPH08144037A

[0001]

INDUSTRIAL APPLICABILITY The present invention relates to a method for producing a molten aluminum-zinc alloy plated steel sheet and a method for producing a molten aluminum-zinc alloy plated steel sheet in which a so-called spangle pattern appearing on the surface of the molten aluminum-zinc alloy plated steel sheet is suppressed.

[0002]

[Conventional Technology] Hot-dip aluminum-zinc alloy-plated steel sheet represented by 55% Al-Zn alloy-plated steel sheet (hereinafter referred to as hot-dip Al-Zn alloy-plated steel sheet or simply Al-Zn alloy-plated steel sheet) is a hot-dip galvanized steel sheet. Since it has significantly better corrosion resistance, its use in building materials such as roofing materials is expanding.

[0003]

Al-Zn alloy plated steel sheets are generally manufactured using a continuous hot dip galvanizing line.

Therefore, after being annealed in the line by the Zenzimir method or the non-oxidizing furnace method, which is the mainstream in the continuous hot-dip galvanizing line, plating is performed. Specifically, after preheating while removing dirt (oils and fats, etc.) on the surface of the plating original plate in an oxidizing furnace or non-oxidizing furnace of a continuous hot-dip galvanizing line, a reduction furnace maintained in an H₂-N₂ mixed gas atmosphere. The surface is activated and annealed at. Next, the original plate was cooled to a temperature suitable for molten Al-Zn alloy plating, then passed through a plating bath to perform Al-Zn alloy plating, and the amount of plating adhered was adjusted by a wiping nozzle on the plating bath outlet side and cooled. After winding the plated steel sheet.

[0004]

On the surface of the molten Al-Zn alloy plated steel sheet produced in this way, a flower-shaped pattern called spangle spots (hereinafter, simply referred to as spangle) is generated, and the plated surface is uneven along the pattern. There is. When spangles become coarse, the appearance of the product deteriorates and the commercial value decreases. Further, for example, when it is used as a base material for a coated steel sheet, there is an inconvenience that a uniform coated surface cannot be secured. Therefore, there is a strong demand for a molten Al—Zn alloy plated steel sheet having a uniform and beautiful surface appearance in which spangle patterns are suppressed.

[0005]

As a method of suppressing (miniaturizing) the spangle pattern of a molten Al-Zn alloy plated steel sheet, a method of spraying air or a chemical solution after plating to quench the steel sheet (Japanese Patent Laid-Open No. 60-162763) has a higher

melting point than the plated metal. A method of spraying and cooling fine metal powder (Japanese Patent Laid-Open No. 59-170271) has been proposed so far. Further, a method of spraying a metal oxide powder as a spangle miniaturization treatment for hot-dip zinc alloy plating and hot-dip aluminum plating is also known (Japanese Patent Laid-Open No. 63-157849). It is most effective to suppress spangles by performing these miniaturization treatments immediately before the hot-dip galvanizing layer solidifies, that is, when the plating layer is at a temperature slightly higher than the melting point.

[0006]

However, even if molten Al—Zn alloy plating is performed by applying these miniaturization treatment methods, spangles often remain in the plated products. This is often due to the non-uniform adhesion of the Al—Zn alloy plating layer before the miniaturization treatment, or the non-uniform cooling in the plate width direction. For example, after hot-dip galvanizing, when the plating layer is miniaturized at a temperature considerably higher than the melting point of the Al—Zn alloy, the plated surface exhibits a pit-like rough skin appearance. On the contrary, if the miniaturization treatment time is too late and the plating layer is already solidified before that, the spangle cannot be sufficiently miniaturized.

[0007]

Regarding the cooling control for suppressing the spangle pattern, although it is an example of hot dip galvanizing, the following method has been proposed so far. A method of locally heating the edge portion of a steel plate in order to correct the deviation of the temperature distribution in the width direction of the molten zinc layer (Japanese Patent Laid-Open No. 48-84038), the width direction of the steel strip before and after the zinc powder spraying position. The temperature distribution of the steel strip is measured, and from the measured temperature distribution in the width direction, the line position where the temperature of the steel strip is slightly higher than the solidification temperature of zinc over the entire width is calculated, and the appropriate zinc powder spraying position is determined. Method for determining (Japanese Unexamined Patent Publication No. 1-30547), thermometers are arranged before and after the spangle refining processing device, and heating and cooling means are arranged in front of the spangle cooling device, and the two directions are the longitudinal direction and the width direction. A method for obtaining an appropriate temperature distribution by measuring a dimensional temperature distribution and changing the heating / cooling method and the position of a spangle micronization treatment device (Japanese Patent Laid-Open No. 2-298248).

[0008]

In both of the methods and methods, the surface temperature of the plated steel sheet is measured to determine the miniaturization treatment point (cooling timing) so that the miniaturization treatment can be performed immediately before the hot-dip galvanized layer solidifies. These methods can also be sufficiently applied to suppress spangles in molten Al—Zn alloy plated steel sheets.

[0009]

However, even if the cooling control method after plating as described above is applied to molten Al-Zn alloy plating, the finally obtained Al-Zn alloy plated steel sheet can be obtained. It has been experienced that unwanted spangles remain on the surface, especially in specific areas in the width direction. That is, the determination of an appropriate cooling time and the uniform cooling in the width direction by the conventional measurement of the surface temperature distribution of the steel sheet are not perfect for suppressing spangles.

[0010]

Therefore, an object of the present invention is to provide a method and a manufacturing apparatus for a molten Al—Zn alloy plated steel sheet capable of reliably suppressing spangles. Specifically, a technology that can surely eliminate the residual or generation of spangles that may occur even if the steel sheet temperature is properly controlled and the appropriate cooling time is determined during hot-dip Al-Zn alloy plating. To develop.

[0011]

PROBLEM TO BE SOLVED: To investigate the cause of spangle residue on a molten Al—Zn alloy plated steel sheet even if the cooling time is appropriately determined as described above. As a result, the final product may have a rough spangle

shape due to reheating, or spangle may occur locally. The cause is that the amount of Al—Zn alloy adhered is non-uniform in the plate width direction. It was clarified that this is because the amount of latent heat is large in the portion where the amount of Al—Zn alloy adhered is large in the plate width direction, and therefore the amount of reheat is also large, and solidification is partially delayed.

[0012]

If solidification is delayed in a part of the plate width direction due to such non-uniform reheating, the plating layer temperature is still fine in the part where solidification is delayed even if spangle miniaturization treatment is performed at an appropriate time thereafter. It is too expensive for the conversion process, and spangles will remain even after the miniaturization process. Therefore, in order to reliably obtain a molten Al—Zn alloy-plated steel sheet in which spangles are suppressed throughout the plate width direction, it is necessary to consider reheat in addition to determining an appropriate cooling time.

[0013]

Thus, the present invention measures the amount of Al-Zn alloy adhering to the steel sheet in the plate width direction when producing the molten Al-Zn alloy plated steel sheet in which spangles are suppressed by the micronization treatment, and the plate width direction. By overcooling only the portion where the amount of adhesion is large, it is a basic feature that uniform cooling of the Al—Zn alloy from immediately before the freezing point is possible over the entire width in the plate width direction during the miniaturization process.

[0014]

That is, the gist of the present invention is a method for producing a hot-dip Al—Zn alloy-plated steel sheet in which spangles are suppressed, in which a micronization treatment is performed after hot-dip plating and immediately before solidification of the hot-dip plating layer. The surface temperature distribution of the steel sheet is measured to determine the point of micronization, and the change in the amount of plating adhesion in the width direction is measured to overcool the thickened area where the amount of adhesion is larger than the average value prior to the miniaturization. This is a method for producing a hot-dip Al—Zn alloy-plated steel sheet in which spangles are suppressed.

[0015]

Here, supercooling means that the degree of cooling is stronger than that of cooling of other parts in the width direction (that is, the part where the amount of adhesion is below the average), but specifically, consideration is given to reheating. Therefore, the cooling is performed so as to be 1 to 5 ° C lower than the cooling temperature required for the target temperature when the other parts reach the miniaturization processing device.

[0016]

From another aspect, the present invention presents the hot-dip galvanized steel sheet with a surface temperature measuring means in the longitudinal direction, a plating adhesion amount measuring means for measuring the plating adhesion amount in the plate width direction, and the plating adhesion. A cooling means capable of selectively overcooling a region designated as a thickened region by a quantity measuring means, a movable micronization processing means provided downstream of the cooling means, and a steel plate temperature distribution and a plate width in the longitudinal direction. It is an apparatus for producing a hot-dip Al—Zn alloy-plated steel sheet in which spangles are suppressed, which comprises an arithmetic apparatus for controlling the cooling means and the micronization processing means based on the amount of plating adhesion in the direction.

[0017]

In a preferred embodiment, the manufacturing apparatus further includes a heating means for the plated steel sheet and another cooling means upstream of the cooling means on the hot-dip galvanizing bath side, and these heating means and cooling means are also the arithmetic unit. Is controlled by.

[0018]

[Action] As described above, even in the conventional method for manufacturing a molten Al-Zn alloy plated steel sheet in which spangles are suppressed, heating, cooling, and miniaturization treatment points are performed so that the miniaturization treatment is performed immediately before solidification of the plating layer. It is in control.

However, conventionally, these controls have been performed by paying attention only to the width direction of the hot-dip galvanized steel sheet or only the temperature distribution in the width direction and the longitudinal direction.

[0019]

For example, FIG. 2 shows a hot-dip galvanizing apparatus for carrying out the above method.

This device includes a burner box 4 for heating, a cooler box 5 for cooling, a radiation thermometer 6 for two-dimensional temperature measurement, a miniaturization processing device 7, and an arithmetic device 8.

Note that 1 is a hot-dip galvanized bath, 2 is a steel plate, 3 is a wiping nozzle, and 9 is a plated steel plate.

The temperature of the plated steel sheet 9 that has exited the hot-dip galvanized bath 1 is measured in the width direction and the longitudinal direction by the two-dimensional temperature measuring device 6, and the heating means 4 or the heating means 4 or The temperature of the steel sheet is controlled by heating or cooling by the cooling means 5.

These measurement, heating, and cooling data are sent to the arithmetic unit 8, and the miniaturization processing device is moved to a position where the entire width of the plate is slightly higher than the solidification temperature, and the miniaturization processing is performed.

[0020]

On the other hand, in the present invention, attention is paid to the fact that the adhesion amount of the hot-dip galvanized steel sheet is non-uniform in the width direction, and for spangles, the reheat in the thickened region where the adhesion amount is larger than the average value is other. It was found that this large reheat, which is larger than the part, affects the spangle. It is presumed that the reason why the amount of hot-dip galvanized varies in the width direction is that the shape of the steel sheet passing between the gas injection nozzles is unstable.

[0021]

In order to prevent the generation of spangles due to this reheating, in the present invention, prior to the miniaturization process, a thickened region in the width direction of the plated steel sheet is detected, and the region is particularly supercooled to be fine. The effect of reheating before and after the conversion process is minimized. The degree of supercooling at this time is determined in relation to the degree of thickening, but if the temperature of the thickening region at the time of miniaturization processing is cooled to be the same as the temperature of other parts. Good. That is, since the amount of reheat generated between the cooling and the miniaturization process is proportional to the amount of plating adhesion, supercooling is performed so as to offset it. Specifically, as described above, the cooling may be performed so as to be 1 to 5 ° C lower than the cooling temperature required for the target temperature at the time of reaching the miniaturization processing apparatus in other parts.

[0022]

Therefore, as shown in FIG. 1, the hot-dip Al—Zn alloy-plated steel sheet manufacturing apparatus of the present invention is capable of partially overcooling in the width direction as compared with the conventional hot-dip galvanizing apparatus shown in FIG. Means (eg, second cooler box 10) and hot-dip galvanizing amount measuring means 11 in the width direction may be attached.

[0023]

Thus, according to the present invention, since only the portion having a large amount of plating adhesion (thickening region) in the width direction is selectively overcooled and then the miniaturization treatment is performed, the plating surface temperature is the width of the steel sheet during the miniaturization treatment. Since it is substantially uniform over the entire width in the direction, the miniaturization treatment effect can be uniformly achieved over the entire width, and a molten Al—Zn alloy plated steel sheet in which spangles are uniformly

suppressed in the width direction can be obtained. it can.

[0024]

On the other hand, in the past, since the degree of cooling is not changed in the width direction, the amount of heat recovery in the thickening region becomes large, and the miniaturization treatment is performed at a temperature higher than the optimum temperature, so that the effect of the miniaturization treatment is sufficient. However, spangles occur and spangles remain in the thickening area.

[0025]

The cooling means for supercooling may be the same as the conventional cooling means, but must be capable of changing the degree of cooling in the width direction.

In addition, there are no restrictions on the means of micronization, and powders with a higher melting point than air, air-water (gas in which minute water droplets are mixed), chemicals, and Al-Zn alloy, which is the material to be plated (eg, zinc powder, metal). It can be carried out using a medium that has been used conventionally, such as oxide powder).

[0026]

[Example] FIG. 1 is a schematic explanatory view of an apparatus for manufacturing a molten Al—Zn alloy plated steel sheet according to the present invention.

Hereinafter, examples of the present invention will be described with reference to this figure.

[0027]

In the apparatus of the present invention shown in FIG. 1, similarly to the conventional apparatus shown in FIG. 2, the steel plate 2 immersed in the molten Al—Zn alloy plating bath 1 is subjected to predetermined plating by the wiping nozzle 3 when it is pulled up from the bath. It is adjusted to the amount of adhesion.

Next, the temperature of the steel sheet is adjusted by heating the steel sheet with the burner box 4 or cooling it in the first cooler box 5 so that the micronization treatment is performed immediately before the molten Al—Zn alloy plating layer solidifies. This adjustment of the steel sheet temperature is not essential, but by adjusting the steel sheet temperature to be almost constant by heating or cooling in this way, the fluctuation range of the position of the miniaturization processing device 7 becomes small, and the miniaturization processing point can be controlled. It is preferable to adjust the temperature because it is easy.

[0028]

The temperature distribution in the longitudinal direction of the steel sheet 2 is monitored by the radiation thermometer 6, and based on this, the degree of heating or cooling for adjusting the temperature of the steel sheet is determined. In order to know the possibility of partial solidification in the width direction, it is preferable to monitor not only the longitudinal direction of the plated steel sheet but also the temperature distribution in the width direction at the same time with the radiation thermometer 6. Then, all of these heating, cooling, and temperature distribution data are sent to the arithmetic unit 8, and the position of the miniaturization processing device 7, that is, the miniaturization processing point is determined by this arithmetic unit. The miniaturization processing device 7 is movable, that is, it can be moved by moving up and down along the plate passing line according to the position where the molten Al-Zn alloy plating layer solidifies, and this device is a molten Al-Zn alloy plating layer. The required amount of movement is determined by the command of the arithmetic unit 8 so as to come to the point immediately before solidification.

[0029]

The hot-dip galvanizing apparatus of the present invention includes a means 11 for measuring the amount of plating adhesion in the width direction of the hot-dip galvanized steel sheet 9. The amount of plating adhered can be quickly measured by an analytical means such as fluorescent X-ray. The measurement result of the plating

adhesion amount measuring means is sent to the arithmetic unit 8 to detect a thick basis weight region in which the adhesion amount is larger than the average adhesion amount in the width direction. Then, based on the result, the second cooler box 10 provided on the upstream side of the miniaturization processing device 7 and capable of changing the degree of cooling in the width direction is operated. Therefore, the position of the adhesion amount measuring means 11 may be any point between the wiping nozzle 3 and the second cooler box 10, but is preferably immediately after the wiping nozzle 3.

[0030]

The second cooler box is specifically 1 to 5 ° C from the target temperature so as to offset the excessive amount of reheat for the thickened region detected based on the measurement result of the adhesion amount measuring means 11. C The hot-dip galvanized layer is cooled by changing the degree of cooling in the width direction so as to supercool to a low temperature. This cooling can be performed by partially cooling only the thickening area (not cooling the other parts) or by making the cooling degree of the thickening area stronger than the cooling degree of the other parts. For example, the second cooler box 10 can consist of a large number of spray nozzles, one in each of a large number of areas evenly partitioned (eg, 1 to 50 mm wide) along the width direction of the steel sheet. In that case, the cooling medium (eg, air, air, water, chemical solution) is sprayed onto the plated steel plate only from the spray nozzle of the section designated as the thickening area, or the amount of the cooling medium sprayed from the spray nozzle of the section is changed. By increasing the amount of spraying in the section of the above, it is possible to overcool the thickened area.

[0031]

After selectively supercooling the thickening region in this way, the plating layer miniaturization processing apparatus is performed. The miniaturization processing apparatus 7 is an apparatus for producing a steel sheet in which spangles are suppressed by spraying an appropriate medium such as air, brackish water, a chemical solution, or a metal powder onto the hot-dip galvanized layer immediately before solidification and uniformly quenching the layer. Is.

[0032]

As described above, the position of the micronization processing device 7 is the steel plate temperature distribution measured by the radiation thermometer 6, the heating or cooling of the plated steel sheet by the burner box 4 or the first cooler box 5, and further the second cooler box 10. The data regarding the cooling of the steel sheet by the above is sent to the arithmetic unit 8 to determine that the molten Al—Zn alloy plating layer is unsolidified over the entire width and is at the position immediately before solidification. Then, based on the command from the arithmetic unit 8, the miniaturization processing device 7 is moved up and down along the plate line (that is, moved in the same direction as the steel plate traveling direction or in the opposite direction) to solidify the hot-dip galvanized layer. Set to the previous position.

[0033]

In the past, the effect of reheat due to the uneven amount of plating adhering in the width direction was ignored, so in the thickened area, miniaturization treatment is performed in a state of insufficient cooling due to reheating, and even after the miniaturization treatment, this is performed. The plated surface has spangles remaining in the area. On the other hand, according to the present invention, since only the thickening region is supercooled upstream of the miniaturization processing apparatus, a relatively large reheat that occurs in this region while the plated steel plate advances to the miniaturization processing apparatus. It is offset by supercooling, and a local temperature rise (insufficient cooling) in the thickening region is avoided, so that the miniaturization treatment can be uniformly performed at the optimum temperature over the entire width in the plate width direction. As a result, the effect of the miniaturization treatment is uniformly exhibited over the entire width, and a plated surface in which spangles are uniformly suppressed in the plate width direction can be obtained. Since the hot-dip galvanized steel sheet is usually double-sided plated, the controlled plating method according to the present invention described above is independently performed on both sides of each side. However, in the case of single-sided plating, or when only one side needs to be a beautiful surface, the

above-mentioned controlled plating method of the present invention may be applied to only one side.

[0034]

3 (a) and 3 (b) schematically explain the formation of a thickened region and supercooling of a molten Al—Zn alloy-plated steel sheet obtained by using the apparatus according to the present invention shown in FIG. 1. In the illustrated example, the plate thickness is 0.5 mm, the plate width is 1219 mm, and the target plating adhesion amount is 90 g / m² per side. The adhesion amount distribution of the molten Al—Zn alloy plating layer in the plate width direction measured by the plating adhesion amount measuring means 11 is as shown in FIG. 3 (a), and two thickening regions were detected. On the other hand, as shown in FIG. 1B, the second cooler box 10 includes 12 water spray nozzles A to L arranged at equal distances in the plate width direction. That is, it can be evenly divided into 12 sections in the width direction, and each section can be supercooled. In the illustrated example, only the thickening area is selectively supercooled by operating only the spray nozzles C and I located at the positions corresponding to the detected thickening area to spray the cooling water, and then fine. The conversion process was performed.

[0035]

The plated appearance of the molten Al-Zn alloy-plated steel sheet finally obtained after the miniaturization treatment, especially the spangle pattern, was observed by dividing the plate width direction into 12 sections corresponding to the nozzle positions A to L. However, spangles were sufficiently suppressed. On the other hand, for comparison, when the same molten Al—Zn alloy plated steel sheet was manufactured without operating the above second cooler box at all (thus, without selective supercooling in the width direction), the plate width was obtained. In the section corresponding to the thickening area in the direction (that is, the section corresponding to the nozzle positions C and I), a visually recognizable spangle pattern remained, and the suppression of spangle was insufficient.

[0036]

INDUSTRIAL APPLICABILITY As described above, when a molten Al—Zn alloy-plated steel sheet in which spangles are suppressed is produced by performing a micronization treatment immediately before solidification of a hot-dip galvanized layer, melting in the plate width direction is performed according to the present invention. By measuring the change in the amount of plating adhesion and selectively overcooling only the thickened area where the amount of plating adhesion is large, a beautiful plated surface in which spangles are suppressed uniformly over the entire width in the plate width direction can be obtained. As a result, even when a painted steel sheet is used, it can be painted uniformly, and the painted appearance is improved.

[0037]

A brief description of the drawing

[0038]

FIG. 1 is a schematic explanatory view of an apparatus for manufacturing a molten Al—Zn alloy plated steel sheet in which spangles are suppressed according to the present invention.

[0039]

FIG. 2 is a schematic explanatory view of a conventional similar device.

[0040]

3 Fig. 3 (a) and 3 (b) show the formation and supercooling of the thickened region of the molten Al—Zn alloy plated steel sheet obtained by using the apparatus according to the present invention shown in FIG.

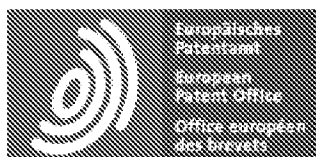
1, respectively. It is a figure to explain.

[0041]

Code description

[0042]

1: Hot-dip galvanized bath 2: Steel plate 3: Wiping nozzle 4: Bumer box 5: First cooler box 6: Radiation thermometer 7: Miniaturization processing device 8: Computing device 9: Hot-dip galvanized steel sheet 10: Second cooler box 11: Plate width direction plating adhesion amount measuring means



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CLAIMS JPH08144037A

1.

In a method for producing a molten aluminum-zinc alloy plated steel sheet in which spangles are suppressed, which is performed after hot-dip plating and immediately before solidification of the hot-dip plating layer, the surface temperature distribution of the steel sheet in the longitudinal direction is measured and refined after hot-dip plating. Spangle suppression, which is characterized by determining the treatment point, measuring the change in the amount of plating adhesion in the width direction, and overcooling the thickened region where the amount of adhesion is larger than the average value prior to the miniaturization treatment. A method for manufacturing a hot-dip aluminum-zinc alloy plated steel sheet.

2.

On the hot-dip galvanizing bath outlet side, a surface temperature measuring means in the longitudinal direction of the hot-dip galvanized steel sheet, a plating adhesion amount measuring means for measuring the plating adhesion amount in the plate width direction, and a region designated as a thickening area by the plating adhesion amount measuring means. A cooling means capable of selectively overcooling, a movable micronization treatment means provided downstream of the cooling means, and the cooling means and the cooling means based on the temperature distribution of the steel plate in the longitudinal direction and the amount of plating adhered in the plate width direction. An apparatus for producing a hot-dip aluminum-zinc alloy plated steel sheet in which spangles are suppressed, which comprises an arithmetic apparatus for controlling the micronization processing means.

3.

The molten aluminum according to claim 2, further comprising a heating means and another cooling means for the plated steel sheet upstream of the cooling means on the hot-dip galvanizing bath side, and these heating means and the cooling means are also controlled by the arithmetic unit. -Zinc alloy plated steel sheet manufacturing equipment.

(19) 日本国特許庁 (J P)

(12) 公開特許公報 (A)

(11) 特許出願公開番号

特開平8-144037

(43) 公開日 平成8年(1996)6月4日

(51) Int.Cl. ⁶	識別記号	序内整理番号	F I	技術表示箇所
C 2 3 C	2/26			
	2/06			
	2/12			

審査請求 未請求 請求項の数 3 O L (全 6 頁)

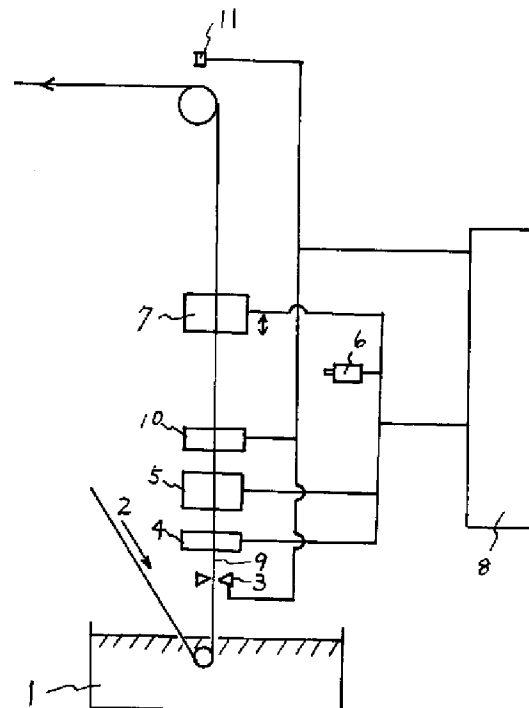
(21) 出願番号	特願平6-283766	(71) 出願人	000002118 住友金属工業株式会社 大阪府大阪市中央区北浜4丁目5番33号
(22) 出願日	平成6年(1994)11月17日	(72) 発明者	金子 謙一郎 茨城県鹿島郡鹿島町大字光3番地 住友金属工業株式会社鹿島製鉄所内
		(74) 代理人	弁理士 広瀬 章一

(54) 【発明の名称】 溶融アルミニウム-亜鉛合金メッキ鋼板の製法及び装置

(57) 【要約】

【構成】 溶融メッキ浴1でメッキ後、メッキ層の凝固直前に7で微細化処理する、スパングルの抑制された溶融アルミニウム-亜鉛合金メッキ鋼板の製造において、溶融メッキ鋼板9の長手方向の鋼板表面温度分布を6で計測し、この温度分布および4、5での加熱、冷却のデータを演算装置8で処理して微細化処理地点を決定する。さらに、幅方向におけるメッキ付着量の変化を11で計測し、平均値より付着量の大きい厚目付け領域を、微細化処理に先立って冷却手段10で過冷却する。

【効果】 厚目付け領域での復熱に起因するスパングルの発生がなく、均一にスパングルが抑制された溶融Al-Zn合金メッキ鋼板が得られる。



【特許請求の範囲】

【請求項1】 溶融メッキ後、溶融メッキ層の凝固直前に微細化処理を行う、スパングルの抑制された溶融アルミニウム-亜鉛合金メッキ鋼板の製造方法において、溶融メッキ後に長手方向の鋼板表面温度分布を計測して微細化処理地点を決定するとともに、幅方向におけるメッキ付着量の変化を計測し、平均値より付着量の大きい厚目付け領域を、微細化処理に先立って過冷却することを特徴とする、スパングルの抑制された溶融アルミニウム-亜鉛合金メッキ鋼板の製造方法。

【請求項2】 溶融メッキ浴出側に、溶融メッキ鋼板の長手方向の表面温度計測手段、板幅方向のメッキ付着量を計測するメッキ付着量計測手段、該メッキ付着量計測手段によって厚目付け領域とされた領域を選択的に過冷却することのできる冷却手段、該冷却手段の下流に設けた可動型の微細化処理手段、および長手方向の鋼板温度分布および板幅方向のメッキ付着量に基づいて該冷却手段および該微細化処理手段を制御する演算装置を備えた、スパングルの抑制された溶融アルミニウム-亜鉛合金メッキ鋼板の製造装置。

【請求項3】 溶融メッキ浴出側の前記冷却手段より上流に、メッキ鋼板の加熱手段および別の冷却手段をさらに備え、これらの加熱手段および冷却手段も前記演算装置により制御される、請求項2記載の溶融アルミニウム-亜鉛合金メッキ鋼板の製造装置。

【発明の詳細な説明】

【0001】

【産業上の利用分野】本発明は、溶融アルミニウム-亜鉛合金メッキ鋼板の表面に現れる、いわゆるスパングル模様が抑制された、溶融アルミニウム-亜鉛合金メッキ鋼板の製造方法および製造方法に関する。

【0002】

【従来の技術】55%Al-Zn合金メッキ鋼板で代表される溶融アルミニウム-亜鉛合金メッキ鋼板（以下、溶融Al-Zn合金メッキ鋼板または単にAl-Zn合金メッキ鋼板という）は、溶融亜鉛メッキ鋼板より耐食性が著しく優れていることから、特に屋根材などの建材への利用が拡大している。

【0003】Al-Zn合金メッキ鋼板は、一般に連続溶融亜鉛メッキラインを利用して製造される。従って、連続溶融亜鉛メッキラインで主流となっている、ゼンジミアー方式または無酸化炉方式によりライン内焼鈍を受けた後、メッキが施されることになる。具体的には、連続式溶融メッキラインの酸化炉または無酸化炉でメッキ原板表面の汚れ（油脂分など）を除去しながら予熱を行った後、 H_2-N_2 混合ガス雰囲気中に保持された還元炉にて表面の活性化および焼鈍を行う。次いで、原板を溶融Al-Zn合金メッキに適した温度に冷却した後、メッキ浴を通過させてAl-Zn合金メッキを施し、メッキ浴出側でワイピングノズルによりメッキ付着量を調整し、冷却した後メ

ッキ鋼板を巻取る。

【0004】このようにして製造された溶融Al-Zn合金メッキ鋼板の表面には、スパングル斑（以下、単にスパングルという）と称する華状の模様が生成し、その模様に沿ってメッキ表面に凹凸を生じている。スパングルが粗大化すると、製品としての見栄えが悪くなり、商品価値が低下する。さらに、例えば、塗装鋼板用母材とした場合に均一な塗装仕上り表面が確保できないといった不都合もある。そのため、スパングル模様が抑制された、一様で美しい表面外観を有する溶融Al-Zn合金メッキ鋼板に対する要求が強い。

【0005】溶融Al-Zn合金メッキ鋼板のスパングル模様を抑制（微細化）する方法として、メッキ後に空気や薬液を噴霧して急冷する方法（特開昭60-162763号公報）、メッキ金属より高い融点を有する金属微粉末を吹付けて冷却する方法（特開昭59-170271号公報）等がこれまでに提案された。また、溶融亜鉛合金メッキおよび溶融アルミニウムメッキのスパングル微細化処理として、金属酸化物粉末を吹付ける方法も知られている（特開昭63-157849号公報）。これらの微細化処理は、溶融メッキ層の凝固直前、即ち、メッキ層が融点よりわずかに高温にある時期に行うことがスパングル抑制に最も効果的である。

【0006】しかし、これらの微細化処理方法を適用して溶融Al-Zn合金メッキを行っても、メッキ製品にスパングルが残ることが多い。この原因は、微細化処理前のAl-Zn合金メッキ層の付着量不均一に基づくか、或いはこの冷却が板幅方向に不均一である場合が多い。例えば、溶融メッキ後、Al-Zn合金の融点よりもかなり高温時にメッキ層が微細化処理されると、メッキ表面がピット状の肌荒れ外観を呈する。逆に、微細化処理時期が遅すぎて、その前に既にメッキ層が凝固していると、スパングルを十分に微細化することはできない。

【0007】スパングル模様の抑制のための冷却制御に関しては、溶融亜鉛メッキの例ではあるが、次の方法がこれまでに提案されている。

溶融亜鉛層の幅方向における温度分布の偏差を修正するために、鋼板の端縁部分を局部加熱する方法（特開昭48-84038号公報）、亜鉛粉吹付け位置の前後における鋼帯幅方向の温度分布を測定し、測定された幅方向温度分布から、該鋼帯の温度が全幅に亘って亜鉛の凝固温度より僅かに高くなるライン位置を算出し、適切な亜鉛粉の吹付け位置を決定する方法（特開平1-306547号公報）、スパングル微細化処理装置の前後に温度計を配置し、さらにスパングル冷却装置の前に加熱、冷却手段を配して、長手方向と幅方向の二次元温度分布を測定し、加熱冷却方法とスパングル微細化処理装置の位置を変更することにより、適切な温度分布を得る方法（特開平2-298248号公報）。

【0008】およびの方法はいずれも、溶融メッキ層の凝固直前に微細化処理を行うことができるように、メッキ鋼板表面温度を測定して微細化処理地点（冷却時期）を決定するものである。これらの方法は溶融Al-Zn合金メッキ鋼板のスパングル抑制にも十分に適用できる。

【0009】

【発明が解決しようとする課題】しかし、上記のようなメッキ後の冷却の制御方法を、溶融Al-Zn合金メッキに適用しても、最終的に得られたAl-Zn合金メッキ鋼板の表面、特に板幅方向の特定領域に、望ましくないスパングルが残ることが経験されてきた。即ち、従来の鋼板表面温度分布の測定による適切な冷却時期の決定や幅方向の冷却均一化は、スパングルの抑制にとって万全ではない。

【0010】よって本発明の目的は、スパングルを確実に抑制することのできる溶融Al-Zn合金メッキ鋼板の製造方法と製造装置を提供することである。具体的には、溶融Al-Zn合金メッキ時に、鋼板温度の適正な管理や適切な冷却時期の決定を行っても生じることがある、スパングルの残留または発生を確実に解消することのできる技術を開発することである。

【0011】

【課題を解決するための手段】本発明者らは、上述のように適切に冷却時期を決定しても溶融Al-Zn合金メッキ鋼板にスパングル残りが見られる原因について検討した。その結果、復熱により最終製品では粗いスパングル状になるか、局部的にスパングルが発生する場合があること、その原因としては、Al-Zn合金付着量が板幅方向に不均一であるため、板幅方向でAl-Zn合金付着量の多い部分が潜熱の量が大きく、従って復熱量も多くなり、部分的に凝固が遅れるからであること、を究明した。

【0012】このような不均一な復熱により板幅方向の一部で凝固が遅れると、その後にスパングル微細化処理を適切な時期に行ったとしても、凝固が遅れた部分では、メッキ層温度がなお微細化処理には高すぎ、微細化処理してもスパングルが残ることになる。従って、スパングルが板幅方向の全体にわたって抑制された溶融Al-Zn合金メッキ鋼板を確実に得るためには、適切な冷却時期の決定に加えて、復熱に対する配慮が必要である。

【0013】かくして、本発明は、微細化処理によりスパングルの抑制された溶融Al-Zn合金メッキ鋼板を製造する際に、鋼板に付着したAl-Zn合金の板幅方向の付着量を測定し、板幅方向で付着量の多い部分のみを過冷却することにより、微細化処理時に板幅方向の全幅に亘ってAl-Zn合金の凝固点直前からの均一冷却を可能にすることを基本的特徴とする。

【0014】即ち、本発明の要旨とするところは、溶融メッキ後、溶融メッキ層の凝固直前に微細化処理を行う、スパングルの抑制された溶融Al-Zn合金メッキ鋼板

の製造方法において、溶融メッキ後に長手方向の鋼板表面温度分布を計測して微細化処理地点を決定するとともに、幅方向におけるメッキ付着量の変化を計測し、平均値より付着量の大きい厚目付け領域を、微細化処理に先立って過冷却することを特徴とする、スパングルの抑制された溶融Al-Zn合金メッキ鋼板の製造方法である。

【0015】なお、ここで、過冷却とは、幅方向の他の部分（即ち、付着量が平均以下の部分）の冷却より冷却度を強めることを意味するが、具体的には、復熱に配慮して、他の部分の微細化処理装置到達時の目標温度に必要な冷却温度より1～5℃低くなるように冷却することである。

【0016】また、別の面からは、本発明は、溶融メッキ浴出側に、溶融メッキ鋼板の長手方向の表面温度計測手段、板幅方向のメッキ付着量を計測するメッキ付着量計測手段、該メッキ付着量計測手段によって厚目付け領域とされた領域を選択的に過冷却することのできる冷却手段、該冷却手段の下流に設けた可動型の微細化処理手段、および長手方向の鋼板温度分布および板幅方向のメッキ付着量に基づいて該冷却手段および該微細化処理手段を制御する演算装置を備えた、スパングルの抑制された溶融Al-Zn合金メッキ鋼板の製造装置である。

【0017】好適態様にあつては、この製造装置は、溶融メッキ浴出側の前記冷却手段より上流に、メッキ鋼板の加熱手段および別の冷却手段をさらに備え、これらの加熱手段および冷却手段も前記演算装置により制御される。

【0018】

【作用】前述したように、従来のスパングルが抑制された溶融Al-Zn合金メッキ鋼板の製造方法においても、微細化処理をメッキ層の凝固直前で行うように加熱、冷却、微細化処理地点の制御を行っている。しかし、従来は、溶融メッキ鋼板の幅方向のみ、或いは幅方向と長手方向の温度分布だけに注目して、これらの制御を行っていた。

【0019】例えば、上記の方法を実施するための溶融メッキ装置を図2に示す。この装置は、加熱用のバーナーボックス4、冷却用のクーラーボックス5、二次元温度測定用の放射温度計6、微細化処理装置7、および演算装置8を備えている。なお、1は溶融メッキ浴、2は鋼板、3はワイピングノズル、9はメッキ鋼板である。溶融メッキ浴1を出たメッキ鋼板9は、二次元温度測定装置6で幅方向と長手方向の温度が測定され、溶融メッキ層が凝固する直前に微細化処理を受けるように、加熱手段4または冷却手段5による加熱または冷却により鋼板温度を制御する。これらの測定、加熱、冷却のデータが演算装置8に送られ、板幅の全幅が凝固温度よりわずかに高温にある位置に微細化処理装置を移動させ、微細化処理を行う。

【0020】これに対して、本発明では、溶融メッキ鋼

板の付着量が幅方向に不均一であることに着目し、スパングルに対しては、付着量が平均値より大きい厚目付け領域における復熱が他の部分より大きく、この大きな復熱がスパングルに影響することを究明したのである。溶融メッキの付着量が幅方向で変動する理由としては、気体噴射ノズル間を通過する鋼板の形状不安定等によるものと推測される。

【0021】この復熱によるスパングルの発生を防止するために、本発明にあつては、微細化処理に先立って、メッキ鋼板の幅方向における厚目付け領域を検知し、その領域を特に過冷却して、微細化処理前後の復熱の影響を可及的に小とするのである。この時の過冷却の程度は、厚目付けの程度との関係で決定されるが、微細化処理時点での厚目付け領域の温度が、他の部分の温度と同じようになるように冷却すればよい。即ち、冷却から微細化処理までの間に起こる復熱の量はメッキ付着量に比例するので、それを相殺するように過冷却する。具体的には、前述したように、他の部分における微細化処理装置到達時の目標温度に必要な冷却温度より1～5℃低温になるように冷却すればよい。

【0022】従つて、本発明の溶融Al-Zn合金メッキ鋼板製造装置は、図1に示すように、図2に示した従来の溶融メッキ装置に対して、さらに幅方向の部分的な過冷却が可能な冷却手段(例、第2クーラーボックス10)と幅方向の溶融メッキ付着量計測手段11を付設すればよい。

【0023】かくして、本発明によれば、幅方向においてメッキ付着量の多い部分(厚目付け領域)だけを選択的に過冷却してから微細化処理を行うため、微細化処理時にはメッキ表面温度が鋼板の幅方向の全幅にわたって実質的に均一になっているので、微細化処理効果を全幅にわたって均一に達成することができ、幅方向で均一にスパングルが抑制された溶融Al-Zn合金メッキ鋼板を得ることができる。

【0024】これに対し、従来は、幅方向で冷却の程度を変化させないため、厚目付け領域での復熱量が大きくなり、適温より高温で微細化処理を受けることになって、微細化処理の効果が十分に得られず、スパングルの発生が起こつて、厚目付け領域にスパングルが残る。

【0025】過冷却のための冷却手段は、従来の冷却手段と同様でよいが、幅方向の冷却度の変化が可能なものでなければならない。また、微細化処理手段も制限がなく、空気、気水(微小水滴が混合状態となった気体)、薬液、被メッキ材であるAl-Zn合金より高融点の粉末(例、亜鉛粉末、金属酸化物粉末など)など、従来より用いてきた媒体を用いて実施することができる。

【0026】

【実施例】図1は、本発明にかかる溶融Al-Zn合金メッキ鋼板の製造装置の概略説明図である。以下、この図に基づき、本発明の実施例について説明する。

【0027】図1に示す本発明の装置においても、図2に示す従来装置と同様に、溶融Al-Zn合金メッキ浴1に浸漬された鋼板2は、浴から引き上げられると、ワイピングノズル3によって所定のメッキ付着量に調整される。次いで、溶融Al-Zn合金メッキ層が凝固する直前に微細化処理を行うように、鋼板をバーナーボックス4によって加熱するか、或いは第1クーラーボックス5において冷却することによって鋼板温度の調整を行う。この鋼板温度の調整は必須ではないが、このように加熱または冷却により鋼板温度をほぼ一定に調整することで、微細化処理装置7の位置の変動幅が小さくなり、微細化処理地点の制御が容易となるので、この温度調整を行うことが好ましい。

【0028】鋼板2の長手方向の温度分布は放射温度計6によって監視されており、それに基づいて上記の鋼板温度の調整のための加熱または冷却の程度が決定される。なお、幅方向の部分的な凝固の可能性を知るために、放射温度計6によってメッキ鋼板の長手方向だけでなく、幅方向の温度分布も同時に監視することが好ましい。そして、これらの加熱、冷却、および温度分布のデータはいずれも演算装置8に送られ、この演算装置によって微細化処理装置7の位置、つまり微細化処理地点が決定される。微細化処理装置7は可動型、即ち、溶融Al-Zn合金メッキ層が凝固する位置に応じて、通板ラインに沿った昇降により移動可能であり、この装置が溶融Al-Zn合金メッキ層の凝固直前の地点にくるように、必要な移動量が演算装置8の指令によって決定される。

【0029】本発明の溶融メッキ装置は、溶融メッキ鋼板9の幅方向のメッキ付着量の計測手段11を備えている。メッキ付着量は、蛍光X線などの分析手段により迅速に測定できる。このメッキ付着量計測手段の測定結果を演算装置8に送って、幅方向において平均付着量より付着量の大きい厚目付け領域を検出する。そして、その結果に基づいて、微細化処理装置7の上流側に設けた、幅方向に冷却度を変化させることができる第2クーラーボックス10を作動させる。従つて、付着量計測手段11の位置は、ワイピングノズル3と第2クーラーボックス10の間の任意の地点でよいが、好ましくはワイピングノズル3の直後である。

【0030】第2クーラーボックスは、付着量計測手段11の測定結果に基づいて検出された厚目付け領域に対しては、その過大な復熱量を相殺するように、具体的には目標温度より1～5℃低い温度に過冷却するように、幅方向に冷却度を変化させて、溶融メッキ層の冷却を行う。この冷却は、厚目付け領域のみを部分的に冷却する(他の部分は冷却しない)か、或いは厚目付け領域の冷却度を他の部分の冷却度より強めることによって行うことができる。例えば、第2クーラーボックス10は、鋼板の幅方向に沿って均等に区画された(例、1～50mm幅)多数の領域に1個づつ設置された多数のスプレーノズル

から構成することができる。その場合、厚目付け領域とされた区画のスプレーノズルだけから冷却媒体（例、空気、気水、薬液）をメッキ銅板に吹付けるか、或いはその区画のスプレーノズルの冷却媒体の吹付け量を他の区画での吹付け量より増大させることにより、厚目付け領域の過冷却を行うことができる。

【0031】このようにして厚目付け領域を選択的に過冷却してから、メッキ層の微細化処理装置を行う。微細化処理装置7は、凝固直前の溶融メッキ層に空気、気水、薬液、金属粉末などの適当な媒体を噴霧して、均一に急冷することにより、スパングルの抑制された銅板を製造する装置である。

【0032】微細化処理装置7の位置は、前述したように、放射温度計6により測定された銅板温度分布、バーナーボックス4もしくは第1クラーボックス5によるメッキ銅板の加熱もしくは冷却、さらには第2クラーボックス10による銅板の冷却、に関するデータを演算装置8に送って、溶融Al-Zn合金メッキ層が全幅にわたって未凝固で、かつ凝固する直前の位置にくるように決定する。そして、この演算装置8からの指令に基づいて、微細化処理装置7を通板ラインに沿って昇降（即ち、銅板進行方向と同方向または逆方法に移動）させて、上記の溶融メッキ層凝固直前の位置にセットする。

【0033】従来は、幅方向における不均一なメッキ付着量による復熱の影響を無視していたため、厚目付け領域では復熱による冷却不足の状態では微細化処理を受けることになり、微細化処理後もこの領域にスパングルが残ったメッキ表面となる。これに対し、本発明によれば、厚目付け領域のみを微細化処理装置の上流で過冷却するため、微細化処理装置までメッキ銅板が進行する間にこの領域において起こる相対的に大きな復熱が過冷却により相殺され、厚目付け領域における局所的な温度上昇（冷却不足）が避けられ、板幅方向の全幅にわたって均一に最適温度で微細化処理を受けさせることが可能となる。その結果、微細化処理の効果が全幅にわたって均一に発揮され、板幅方向に様にスパングルが抑制されたメッキ表面が得られる。なお、溶融メッキ銅板は、通常は両面メッキであるから、以上に説明した本発明にかかる制御されたメッキ方法を片面づつ独立して両面に対して行う。但し、片面メッキの場合、或いは1面だけを美しい表面にすればよい場合には、片面のみに対して上記の本発明の制御されたメッキ方法を適用してもよい。

【0034】図3(a)および(b)に、図1に示す本発明にかかる装置を使用して得た溶融Al-Zn合金メッキ銅板の厚目付け領域の形成および過冷却の様子を図式的に説明する。図示例では、板厚は0.5 mm、板幅は1219 mm、目標のメッキ付着量は片面当たり90 g/m²である。メッキ付着量計測手段11で測定された板幅方向の溶融Al-Zn合金メッキ層の付着量分布は、図3(a)に示す通りであ

り、二箇所の厚目付け領域、が検出された。一方、第2クラーボックス10は、図1(b)に示すように、板幅方向に均等な距離で配置された12個の水スプレーノズルA~Lを備えている。即ち、幅方向に12区画に均等分割して、各区画ごとに過冷却することができる。図示例では、検出された厚目付け領域、に対応する位置にあるスプレーノズルC、Iだけを作動させて冷却水をスプレーすることにより、厚目付け領域だけを選択的に過冷却してから、微細化処理を行った。

【0035】微細化処理後に最終的に得られた溶融Al-Zn合金メッキ銅板のメッキ外観、特にスパングル模様について、板幅方向をノズル位置A~Lに対応する12区画に分けて観察したが、いずれの区画もスパングルが十分に抑制されていた。一方、比較のために、上記の第2クラーボックスを全く作動させずに（従って、幅方向における選択的過冷却を行わずに）、同様溶融Al-Zn合金メッキ銅板を製造したところ、板幅方向における厚目付け領域、に対応する区画（即ち、ノズル位置C、Iに対応する区画）では、目視ではっきり認識できるスパングル模様が残っており、スパングルの抑制が不十分であった。

【0036】

【発明の効果】以上に説明したごとく、溶融メッキ層の凝固直前に微細化処理を行ってスパングルの抑制された溶融Al-Zn合金メッキ銅板を製造する際、本発明に従って、板幅方向の溶融メッキ付着量の変化を測定し、メッキ付着量の多い厚目付け領域のみを選択的に過冷却することにより、板幅方向に均一に全幅にわたってスパングルが抑制された、美しいメッキ表面が得られる。それにより、塗装銅板にした場合にも均一に塗装でき、塗装外観が向上する。

【図面の簡単な説明】

【図1】本発明にかかる、スパングルの抑制された溶融Al-Zn合金メッキ銅板の製造装置の概略説明図である。

【図2】従来の同様の装置の概略説明図である。

【図3】図3(a)、(b)は、それぞれ、図1に示す本発明にかかる装置を使用して得た溶融Al-Zn合金メッキ銅板の厚目付け領域の形成および過冷却の様子を図式的に説明する図である。

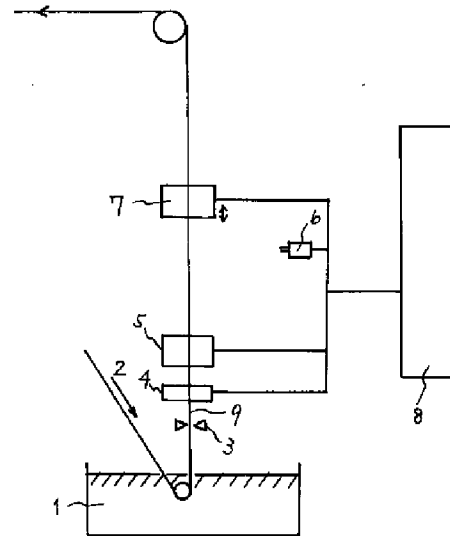
【符号の説明】

- 1：溶融メッキ浴
- 2：銅板
- 3：ワイピングノズル
- 4：バーナーボックス
- 5：第1クラーボックス
- 6：放射温度計
- 7：微細化処理装置
- 8：演算装置
- 9：溶融メッキ銅板
- 10：第2クラーボックス

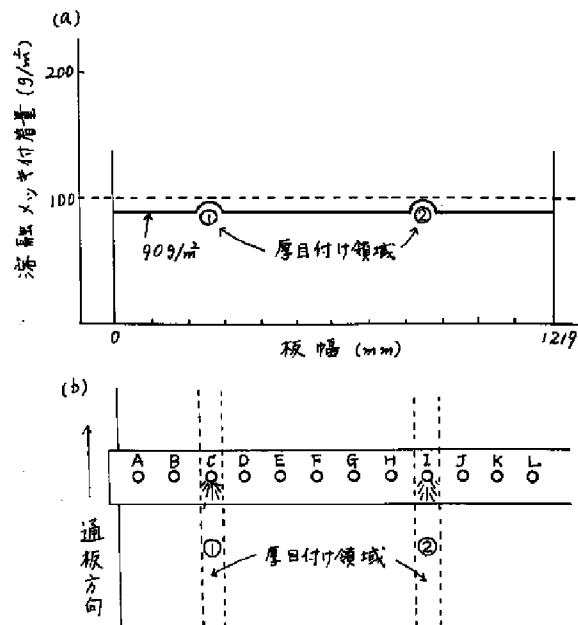
11: 板幅方向メッキ付着量計測手段

【図1】

【図2】



【図3】



ERROR: undefined
OFFENDING COMMAND: eexec

STACK:

/quit
-dictionary-
-mark-

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	16413799
	Filing Date	2019-05-16
	First Named Inventor	Pascal DRILLET
	Art Unit	
	Examiner Name	SCHLEIS, DANIEL J
	Attorney Docket Number	20631.1028CON5

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	2	4257549	A	1981-03-24	ROBERTSON CO H H			
	3	5495736	A	1996-03-05	Nishi et al.			
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Examiner Initial*	Cite No	Publication Number	Kind Code ¹	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear		
	1	20020114884	A1	2002-08-22	FRIEDERSDORF FRITZ J et al.			
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	1	19749706	DE	C1	1999-03-04	MANNESMANN AG	See English Abstract and EPO machine translation	

**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**
(Not for submission under 37 CFR 1.99)

Application Number		16413799
Filing Date		2019-05-16
First Named Inventor	Pascal DRILLET	
Art Unit		
Examiner Name	SCHLEIS, DANIEL J	
Attorney Docket Number	20631.1028CON5	

2	0724919	EP	A2	1996-08-07	HITACHI LTD	In English	
3	1657004	EP	A1	2006-05-17	ARVEDI GIOVANNI	In English	
4	2573226	CA	A1	2006-01-19	NIPPON STEEL CORP	In English	
5	0692549	EP	A1	1996-01-17	UNITAS SA	In English	
6	1063314	EP	A1	2000-12-27	KAWASAKI STEEL CO	In English	
7	2720079	FR	A1	1995-11-24	LORRAINE LAMINAGE	See English Abstract and EPO machine translation	
8	622697	AU	B2	1992-04-16	ARMCO INC	In English	
9	H08144037	JP	A	1996-06-04	SUMITOMO METAL IND	See English Abstract and EPO machine translation	
10							
11							
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Attorney Docket Number	20631.1028CON5

13							
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NON-PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T ⁵
	1	Stahl und Eisen 120 (2000) Nr. 8, Seiten 51 bis 56, "Die neue Verzinkungsanlage 2 bei Eko Stahl", "The new No. 2 hot-dip galvanizing line at Eko Stahl", Autoren: Karl Döring, Jürgen Nathow, Dietrich Kern, Michael Breiter und Dietmar Lowenberg.	
	2	Andrews, K.W. Empirical Formulae for the Calculation of Some Transformation Temperatures. Journal of the Iron and Steel Institute, 203, Part 7, July 1965, 721-727.	
	3	Enlarged Fig. 7 of U.S. 16413825 (present application)	
	4	Low Carbon, Heat-Treatable Boron Steel - Uncoated or Aluminized PreCoated, GM Worldwide Engineering Standards, GMW14400.	
	5	Patent Trial and Appeal Board Final Decision in IPR2019-01275, US 9708683, dated January 5, 2021	
	6	Gokhale, Arun M., "Report on quantitative characterization of the microstructure of Aluminium alloy surface coating on hot-stamped US BOR 1500 steel blanks" School of Materials Science and Engineering, Georgia Institute of Technology, 13 May 2019	
	7	Fan, Dong Wei et al., "Formation of an Aluminide Coating on Hot Stamped Steel" ISIJ International, Vol. 50, No. 11, 2010, pp 1713-1718	
	8	Summons in EP proceeding for EP 09701846, dated 11/18/2016	

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First Named Inventor	Pascal DRILLET
Art Unit	
Examiner Name	SCHLEIS, DANIEL J
Attorney Docket Number	20631.1028CON5

9	Bourouga, Brahim, "Report on the heating of coated steel blanks for hot stamping" Laboratoire de thermique et engerie de Nantes, 30 Aprill 2019
10	Imose, Masayuki, "Heating and Cooling Technology in the Continuous Annealing" Transactions ISIJ, Vol. 25, 1985, 911-932
11	Kolleck, R. et al., "Investigation on induction heating for hot stamping of boron alloyed steel" CIRP Annals - Manufacturing Technology 58, (2009), 275-278
12	Kahl, Martin, "Some like it hot" Technology focus - Hot stamping, September/October 2004 AMS
13	Self-study programme 339, The Passat 2006

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EXAMINER SIGNATURE

Examiner Signature		Date Considered	
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***EXAMINER:** Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.

**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**
(Not for submission under 37 CFR 1.99)

Application Number	16413799
Filing Date	2019-05-16
First Named Inventor	Pascal DRILLET
Art Unit	
Examiner Name	SCHLEIS, DANIEL J
Attorney Docket Number	20631.1028CON5

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/William C. Gehris/	Date (YYYY-MM-DD)	2021-01-07
Name/Print	William C. Gehris	Registration Number	38,156

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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IN THE UNITED STATES PATENT & TRADEMARK OFFICE

Application of: ARCELORMITTAL
Inventor(s): Drillet et al.
Application No.: 16/413,799
Filed: May 16, 2019
Attorney Docket No.: 20631.1028CON5
Confirmation No.: 7637
Examiner: Daniel J. Schleis
Title: Coated Steel Strips, Coated Stamped Products and Methods

Submitted electronically via EFS-WEB

January 8, 2021

RCE AND RESPONSE TO FINAL OFFICE ACTION

Dear Sir or Madam:

In response to the Final Office Action dated July 10, 2020, please re-consider the above-identified patent application based on the following:

IN THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1 to 47 (canceled).

Claim 48 (previously presented): A precoated steel product comprising:

a strip of base steel having a first side and a second side; and
a coating on at least one of the first side of the strip of base steel and the second side of the strip of base steel, wherein the coating results from interdiffusion between the base steel, and an aluminum or aluminum alloy pre-coating, and wherein the coating includes, proceeding from the base steel outwards:

- (a) an interdiffusion layer having a first mean iron composition,
 - (b) an intermediate layer having a second mean iron composition different from the first mean iron composition,
 - (c) an intermetallic layer having a third mean iron composition different from the first and second mean iron compositions, the third mean iron composition being higher than the second mean iron composition; and
 - (d) a superficial layer having a fourth mean iron composition different from the third mean iron composition,
- wherein the coating has a thickness greater than 30 micrometers.

Claim 49 (previously presented): The precoated steel product as recited in claim 48 wherein the layers (c) and (d) are quasi continuous by occupying at least 90% of a level corresponding to each of the layers (c) and (d) and wherein less than 10% of layer (c) is present at an extreme surface of the product.

Claim 50 (previously presented): The precoated steel product as recited in claim 48 wherein the base steel includes the following components by weight based on total weight:

- 0.15%<carbon<0.5%;
- 0.5%<manganese<3%;

0.1%<silicon<0.5%;
0.01%<chromium<1%;
titanium<0.2%;
aluminum<0.1%;
phosphorus<0.1%;
sulfur<0.05%;
0.0005%<boron<0.08%;
and further comprises iron and impurities inherent in processing.

Claim 51 (previously presented): The precoated steel product as recited in claim 48 wherein the base steel comprises the following components by weight based on total weight:

0.20%<carbon<0.5%;
0.8%<manganese<1.5%;
0.1%<silicon<0.35%;
0.01%<chromium<1%;
titanium<0.1%;
aluminum<0.1%;
phosphorus<0.05%;
sulfur<0.03%;
0.0005%<boron<0.01%;
and further comprises iron and impurities inherent in processing.

Claim 52 (previously presented): The precoated steel product as recited in claim 48 wherein the base steel comprises 20 ppm or less of sulfur.

Claim 53 (previously presented): The precoated steel product as recited in claim 49 wherein the base steel comprises 20 ppm or less of sulfur.

Claim 54 (previously presented): The precoated steel product as recited in claim 48 wherein a ratio of titanium to nitrogen in the base steel in weight % is in excess of 3.42.

Claim 55 (previously presented): The precoated steel product as recited in claim 49 wherein a ratio of titanium to nitrogen in the base steel in weight % is in excess of 3.42.

Claim 56 (previously presented): The precoated steel product as recited in claim 48 wherein the layer (a) has a thickness less than 15 micrometers.

Claim 57 (previously presented): The precoated steel product as recited in claim 48 wherein the layer (a) has a thickness less than 10 micrometers.

Claim 58 (previously presented): The precoated steel product as recited in claim 48 wherein the interdiffusion layer comprises the following components by weight based on total weight: 86 to 95% Fe, 4 to 10% Al, and 0 to 5% Si.

Claim 59 (previously presented): The precoated steel product as recited in claim 48 wherein the intermediate layer comprises the following components by weight based on total weight: 39 to 47% Fe, 53 to 61% Al, and 0 to 2% Si.

Claim 60 (previously presented): The precoated steel product as recited in claim 48 wherein the intermetallic layer comprises the following components by weight based on total weight: 62 to 67% Fe, 30 to 34% Al, and 2 to 6% Si.

Claim 61 (previously presented): The precoated steel product as recited in claim 48 wherein the superficial layer comprises the following components by weight based on total weight: 39 to 47% Fe, 53 to 61% Al, and 0 to 2% Si.

Claim 62 (previously presented): The precoated steel product as recited in claim 58 wherein the intermediate layer comprises the following components by weight based on total weight: 39 to 47% Fe, 53 to 61% Al, and 0 to 2% Si.

Claim 63 (previously presented): The precoated steel product as recited in claim 62 wherein the intermetallic layer comprises the following components by weight based on total weight: 62 to 67% Fe, 30 to 34% Al, and 2 to 6% Si.

Claim 64 (previously presented): The precoated steel product as recited in claim 63 wherein the superficial layer comprises the following components by weight based on total weight: 39 to 47% Fe, 53 to 61% Al, and 0 to 2% Si.

Claim 65 (previously presented): The precoated steel product as recited in claim 48 wherein the interdiffusion layer has a thickness of from 1 micron to 15 microns.

Claim 66 (previously presented): The precoated steel product as recited in claim 48 wherein the first mean iron composition is 90 percent, the second mean iron composition is 43 percent, the third mean iron composition is 63 percent and the fourth mean iron composition is 45 percent.

Claim 67 (previously presented): The precoated steel product as recited in claim 48 wherein the fourth mean iron composition is lower than the third mean iron composition.

Claim 68 (previously presented): A precoated steel product comprising:

a strip of base steel having a first side and a second side; and
a coating on at least one of the first side of the strip of base steel and the second side of the strip of base steel, wherein the coating results from interdiffusion between the base steel, and an aluminum or aluminum alloy pre-coating, and wherein the coating includes, proceeding from the base steel outwards:

- (a) an interdiffusion layer having a first mean iron composition,
- (b) an intermediate layer having a second mean iron composition different from the first mean iron composition,
- (c) an intermetallic layer having a third mean iron composition different from the first and second mean iron compositions, the third mean iron concentration being higher than the second mean iron composition, and

(d) a superficial layer having a fourth mean iron composition different from the first, second and third mean iron compositions,
wherein the coating has a thickness greater than 30 micrometers.

Claim 69 (previously presented): The precoated steel product as recited in claim 68 wherein the fourth mean iron composition is lower than the third mean iron composition.

Claim 70 (previously presented): The precoated steel product as recited in claim 69 wherein the fourth mean iron composition is higher than the second mean iron composition.

Claim 71 (previously presented): A precoated steel product comprising:
a strip of base steel having a first side and a second side; and
a coating on at least one of the first side of the strip of base steel and the second side of the strip of base steel, wherein the coating results from interdiffusion between the base steel, and an aluminum or aluminum alloy pre-coating, and wherein the coating includes, proceeding from the base steel outwards:

(a) an interdiffusion layer having a first mean aluminum composition,
(b) an intermediate layer having a second mean aluminum composition different from the first mean aluminum composition,
(c) an intermetallic layer having a third mean aluminum composition different from the first and second mean aluminum compositions, and
(d) a superficial layer having a fourth mean aluminum composition different from the first, second and third mean aluminum compositions, the second mean aluminum composition being greater than the third mean aluminum composition;
wherein the coating has a thickness greater than 30 micrometers.

Claim 72 (previously presented): The precoated steel product as recited in claim 71 wherein the fourth mean aluminum composition is less than the second mean aluminum composition.

Claim 73 (previously presented): The precoated steel product as recited in claim 71 wherein the layer (a) has a thickness less than 15 micrometers.

Claim 74 (previously presented): The precoated steel product as recited in claim 71 wherein the interdiffusion layer comprises the following components by weight based on total weight: 86 to 95% Fe, 4 to 10% Al, and 0 to 5% Si.

Claim 75 (previously presented): The precoated steel product as recited in claim 71 wherein the intermediate layer comprises the following components by weight based on total weight: 39 to 47% Fe, 53 to 61% Al, and 0 to 2% Si.

Claim 76 (previously presented): The precoated steel product as recited in claim 71 wherein the intermetallic layer comprises the following components by weight based on total weight: 62 to 67% Fe, 30 to 34% Al, and 2 to 6% Si.

Claim 77 (previously presented): The precoated steel product as recited in claim 71 wherein the superficial layer comprises the following components by weight based on total weight: 39 to 47% Fe, 53 to 61% Al, and 0 to 2% Si.

REMARKS

This paper is submitted in response to the Final Office Action dated July 10, 2020.
Claims 48 to 77 are pending.

Claims 48-50 and 54-77 stand rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over U.S. Patent Number 6,296,805 (Laurent); and claims 51-53 stand rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Laurent.

Claims 48, 68, and 71 are independent claims. Each of the independent recites a strip of based steel having a coating on one or both sides where " the coating results from interdiffusion between the base steel, and an aluminum or aluminum alloy pre-coating." Each claim also specifies that the coating has a thickness greater than 30 micrometers. The claims differ in the claimed layers in the coating, where:

In claim 48: "the coating includes, proceeding from the base steel outwards:

- (a) an *interdiffusion layer* having a *first mean iron* composition,
- (b) an *intermediate layer* having a *second mean iron* composition *different from* the *first mean iron* composition,
- (c) an *intermetallic layer* having a *third mean iron* composition *different from* the *first and second mean iron* compositions, the *third mean iron* composition *being higher than* the *second mean iron* composition; and
- (d) a *superficial layer* having a *fourth mean iron* composition *different from* the *third mean iron* composition"

In claim 68: "the coating includes, proceeding from the base steel outwards:

- (a) an *interdiffusion layer* having a *first mean iron* composition,
- (b) an *intermediate layer* having a *second mean iron* composition *different from* the *first mean iron* composition,
- (c) an *intermetallic layer* having a *third mean iron* composition *different from* the *first and second mean iron* compositions, the *third mean iron* concentration *being higher than* the *second mean iron* composition, and
- (d) a *superficial layer* having a *fourth mean iron* composition *different from* the *first, second and third mean iron* compositions,

In claim 71: " the coating includes, proceeding from the base steel outwards:

- (a) an *interdiffusion layer* having a *first mean aluminum* composition,
- (b) an *intermediate layer* having a *second mean aluminum* composition *different from* the *first mean aluminum* composition,

(c) *an intermetallic layer having a third mean aluminum composition different from the first and second mean aluminum compositions, and*
(d) *a superficial layer having a fourth mean aluminum composition different from the first, second and third mean aluminum compositions, the second mean aluminum composition being greater than the third mean aluminum composition*"

The Examiner concedes that Laurent does not disclose a coating resulting "from interdiffusion between the base steel, and an aluminum or aluminum alloy pre-coating" that has four layers in the claimed arrangement (interdiffusion, intermediate, intermetallic, superficial), or that such layers would have the specifically claimed mean iron or mean aluminum compositions. Indeed, at best, Laurent discloses a two layered coating. (col. 3, lines 15-23).

Instead, at pages 4-5 of the Final Office Action the Examiner contends that the Laurent "process appears to be identical or substantially identical to the process set forth in the specification of the instant application, which produces the claimed product," citing Laurent at col. 1, lines 6-8 and 47-64, col. 2, lines 37-45, col. 3, lines 26-44 and 61-65, and col. 4, lines 4-9. The Examiner alleges that "[w]here the claimed and prior art products are identical or substantially identical, or are produced by identical or substantially identical processes, the Office can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of the claimed product." Final Office Action, p. 6. In making this assertion, the Examiner relies, inter alia, on the discussion of an "increase in temperature to an excess of 5° C/second" (col. 3, lines 26-29) and heat treatment of a 1 mm thick coated sheet at "900 C for 5 min" (column 4, lines 8-9), which the Examiner alleges is substantially the same as the process disclosed in the present application, citing to paragraph [0059] thereof..

Applicant respectfully traverses. First, the process of Laurent is not "identical or substantially identical to the process set forth in the specification of the instant application."

The process of Laurent comprises:

- Shaping the coated steel sheet to form a "casting" (col.3, line 26, claims 4 and 11);
- Then heating the coating at a heating rate of 5-600°C/s (col.2, lines 23-25, col.3, lines 26-31, claims 4 and 11) to a temperature higher than 750°C (col. 2, line 28, claim 12), for example 900°C for 5 min for a 1 mm thick sheet (col. 4, lines 4-9); and

- Cooling with a cooling rate of at least 27°C/s. (col. 4, lines 2-9).

For the reasons detailed below, this process of Laurent is not "identical or substantially identical to the process set forth in the specification of the instant application," at least because:

(i) no hot-stamping is performed after heating to the temperature higher than 750° C, for example 900° C;

(ii) no hot-stamping is performed after the heating rate of 5-600° C/s is applied;

(iii) the heating rate is not Vc according to the cited passages of the present application because the heating rate of 5-600 C/s is from room temperature to the final heating temperature (e.g. a temperature higher than 750°C (col. 2, line 28, claim 12), for example 900°C), and not between 20-700°C/s as in the process described in the present application; and

(iv) the cited heating of 900°C for 5 min for a 1 mm thick sheet is not according to the limits of diagram "ABCD" at least because the referenced 5 minutes refers not to the dwell time of diagram "ABCD", but rather to the total time in the furnace.

This process is therefore not according to the process described in the present application.

First, applicant points out that although Laurent discloses that hot-shaping may be performed on the sheet of Laurent (col. 1, lines 44-46, col. 2, lines 49-52, col. 3, lines 56-59), Laurent does not provide any detail regarding the hot-shaping process, and this process is not performed after the heating rates cited by the Examiner.

In particular, the heat treatment at 900 C for 5 mins in Laurent is not followed by hot stamping, as in the process described in the present application. Further, and independently, the process of Laurent lacks the **heating rate Vc** during the heat treatment, which applicant's specification explains at paragraph [0059] is critical to obtaining the layer disposition in combination to furnace temperature and dwell time:

[0059] For sheets of total thicknesses greater or equal to 0.7 mm, and less than or equal to 1.5 mm, the preferred treatment conditions: (furnace temperature, total dwell time in the furnace) are illustrated in FIG. 7 by conditions lying within the limits of diagram "ABCD" For sheets of total thicknesses greater than 1.5 mm, and less than or equal to 3 mm, the preferred treatment conditions: (furnace temperature, total dwell time in the furnace) are illustrated in FIG. 7 by diagram "EFGH". **The heating rate Vc is comprised between 4 and 12° C./s for producing a favorable alloyed layer disposition. In this**

regard, this "heating rate" reflects the temperature rise which is experienced by the pre-coated steel upon being located in the preheated furnace. Vc is defined as the mean heating rate between 20 and 700° C. The inventors have discovered that the control of Vc in this precise range is a key factor, because it controls directly the nature and the morphology of the alloyed layers which are formed. It is here underlined that the heating rate Vc is different from the mean heating rate, which is the heating rate between room temperature and furnace temperature.

In alleging that Laurent includes the heating rate Vc, the Examiner cites to col 3, lines 26-29 as describing that "[a]fter the shaping of a casting the coating is subjected to an increase in temperature to an excess of 5° C/second, which may exceed 600 C/second." However, the referenced heating cannot be compared to Vc for a number of reasons.

First, the cited passage of Laurent at col 3, lines 26-29 is discussing a heating rate increase in "excess of 5° C/second, which may exceed 600 C/second" in reference to heating after a forming operation:

The first alloy layer may crack when the sheet is shaped for the manufacture of castings.

According to the invention, after the shaping of the casting, the coating is subjected to an increase in temperature at a speed in excess of 5° C./second, which may exceed 600° C./second. This rise in temperature makes possible a rapid remelting of the aluminum which fills in the cracks generated by the operation of shaping of the casting.

Thus, the heating rate of 5-600° C/s disclosed by Laurent expressly does not apply to the hot-shaping process described in the present application, and thus this heating rate in Laurent is not part of a process that is "identical or substantially identical to the process set forth in the specification of the instant application, which produces the claimed product," as alleged by the Examiner. (Office Action, p. 5).

Rather, Laurent discloses on column 3, lines 26-29, as well as in claims 4, 6, 8, 10 and 11 that the increase in temperature at a rate of at least 5°C/s, preferably at least 600°C/s is performed after the shaping.

And indeed, Laurent stresses that this heating rate is especially designed to allow remelting the aluminum coating which fills the cracks which were generated during the shaping operation, see col.3, 1.26-31:

According to the invention, after the shaping of the casting, the coating is subjected to an increase in temperature at a speed in excess of 5.degree. C./second, which may exceed 600.degree. C./second. This rise in temperature makes possible a rapid remelting of the aluminum which fills in the cracks generated by the operation of shaping of the casting

Therefore, the heating rate of 5 to 600°C/s disclosed by Laurent is not the heating rate before hot-stamping and is not transposable to the hot-shaping process.

There is no indication that this process forms to claimed four layer structure, or that the referenced 4 ° C /second has any relation to the Vc used in the completely different process for obtaining the claimed four layer structure is the heat treatment discussed at paragraph [0059] quoted above. Thus, the heating rate in Laurent is not part of a process that is "identical or substantially identical to the process set forth in the specification of the instant application, which produces the claimed product," as alleged by the Examiner. (Office Action, p. 5).

Second, and independently, even if Laurent had disclosed a heating rate prior to hot-stamping of at least 5°C/s, Laurent would still not disclose nor even suggest a process implementing a specific heating rate in the temperature range 20-700°C comprised between 4 and 12°C/s.

In particular, the heating rate mentioned in Laurent, after shaping, is the mean heating rate between room temperature and the final heating temperature. The present specification is express in stating that this is not Vc:

The heating rate Vc is comprised between 4 and 12° C./s for producing a favorable alloyed layer disposition. In this regard, this "heating rate" reflects the temperature rise which is experienced by the pre-coated steel upon being located in the preheated furnace. Vc is defined as the mean heating rate between 20 and 700° C. The inventors have discovered that the control of Vc in this precise range is a key factor, because it controls directly the nature and the morphology of the alloyed layers which are formed. It is here underlined that the heating rate Vc is different from the mean heating rate, which is the heating rate between room temperature and furnace temperature.

It is therefore clear that the heating rate in Laurent does not correspond V_c , which is the mean heating rate between 20°C and 700°C. Accordingly, having a mean heating rate to the final heating temperature of at least 5°C/s cannot lead to any conclusion as to V_c . For this reason as well, the heating rate in Laurent is not part of a process that is "identical or substantially identical to the process set forth in the specification of the instant application, which produces the claimed product," as alleged by the Examiner. (Office Action, p. 5).

Finally, Laurent also fails to disclose the combination of heating temperature and time disclosed in the present application. Indeed, Laurent discloses, as an example, an austenitizing at 900°C for 5 min for a 1 mm thick sheet (col.4, line 8). First, Laurent does not disclose that this austenitizing is performed in a hot stamping process. Rather, the paragraph in which this austenitization is disclosed does not mention any hot stamping step, and rather seems to relate to the embodiment of Laurent wherein the heating is performed after stamping. This is confirmed by col.2, lines 27-28 which stress that the heating above 750°C, which corresponds to the heating above 750°C disclosed in the paragraph bridging columns 3 and 4, is performed on the "casting" therefore after shaping. In any event, Laurent does not disclose any dwell time, but merely discloses a holding time of 5 min. Therefore, Laurent does not disclose the temperature/time diagram of the process of the application, and for this reason as well, does not describe a process that is "identical or substantially identical to the process set forth in the specification of the instant application, which produces the claimed product," as alleged by the Examiner. (Office Action, p. 5).

Accordingly, in view of the fact that the process described in Laurent is not substantially the same as the process described in the present specification for the created the claimed four layer arrangement, and that there is no indication whatsoever that Laurent provides the claimed four layer arrangement, and in fact, discusses at most two layers (col. 3, lines 15-31), withdrawal of the Examiners rejections under 35 U.S.C. §§ 102 and 103 is respectfully requested.

Information Disclosure Statement

An information disclosure statement is submitted herewith.

It is respectfully submitted that the application is in condition for allowance and applicants respectfully request such action

If any fees are deemed to be due at this time, the Assistant Commissioner is authorized to charge payment of the same to Deposit Account No. 50-0552.

Respectfully submitted,
DAVIDSON, DAVIDSON & KAPPEL, LLC

By: /Cary Kappel/
Cary Kappel, Reg. No. 36,561

Davidson, Davidson & Kappel, LLC
589 Eighth Ave, 22nd Floor
New York, New York 10018

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a)		Docket Number (Optional) 20631.1028CON5
Application Number 16413799	Filed 05-16-2019	
For Coated Steel Strips, Coated Stamped Products and Methods		
Art Unit 7637	Examiner SCHLEIS, DANIEL J	

This is a request under the provisions of 37 CFR 1.136(a) to extend the period for filing a reply in the above-identified application.

The requested extension and fee are as follows (check time period desired and enter the appropriate fee below):

	<u>Fee</u>	<u>Small Entity Fee</u>	<u>Micro Entity Fee</u>	
☐ One month (37 CFR 1.17(a)(1))	\$220	\$110	\$55	\$ _____
☐ Two months (37 CFR 1.17(a)(2))	\$640	\$320	\$160	\$ _____
☒ Three months (37 CFR 1.17(a)(3))	\$1,480	\$740	\$370	\$ 1480
☐ Four months (37 CFR 1.17(a)(4))	\$2,320	\$1,160	\$580	\$ _____
☐ Five months (37 CFR 1.17(a)(5))	\$3,160	\$1,580	\$790	\$ _____

☐ Applicant asserts small entity status. See 37 CFR 1.27.☐ Applicant certifies micro entity status. See 37 CFR 1.29.
Form PTO/SB/15A or B or equivalent must either be enclosed or have been submitted previously.☐ A check in the amount of the fee is enclosed.☐ Payment by credit card. Form PTO-2038 is attached.☒ The Director has already been authorized to charge fees in this application to a Deposit Account.☒ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment, to
Deposit Account Number 500552.☒ Payment made via EFS-Web.**WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.**

I am the

☐ applicant.☒ attorney or agent of record. Registration number 38156.☐ attorney or agent acting under 37 CFR 1.34. Registration number _____./williamcgehris/

Signature

January 8, 2021

Date

William C. Gehris

Typed or printed name

212 736 1940

Telephone Number

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. Submit multiple forms if more than one signature is required, see below*.☐ * Total of _____ forms are submitted.

This collection of information is required by 37 CFR 1.136(a). The information is required to obtain or retain a benefit by the public, which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 6 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Mail Stop PCT, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

23280 7590 02/09/2021
Davidson, Davidson & Kappel, LLC
589 8th Avenue
22nd Floor
New York, NY 10018

EXAMINER

SCHLEIS, DANIEL J

ART UNIT

PAPER NUMBER

1784

DATE MAILED: 02/09/2021

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/413,799	05/16/2019	Pascal DRILLET	20631.1028CON5	7637

TITLE OF INVENTION: Coated Steel Strips, Coated Stamped Products and Methods

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$1200	\$0.00	\$0.00	\$1200	05/10/2021

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at www.uspto.gov/PatentMaintenanceFees.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

23280 7590 02/09/2021
Davidson, Davidson & Kappel, LLC
589 8th Avenue
22nd Floor
New York, NY 10018

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/413,799	05/16/2019	Pascal DRILLET	20631.1028CON5	7637

TITLE OF INVENTION: Coated Steel Strips, Coated Stamped Products and Methods

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$1200	\$0.00	\$0.00	\$1200	05/10/2021

EXAMINER	ART UNIT	CLASS-SUBCLASS
SCHLEIS, DANIEL J	1784	428-653000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-09 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,

1 _____

(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

2 _____

3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. Fees submitted: ☐ Issue Fee ☐ Publication Fee (if required) ☐ Advance Order - # of Copies _____

4b. Method of Payment: (Please first reapply any previously paid fee shown above)

☐ Electronic Payment via EFS-Web ☐ Enclosed check ☐ Non-electronic payment by credit card (Attach form PTO-2038)

☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. _____

5. Change in Entity Status (from status indicated above)

☐ Applicant certifying micro entity status. See 37 CFR 1.29

☐ Applicant asserting small entity status. See 37 CFR 1.27

☐ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____

Date _____

Typed or printed name _____

Registration No. _____



UNITED STATES PATENT AND TRADEMARK OFFICE

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/413,799	05/16/2019	Pascal DRILLET	20631.1028CON5	7637
23280	7590	02/09/2021	EXAMINER	
Davidson, Davidson & Kappel, LLC			SCHLEIS, DANIEL J	
589 8th Avenue			ART UNIT	
22nd Floor			PAPER NUMBER	
New York, NY 10018			1784	

DATE MAILED: 02/09/2021

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.** Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b) (2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Notice of Allowability	Application No. 16/413,799	Applicant(s) DRILLET et al.	
	Examiner Daniel J Schleis	Art Unit 1784	AIA (FITF) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to RCE filed 01/08/2021.
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☒ The allowed claim(s) is/are 48-77. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a) ☐ All b) ☐ Some *c) ☐ None of the:

1. ☐ Certified copies of the priority documents have been received.

2. ☐ Certified copies of the priority documents have been received in Application No. _____.

3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)	5. ☐ Examiner's Amendment/Comment
2. ☒ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date <u>01/08/2021</u> .	6. ☒ Examiner's Statement of Reasons for Allowance
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.	7. ☐ Other _____.
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date. _____.	

/Daniel J. Schleis/ Primary Examiner, Art Unit 1784	
--	--

Reasons for Allowance

The following is an examiner's statement of reasons for allowance:

A search of the prior art failed to turn up a single reference or an appropriate combination of references that teaches each and every claimed limitation. In particular, the precoated steel product with the coating having the interdiffusion layer, intermediate layer, intermetallic layer, and superficial layer with a thickness greater than 30 micrometers and having the claimed iron compositions, in particular the intermetallic layer having a third mean composition being higher than the second mean iron composition.

As set forth in Applicant's remarks submitted on 8 January 2021, the previously applied prior art does not teach a process that is identical or substantially identical to that of the instant application. In particular, the prior art has no hot stamping with the parameters required to produce the claimed product, including the particular heating parameters. Accordingly, Applicant's remarks are persuasive and the previously applied prior art rejections are withdrawn.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel J Schleis whose telephone number is (571)270-5636. The examiner can normally be reached on 10 AM to 4 PM Monday through Friday.

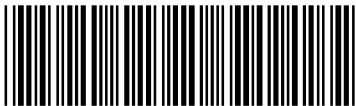
Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at <http://www.uspto.gov/interviewpractice>.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Humera Sheikh can be reached on (571) 272-0604. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Daniel J. Schleis
Primary Examiner
Art Unit 1784

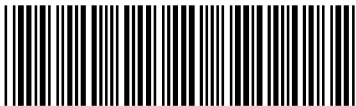
/Daniel J. Schleis/
Primary Examiner, Art Unit 1784

Issue Classification 	Application/Control No. 16/413,799	Applicant(s)/Patent Under Reexamination DRILLET et al.
	Examiner Daniel J Schleis	Art Unit 1784

CPC						
Symbol					Type	Version
C21D	/	9	/	46	F	2013-01-01
B32B	/	15	/	012	I	2013-01-01
C23C	/	2	/	12	I	2013-01-01
C23C	/	2	/	26	I	2013-01-01
C23C	/	2	/	40	I	2013-01-01
Y10T	/	428	/	12389	A	2015-01-15
Y10T	/	428	/	12396	A	2015-01-15
Y10T	/	428	/	12757	A	2015-01-15

CPC Combination Sets				
Symbol	Type	Set	Ranking	Version
/				

NONE (Assistant Examiner) _____ (Date) _____		Total Claims Allowed: 30	
/Daniel J. Schleis/ Primary Examiner, Art Unit 1784 (Primary Examiner) _____ (Date) _____		30 January 2021 O.G. Print Claim(s) 1	O.G. Print Figure 48

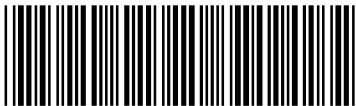
Issue Classification 	Application/Control No. 16/413,799	Applicant(s)/Patent Under Reexamination DRILLET et al.
	Examiner Daniel J Schleis	Art Unit 1784

INTERNATIONAL CLASSIFICATION			
CLAIMED			
C21D	/	9	/ 46
NON-CLAIMED			
/	/		

US ORIGINAL CLASSIFICATION	
CLASS	SUBCLASS
428	653

CROSS REFERENCES(S)						
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)					

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	30	
/Daniel J. Schleis/ Primary Examiner, Art Unit 1784	30 January 2021	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	48

Issue Classification 	Application/Control No. 16/413,799	Applicant(s)/Patent Under Reexamination DRILLET et al.
	Examiner Daniel J Schleis	Art Unit 1784

☒ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47
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CLAIMS															
Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	48	10	57	19	66	28	75								
2	49	11	58	20	67	29	76								
3	50	12	59	21	68	30	77								
4	51	13	60	22	69										
5	52	14	61	23	70										
6	53	15	62	24	71										
7	54	16	63	25	72										
8	55	17	64	26	73										
9	56	18	65	27	74										

NONE (Assistant Examiner) _____ (Date) _____		Total Claims Allowed: 30	
/Daniel J. Schleis/ Primary Examiner, Art Unit 1784 (Primary Examiner) _____ (Date) _____		30 January 2021 (Date)	O.G. Print Claim(s) 1 O.G. Print Figure 48

<i>Index of Claims</i> 	Application/Control No. 16/413,799	Applicant(s)/Patent Under Reexamination DRILLET et al.
	Examiner Daniel J Schleis	Art Unit 1784

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS										
☒ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47										
CLAIM			DATE							
Final	Original	01/29/2021								
1	48	=								
2	49	=								
3	50	=								
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30	77	=								

<i>Search Notes</i> 	Application/Control No. 16/413,799	Applicant(s)/Patent Under Reexamination DRILLET et al.
	Examiner Daniel J Schleis	Art Unit 1784

CPC - Searched*		
Symbol	Date	Examiner

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

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<i>Search Notes</i> 	Application/Control No. 16/413,799	Applicant(s)/Patent Under Reexamination DRILLET et al.
	Examiner Daniel J Schleis	Art Unit 1784

Search Notes		
Search Notes	Date	Examiner
Inventor Name Search	07/08/2019	Schleis
Assignee Name Search	07/08/2019	Schleis
Reviewed Global Dossier	07/08/2019	Schleis
Non-Patent Literature Search - Google Scholar	07/08/2019	Schleis
EAST Text Search - See Search History	07/08/2019	Schleis
Reviewed File Wrappers of Other Applications in Patent Family	07/08/2019	Schleis
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Reviewed File Wrappers, including search histories- in Patent Family	07/06/2020	Schleis
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EAST Text Search - See Search History	07/06/2020	Schleis
Reviewed File Wrappers of related applications: 12447777, 13621015, 15606770, 16414022, 16413774, 16413825, 16413729	01/29/2021	Schleis
Reviewed Global Dossier	01/29/2021	Schleis
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Inventor Name Search	01/29/2021	Schleis
Assignee Name Search	01/29/2021	Schleis

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner
C21D	9/46	01/29/2021	Schleis
c23C	2/12, 2/40, 2/26	01/29/2021	Schleis
B32B	15/012	01/29/2021	Schleis
Y10T	428/12389, 428/12396, 428/12757	01/29/2021	Schleis

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Web Search History

date, time	web site	search string
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)

Application Number	16413799
Filing Date	2019-05-16
First Named Inventor	Pascal DRILLET
Art Unit	
Examiner Name	SCHLEIS, DANIEL J
Attorney Docket Number	20631.1028CON5

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STATEMENT BY APPLICANT**
(Not for submission under 37 CFR 1.99)

Application Number		16413799
Filing Date		2019-05-16
First Named Inventor	Pascal DRILLET	
Art Unit		
Examiner Name	SCHLEIS, DANIEL J	
Attorney Docket Number	20631.1028CON5	

2	0724919	EP	A2	1996-08-07	HITACHI LTD	In English	
3	1657004	EP	A1	2006-05-17	ARVEDI GIOVANNI	In English	
4	2573226	CA	A1	2006-01-19	NIPPON STEEL CORP	In English	
5	0692549	EP	A1	1996-01-17	UNITAS SA	In English	
6	1063314	EP	A1	2000-12-27	KAWASAKI STEEL CO	In English	
7	2720079	FR	A1	1995-11-24	LORRAINE LAMINAGE	See English Abstract and EPO machine translation	
8	622697	AU	B2	1992-04-16	ARMCO INC	In English	
9	H08144037	JP	A	1996-06-04	SUMITOMO METAL IND	See English Abstract and EPO machine translation	
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12							

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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First Named Inventor	Pascal DRILLET
Art Unit	
Examiner Name	SCHLEIS, DANIEL J
Attorney Docket Number	20631.1028CON5

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	1	Stahl und Eisen 120 (2000) Nr. 8, Seiten 51 bis 56, "Die neue Verzinkungsanlage 2 bei Eko Stahl", "The new No. 2 hot-dip galvanizing line at Eko Stahl", Autoren: Karl Döring, Jürgen Nathow, Dietrich Kern, Michael Breiter und Dietmar Lowenberg.	
	2	Andrews, K.W. Empirical Formulae for the Calculation of Some Transformation Temperatures. Journal of the Iron and Steel Institute, 203, Part 7, July 1965, 721-727.	
	3	Enlarged Fig. 7 of U.S. 16413825 (present application)	
	4	Low Carbon, Heat-Treatable Boron Steel - Uncoated or Aluminized PreCoated, GM Worldwide Engineering Standards, GMW14400.	
	5	Patent Trial and Appeal Board Final Decision in IPR2019-01275, US 9708683, dated January 5, 2021	
	6	Gokhale, Arun M., "Report on quantitative characterization of the microstructure of Aluminium alloy surface coating on hot-stamped US BOR 1500 steel blanks" School of Materials Science and Engineering, Georgia Institute of Technology, 13 May 2019	
	7	Fan, Dong Wei et al., "Formation of an Aluminide Coating on Hot Stamped Steel" ISIJ International, Vol. 50, No. 11, 2010, pp 1713-1718	
	8	Summons in EP proceeding for EP 09701846, dated 11/18/2016	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)

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Examiner Name	SCHLEIS, DANIEL J
Attorney Docket Number	20631.1028CON5

9	Bourouga, Brahim, "Report on the heating of coated steel blanks for hot stamping" Laboratoire de thermique et engerie de Nantes, 30 Aprill 2019
10	Imose, Masayuki, "Heating and Cooling Technology in the Continuous Annealing" Transactions ISIJ, Vol. 25, 1985, 911-932
11	Kolleck, R. et al., "Investigation on induction heating for hot stamping of boron alloyed steel" CIRP Annals - Manufacturing Technology 58, (2009), 275-278
12	Kahl, Martin, "Some like it hot" Technology focus - Hot stamping, September/October 2004 AMS
13	Self-study programme 339, The Passat 2006

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EXAMINER SIGNATURE

Examiner Signature	/Daniel J. Schleis/	Date Considered	01/29/2021
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)

Application Number	16413799
Filing Date	2019-05-16
First Named Inventor	Pascal DRILLET
Art Unit	
Examiner Name	SCHLEIS, DANIEL J
Attorney Docket Number	20631.1028CON5

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Signature	/William C. Gehris/	Date (YYYY-MM-DD)	2021-01-07
Name/Print	William C. Gehris	Registration Number	38,156

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      1796 0.01
      121957823 1
L5      17 0.01-1
          (0.01(W)1)

```

=> search 0.01-1 cr/mac

```

      828580 0.01-1/MAC
      455122 CR/MAC
L6      133480 0.01-1 CR/MAC
          (0.01-1/MAC (P) CR/MAC)

```

=> search 0-0.2 ti/mac

```
      587791 0-0.2/MAC
      208026 TI/MAC
L7      72787 0-0.2 TI/MAC
          (0-0.2/MAC (P) TI/MAC)
```

=> search 0.0005-0.08b/mac

```
L8      0 0.0005-0.08B/MAC
```

=> 0.0005-0.08 B/MAC

0.0005-0.08 IS NOT A RECOGNIZED COMMAND

The previous command name entered was not recognized by the system.
For a list of commands available to you in the current file, enter
"HELP COMMANDS" at an arrow prompt (=>).

=> search 0.0005-0.08 B/MAC

```
      159789 0.0005-0.08/MAC
      107957 B/MAC
L9      5567 0.0005-0.08 B/MAC
          (0.0005-0.08/MAC (P) B/MAC)
```

=> search fe/mac

```
L10     735777 FE/MAC
```

=> search l1 and l2 and l4 and l6 and l7 and l9 and l10

```
L11     170 L1 AND L2 AND L4 AND L6 AND L7 AND L9 AND L10
```

=> file caplus

COST IN U.S. DOLLARS	SINCE FILE ENTRY	TOTAL SESSION
FULL ESTIMATED COST	184.93	185.14

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=> search l11 and steel

```
425 L11
```

```

1372430 STEEL
218954 STEELS
1386360 STEEL
      (STEEL OR STEELS)
L12      398 L11 AND STEEL

=> search l12 and (coat or coated or coating or layer or laminate or clad)

113012 COAT
23266 COATS
130099 COAT
      (COAT OR COATS)
987769 COATED
2 COATEDS
987771 COATED
      (COATED OR COATEDS)
1836564 COATING
593243 COATINGS
1936535 COATING
      (COATING OR COATINGS)
3350197 LAYER
1164171 LAYERS
3887169 LAYER
      (LAYER OR LAYERS)
168019 LAMINATE
91370 LAMINATES
198456 LAMINATE
      (LAMINATE OR LAMINATES)
46554 CLAD
1066 CLADS
47172 CLAD
      (CLAD OR CLADS)
332 CLOTHED
47503 CLAD
      (CLAD OR CLOTHED)
L13      103 L12 AND (COAT OR COATED OR COATING OR LAYER OR LAMINATE OR CLAD)

```

```

=> display ibib abs retable hitstr hitind l12 1-103

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L12 ANSWER 1 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN
ACCESSION NUMBER: 2020:2713368 CAPLUS Full-text
DOCUMENT NUMBER: 174:278826
TITLE: Steel sheet comprising carbon, silicon and titanium
with high strength and excellent collision resistance
INVENTOR(S): Nakano, Katsuya; Takeda, Kengo; Kawata, Hiroyuki;
Uenishi, Akihiro; Suzuki, Yuya
PATENT ASSIGNEE(S): Nippon Steel Corporation, Japan
SOURCE: PCT Int. Appl., 58pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:
PATENT NO. KIND DATE APPLICATION NO. DATE
-----
WO 2020262651 A1 20201230 WO 2020-JP25352 20200626
PRIORITY APPLN. INFO.: JP 2019-121092 A 20190628
JP 2019-121093 A 20190628

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AB A steel sheet which has a metal structure that contains, in terms of
vol. fraction, 95% or more of tempered martensite and a total of 5% or
less of one or more structures selected from among ferrite, pearlite,
bainite, as-quenched martensite and residual austenite. This steel
sheet has a tensile strength of 1,100 MPa or more; the std. deviation of
the Vickers hardness is 30 or less as measured under a load of 9.8 N at 30
points in a 300µm square area that is centered at the position of t/2,
where t is the sheet thickness, in a cross-section of the steel sheet
10, said cross-section being parallel to the sheet thickness direction;
and if nanohardness is measured under a max. load of 1 mN at 100 points in
a 100µm square area that is centered at the position of t/2, the ratio
of the measurement points that have a nanohardness difference of 3 GPa or
more from 8 adjacent measurement points is 10% or less.

```

IT 2572991-88-7
 RL: PRP (Properties); TEM (Technical or engineered material use); USES
 (Uses)
 (steel sheet comprising carbon, silicon and titanium with
 high strength and excellent collision resistance)
 RN 2572991-88-7 CAPLUS
 CN Iron alloy, base, Fe 85-99, Mn 0.6-5, Si 0-2.5, Cr 0-2, Al 0-1, Co 0-1, Ni
 0-1, Cu 0-0.5, Mo 0-0.5, V 0-0.5, C 0.2-0.4, B 0-0.1, Nb 0-0.1, Ta 0-0.1, Ti
 0-0.1, W 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	85 - 99	7439-89-6
Mn	0.6 - 5	7439-96-5
Si	0 - 2.5	7440-21-3
Cr	0 - 2	7440-47-3
Al	0 - 1	7429-90-5
Co	0 - 1	7440-48-4
Ni	0 - 1	7440-02-0
Cu	0 - 0.5	7440-50-8
Mo	0 - 0.5	7439-98-7
V	0 - 0.5	7440-62-2
C	0.2 - 0.4	7440-44-0
B	0 - 0.1	7440-42-8
Nb	0 - 0.1	7440-03-1
Ta	0 - 0.1	7440-25-7
Ti	0 - 0.1	7440-32-6
W	0 - 0.1	7440-33-7

IPCI C21D0009-46 [I]; C22C0038-00 [I]; C22C0038-60 [I]
 IPCR C21D0009-46 [I]; C22C0038-00 [I]; C22C0038-60 [I]
 CC 55-3 (Ferrous Metals and Alloys)
 ST carbon silicon titanium steel sheet
 IT Galvanizing
 (electrolytic galvanizing, layer; steel sheet comprising carbon,
 silicon and titanium with high strength and excellent collision
 resistance)
 IT Hot-dip galvanizing
 (layer; steel sheet comprising carbon, silicon and titanium
 with high strength and excellent collision resistance)
 IT Collisions
 (resistance; steel sheet comprising carbon, silicon and
 titanium with high strength and excellent collision resistance)
 IT Microhardness
 Tensile strength
 Vickers hardness
 (steel sheet comprising carbon, silicon and titanium with
 high strength and excellent collision resistance)
 IT 12597-69-2, Steel, properties
 RL: PRP (Properties); TEM (Technical or engineered material use); USES
 (Uses)
 (sheet; steel sheet comprising carbon, silicon and titanium
 with high strength and excellent collision resistance)
 IT 2572991-88-7
 RL: PRP (Properties); TEM (Technical or engineered material use); USES
 (Uses)
 (steel sheet comprising carbon, silicon and titanium with
 high strength and excellent collision resistance)

L12 ANSWER 2 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN
 ACCESSION NUMBER: 2020:2557482 CAPLUS Full-text
 DOCUMENT NUMBER: 174:294718
 TITLE: Steel pipe, its preparation method and application
 in petroleum and/or natural gas field
 INVENTOR(S): Tian, Yan; Yan, Wei; Zou, Xiyang; Shi, Xianbo; Zhuo,
 Zhao; Yang, Ke; Shan, Yiyin; Zheng, Qiuyan
 PATENT ASSIGNEE(S): Hengyang Valin Steel Tube Co., Ltd., Peop. Rep. China;
 Institute of Metal Research, Chinese Academy of
 Sciences
 SOURCE: Faming Zhuanli Shenqing, 13pp.

CODEN: CNXXEV
DOCUMENT TYPE: Patent
LANGUAGE: Chinese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
CN 112063922	A	20201211	CN 2020-10912257	20200902
PRIORITY APPLN. INFO.:			CN 2020-10912257	20200902

AB The invention provides a ~~steel~~ pipe, a prepn. method and application in petroleum and/or natural gas field, which has the advantages of high strength, high toughness, high sulfide stress corrosion resistance and microbial corrosion resistance. The ~~steel~~ pipe contains the following raw materials in percentage by wt.: C 0.08-0.30%, Si≤0.5%, Mn≤1.0%, Cu 0.5-2.0%, Al≤1.0%, Ce 0.01-0.2%, Cr 0.5-1.5%, Mo 0.5-1.5%, V≤0.3%, N≤0.005%, O≤0.005%, S≤0.005%, P≤0.005% and the balance Fe. The prepn. method comprises the following steps: smelting, pouring, electros slag remelting, rolling and heat treatment.

IT ~~2567490-07-5P~~, Carbon 0.08-0.30, aluminum 0-1.0, boron 0-0.1, calcium 0-0.1, cerium 0.01-0.2, chromium 0.5-1.5, copper 0.5-2.0, manganese 0-1.0, molybdenum 0.5-1.5, niobium 0-0.1, silicon 0-0.5, titanium 0-0.1, vanadium 0-0.3, iron bal.
RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(~~steel~~ pipe, its prepn. method and application in petroleum and/or natural gas field)

RN 2567490-07-5 CAPLUS

CN Iron alloy, base, Fe 91-98, Cu 0.5-2, Cr 0.5-1.5, Mo 0.5-1.5, Al 0-1, Mn 0-1, Si 0-0.5, C 0.1-0.3, V 0-0.3, Ce 0-0.2, B 0-0.1, Ca 0-0.1, Nb 0-0.1, Ti 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	91 - 98	7439-89-6
Cu	0.5 - 2	7440-50-8
Cr	0.5 - 1.5	7440-47-3
Mo	0.5 - 1.5	7439-98-7
Al	0 - 1	7429-90-5
Mn	0 - 1	7439-96-5
Si	0 - 0.5	7440-21-3
C	0.1 - 0.3	7440-44-0
V	0 - 0.3	7440-62-2
Ce	0 - 0.2	7440-45-1
B	0 - 0.1	7440-42-8
Ca	0 - 0.1	7440-70-2
Nb	0 - 0.1	7440-03-1
Ti	0 - 0.1	7440-32-6

IPCI C22C0038-02; C22C0038-04; C22C0038-06; C22C0038-20; C22C0038-22; C22C0038-24; C22C0038-26; C22C0038-28; C22C0038-32; C21D0001-18; C21D0006-00; C21D0008-10; C21D0009-08; C22C0033-04

IPCR C22C0038-02 [I]; C21D0001-18 [I]; C21D0006-00 [I]; C21D0008-10 [I]; C21D0009-08 [I]; C22C0033-04 [I]; C22C0038-04 [I]; C22C0038-06 [I]; C22C0038-20 [I]; C22C0038-22 [I]; C22C0038-24 [I]; C22C0038-26 [I]; C22C0038-28 [I]; C22C0038-32 [I]

CC 55-3 (Ferrous Metals and Alloys)

ST ~~steel~~ pipe prepn petroleum natural gas

IT Casting of metals
(electros slag; ~~steel~~ pipe, its prepn. method and application in petroleum and/or natural gas field)

IT Metals
RL: IMF (Industrial manufacture); PUR (Purification or recovery); PREP (Preparation)
(refining; ~~steel~~ pipe, its prepn. method and application in petroleum and/or natural gas field)

IT Corrosion-resistant materials
Heat treatment
Hot rolling
Pipes and Tubes
(~~steel~~ pipe, its prepn. method and application in petroleum

and/or natural gas field)

IT Oxides (inorganic)
 RL: FMU (Formation, unclassified); FORM (Formation, nonpreparative)
 (steel pipe, its prepn. method and application in petroleum
 and/or natural gas field)

IT Smelting
 (vacuum induction; steel pipe, its prepn. method and
 application in petroleum and/or natural gas field)

IT 1344-28-1, Alumina, formation (nonpreparative) 12173-93-2, Martensite,
 formation (nonpreparative)
 RL: FMU (Formation, unclassified); FORM (Formation, nonpreparative)
 (steel pipe, its prepn. method and application in petroleum
 and/or natural gas field)

IT 2567490-07-58, Carbon 0.08-0.30, aluminum 0-1.0, boron 0-0.1,
 calcium 0-0.1, cerium 0.01-0.2, chromium 0.5-1.5, copper 0.5-2.0,
 manganese 0-1.0, molybdenum 0.5-1.5, niobium 0-0.1, silicon 0-0.5,
 titanium 0-0.1, vanadium 0-0.3, iron bal.
 RL: IMF (Industrial manufacture); TEM (Technical or engineered material
 use); PREP (Preparation); USES (Uses)
 (steel pipe, its prepn. method and application in petroleum
 and/or natural gas field)

IT 1333-74-0, Hydrogen, processes
 RL: REM (Removal or disposal); PROC (Process)
 (steel pipe, its prepn. method and application in petroleum
 and/or natural gas field)

L12 ANSWER 3 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2020:2500863 CAPLUS Full-text

DOCUMENT NUMBER: 174:278824

TITLE: HB450 grade high wear resistant thin steel sheet and
 production method thereof

INVENTOR(S): Zhang, Tao; Ji, Wenbo; Yang, Ying; Lin, Tianzi; Zhang,
 Zhe; Wang, Yubo

PATENT ASSIGNEE(S): Angang Steel Co., Ltd., Peop. Rep. China

SOURCE: Faming Zhuanli Shenqing, 10pp.

CODEN: CNXXEV

DOCUMENT TYPE: Patent

LANGUAGE: Chinese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
CN 112048672	A	20201208	CN 2020-10939769	20200909
PRIORITY APPLN. INFO.:			CN 2020-10939769	20200909

AB The invention discloses a HB450 grade high wear resistant thin steel
 sheet and prodn. method thereof, which has the advantages of simple prodn.
 process, good forming performance and good wear resistance. The high wear
 resistant thin steel sheet comprises the following components in
 percentage by wt.: C 0.18%-0.22%, Si 0.10%-0.30%, Mn 1.0%-1.5%, Cr
 0.20%-0.40%, B 0.005%-0.010%, Ti 0.03%-0.06%, Ti/B≥3.0, Als
 0.015%-0.045%, and balance of Fe and inevitable impurities.

IT 2574491-27-188, Carbon 0.2, boron 0-3.0, chromium 0.20-0.40,
 manganese 1.0-1.5, silicon 0.10-0.30, titanium 0-3, titanium 0.03-0.06,
 iron bal., Al 0.015-0.045

RL: IMF (Industrial manufacture); TEM (Technical or engineered material
 use); PREP (Preparation); USES (Uses)
 (hB450 grade high wear resistant thin steel sheet and prodn.
 method thereof)

RN 2574491-27-1 CAPLUS

CN INDEX NAME NOT YET ASSIGNED

Component	Component Percent	Component Registry Number
Fe	92 - 98	7439-89-6
B	0 - 3	7440-42-8
Ti	0 - 3	7440-32-6
Mn	1 - 1.5	7439-96-5
Cr	0.2 - 0.4	7440-47-3
Si	0.1 - 0.3	7440-21-3
C	0.2	7440-44-0

IPCI C22C0038-02; C22C0038-04; C22C0038-32; C22C0038-28; C22C0038-06;
C21D0008-02
IPCR C22C0038-02 [I]; C21D0008-02 [I]; C22C0038-04 [I]; C22C0038-06 [I];
C22C0038-28 [I]; C22C0038-32 [I]
CC 55-3 (Ferrous Metals and Alloys)
ST HB450 high wear resistant thin ~~steel~~ sheet prodn
IT Sheet materials
Wear-resistant materials
(hB450 grade high wear resistant thin ~~steel~~ sheet and prodn.
method thereof)
IT 2574491-27-1DE, Carbon 0.2, boron 0-3.0, chromium 0.20-0.40,
manganese 1.0-1.5, silicon 0.10-0.30, titanium 0-3, titanium 0.03-0.06,
iron bal., Al 0.015-0.045
RL: IMF (Industrial manufacture); TEM (Technical or engineered material
use); PREP (Preparation); USES (Uses)
(hB450 grade high wear resistant thin ~~steel~~ sheet and prodn.
method thereof)

L12 ANSWER 4 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2020:2453019 CAPLUS Full-text

DOCUMENT NUMBER: 174:38459

TITLE: Manufacture of welded components made of a deformed
high-strength ~~steel~~

INVENTOR(S): Otto, Manuel

PATENT ASSIGNEE(S): Salzgitter Flachstahl GmbH, Germany

SOURCE: Ger. Offen., 15pp.

CODEN: GWXXBX

DOCUMENT TYPE: Patent

LANGUAGE: German

FAMILY ACC. NUM. COUNT: 2

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
DE 102019114090	A1	20201203	DE 2019-102019114090	20190527
WO 2020239671	A1	20201203	WO 2020-EP64399	20200525
			DE 2019-102019114090 A	20190527

PRIORITY APPLN. INFO.:

AB A method for producing a welded component achieves mech. properties in the
welding seam region, in particular fatigue strength, comparable to those
in the non-influenced base material, preferably even with a higher degree
of strength than in the base material. This method comprises: producing a
hot-rolled ~~steel~~ product made of a high-strength air-hardenable ~~steel~~
with a material thickness ≥ 1.5 mm, the hot-rolled ~~steel~~ product
contg., by wt.-%: C: 0.03-0.4, preferably 0.08-0.1; Mn: 1-4, preferably
1.8-2; Si: 0.09-2, preferably 0.25-0.3; Al: 0.02-2, preferably 0.02-0.05;
P 0-0.1, preferably ≤ 0.020 ; S 0-0.1, preferably ≤ 0.01 ; N:
0.001-0.5, preferably 0.003-0.008; Ti: 0.01-0.2, preferably 0.02-0.03; Cr:
0.05-2, preferably 0.7-0.8; B: 0.001-0.1, preferably 0.0025-0.0035; Mo:
0.01-1, preferably 0.15-0.3; V: 0.01-0.2, preferably 0.05-0.08;
optionally: Ni: 0.02-1; Nb: 0.01-0.1; and balance in iron including
conventional ~~steel~~-accompanying elements; air hardening the produced
hot-rolled ~~steel~~ product; then deforming the hot-rolled ~~steel~~ product
in the air-hardened state to form a component; and producing welding
connections using a fusion welding process on the component.

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
Anon				DE 10023488 A1	CAPLUS
Anon				DE 102004053620 A1	CAPLUS
Anon				WO 2011000351 A1	CAPLUS
Anon				DE 4446709 A1	CAPLUS

IT 2550686-17-2P

RL: IMF (Industrial manufacture); TEM (Technical or engineered material
use); PREP (Preparation); USES (Uses)
(manuf. of welded components made of a deformed high-strength
~~steel~~)

RN 2550686-17-2 CAPLUS

CN Iron alloy, base, Fe 86-99, Mn 1-4, Si 0.1-2, Al 0-2, Cr 0-2, Mo 0-1, Ni 0-1, N
0-0.5, C 0-0.4, Ti 0-0.2, V 0-0.2, B 0-0.1, Nb 0-0.1, P 0-0.1, S 0-0.1 (CA INDEX
NAME)

Component	Component Percent	Component Registry Number
=====+=====+=====		
Fe	86 - 99	7439-89-6
Mn	1 - 4	7439-96-5
Si	0.1 - 2	7440-21-3
Al	0 - 2	7429-90-5
Cr	0 - 2	7440-47-3
Mo	0 - 1	7439-98-7
Ni	0 - 1	7440-02-0
N	0 - 0.5	17778-88-0
C	0 - 0.4	7440-44-0
Ti	0 - 0.2	7440-32-6
V	0 - 0.2	7440-62-2
B	0 - 0.1	7440-42-8
Nb	0 - 0.1	7440-03-1
P	0 - 0.1	7723-14-0
S	0 - 0.1	7704-34-9

IPCI C21D0008-00 [I]; C22C0038-04 [I]
 IPCR C21D0008-00 [I]; C22C0038-04 [I]
 CC 55-9 (Ferrous Metals and Alloys)
 ST welding deformation strength ~~steel~~ rolling
 IT Automobile bodies
 (chassis; manuf. of welded components made of a deformed high-strength
 ~~steel~~)
 IT Welding of metals
 (gas metal-arc welding; manuf. of welded components made of a deformed
 high-strength ~~steel~~)
 IT Appliances
 Automotive bumpers
 Deep drawing of materials
 Elongation at break
 Forging
 Hot rolling
 Laser welding
 Metalworking
 Yield strength
 (manuf. of welded components made of a deformed high-strength
 ~~steel~~)
 IT 12427-23-5, Bainite
 RL: FMU (Formation, unclassified); PRP (Properties); FORM (Formation,
 nonpreparative)
 (manuf. of welded components made of a deformed high-strength
 ~~steel~~)
 IT ~~2550686-17-2P~~
 RL: IMF (Industrial manufacture); TEM (Technical or engineered material
 use); PREP (Preparation); USES (Uses)
 (manuf. of welded components made of a deformed high-strength
 ~~steel~~)

L12 ANSWER 5 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN
 ACCESSION NUMBER: 2020:2453018 CAPLUS Full-text
 DOCUMENT NUMBER: 174:38458
 TITLE: Manufacture of welded components made of a deformed
 high-strength ~~steel~~
 INVENTOR(S): Otto, Manuel
 PATENT ASSIGNEE(S): Salzgitter Flachstahl GmbH, Germany
 SOURCE: PCT Int. Appl., 32pp.
 CODEN: PIXXD2
 DOCUMENT TYPE: Patent
 LANGUAGE: German
 FAMILY ACC. NUM. COUNT: 2
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
-----	----	-----	-----	-----
WO 2020239671	A1	20201203	WO 2020-EP64399	20200525
DE 102019114090	A1	20201203	DE 2019-102019114090	20190527
PRIORITY APPLN. INFO.:			DE 2019-102019114090 A	20190527

 AB A method for producing a welded component achieves mech. properties in the

welding seam region, in particular fatigue strength, comparable to those in the non-influenced base material, preferably even with a higher degree of strength than in the base material. This method comprises: producing a hot-rolled ~~steel~~ product made of a high-strength air-hardenable ~~steel~~ with a material thickness ≥ 1.5 mm, the hot-rolled ~~steel~~ product contg., by wt. %: C: 0.03-0.4, preferably 0.08-0.1; Mn: 1-4, preferably 1.8-2; Si: 0.09-2, preferably 0.25-0.3; Al: 0.02-2, preferably 0.02-0.05; P 0-0.1, preferably ≤ 0.020 ; S 0-0.1, preferably ≤ 0.01 ; N: 0.001-0.5, preferably 0.003-0.008; Ti: 0.01-0.2, preferably 0.02-0.03; Cr: 0.05-2, preferably 0.7-0.8; B: 0.001-0.1, preferably 0.0025-0.0035; Mo: 0.01-1, preferably 0.15-0.3; V: 0.01-0.2, preferably 0.05-0.08; optionally: Ni: 0.02-1; Nb: 0.01-0.1; and balance in iron including conventional ~~steel~~-accompanying elements; air hardening the produced hot-rolled ~~steel~~ product; then deforming the hot-rolled ~~steel~~ product in the air-hardened state to form a component; and producing welding connections using a fusion welding process on the component.

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
=====	=====	=====	=====	=====	=====
Anon	2009			KR 20090103779 A	
BANGARU NARASIMHA-RAO V	1999			WO 9905336 A1	CAPLUS
HANSEN STEVEN S	2007			US 20070267110 A1	CAPLUS
HARA TAKUYA	2014			US 8715430 B2	CAPLUS
PAN HUI	2019			CN 109136762 A	CAPLUS
PAN HUI	2019			CN 109402499 A	CAPLUS
SCHOETTLER JOACHIM	2009			DE 102007058222 A1	CAPLUS
SCHOTTLE JOACHIM	2017			DE 102016104295 A1	CAPLUS
VON HAGEN INGO	1999			WO 9928518 A1	CAPLUS

IT 2550686-17-2P

RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(manuf. of welded components made of a deformed high-strength ~~steel~~)

RN 2550686-17-2 CAPLUS

CN Iron alloy, base, Fe 86-99, Mn 1-4, Si 0.1-2, Al 0-2, Cr 0-2, Mo 0-1, Ni 0-1, N 0-0.5, C 0-0.4, Ti 0-0.2, V 0-0.2, B 0-0.1, Nb 0-0.1, P 0-0.1, S 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
=====	=====	=====
Fe	86 - 99	7439-89-6
Mn	1 - 4	7439-96-5
Si	0.1 - 2	7440-21-3
Al	0 - 2	7429-90-5
Cr	0 - 2	7440-47-3
Mo	0 - 1	7439-98-7
Ni	0 - 1	7440-02-0
N	0 - 0.5	17778-88-0
C	0 - 0.4	7440-44-0
Ti	0 - 0.2	7440-32-6
V	0 - 0.2	7440-62-2
B	0 - 0.1	7440-42-8
Nb	0 - 0.1	7440-03-1
P	0 - 0.1	7723-14-0
S	0 - 0.1	7704-34-9

IPCI C21D0008-04 [I]; B23K0009-23 [I]; C22C0038-00 [I]; C22C0038-02 [I];
C22C0038-06 [I]; C22C0038-22 [I]; C22C0038-24 [I]; C22C0038-26 [I];
C22C0038-28 [I]; C22C0038-32 [I]; C22C0038-38 [I]; C22C0038-44 [I];
C22C0038-46 [I]; C22C0038-50 [I]; C22C0038-54 [I]
IPCR C21D0008-04 [I]; B23K0009-23 [I]; C22C0038-00 [I]; C22C0038-02 [I];
C22C0038-06 [I]; C22C0038-22 [I]; C22C0038-24 [I]; C22C0038-26 [I];
C22C0038-28 [I]; C22C0038-32 [I]; C22C0038-38 [I]; C22C0038-44 [I];
C22C0038-46 [I]; C22C0038-50 [I]; C22C0038-54 [I]

CC 55-9 (Ferrous Metals and Alloys)

ST welding deformation strength ~~steel~~ rolling

IT Automobile bodies

(chassis; manuf. of welded components made of a deformed high-strength ~~steel~~)

IT Welding of metals

(gas metal-arc welding; manuf. of welded components made of a deformed high-strength steel)

IT Appliances
Automotive bumpers
Deep drawing of materials
Elongation at break
Forging
Hot rolling
Laser welding
Metalworking
Yield strength
(manuf. of welded components made of a deformed high-strength steel)

IT 12427-23-5, Bainite
RL: FMU (Formation, unclassified); PRP (Properties); FORM (Formation, nonpreparative)
(manuf. of welded components made of a deformed high-strength steel)

IT 2550686-17-2P
RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(manuf. of welded components made of a deformed high-strength steel)

L12 ANSWER 6 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2020:2383485 CAPLUS Full-text

DOCUMENT NUMBER: 174:174308

TITLE: Steel comprising specific amount of oxygen, sulfur, and cerium, its manufacturing method, and application
INVENTOR(S): Zou, Xiyang; Shi, Xianbo; Tian, Yan; Yan, Wei; Zhou, Zhengping; Yang, Ke; Li, Duanzheng; Shan, Yiyin; Zeng, Tianyi

PATENT ASSIGNEE(S): Hengyang Valin Steel Tube Co., Ltd., Peop. Rep. China; Institute of Metal Research, Chinese Academy of Sciences

SOURCE: Faming Zhuanli Shenqing, 13pp.
CODEN: CNXXEV

DOCUMENT TYPE: Patent
LANGUAGE: Chinese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
CN 111961976	A	20201120	CN 2020-10911376	20200902
PRIORITY APPLN. INFO.:			CN 2020-10911376	20200902

AB A steel having high strength, high toughness, resistance to sulfide stress corrosion and microbial corrosion, and realizing the integration of structure and function is provided. The steel comprises the following raw materials in wt.%: 0.08-0.30 of carbon, 0-0.5 of silicon, 0-1.0 of manganese, 0.5-2.0 of copper, 0-1.0 of aluminum, 0.01-0.2 of cerium, 0.5-1.5 of chromium, 0.5-1.5 of molybdenum, 0-0.3 of vanadium, 0-0.005 of nitrogen, 0-0.005 of oxygen, 0-0.005 of sulfur, 0-0.005 of phosphorous, 0-0.1 of niobium, 0-0.1 of calcium, 0-0.1 of titanium, 0-0.1 of boron, and balance is iron. The manufg. method comprises: smelting the raw materials in a vacuum induction furnace, or sequentially passing the raw materials through an elec. furnace and refining outside the furnace, or the raw materials are sequentially subjecting to primary refining and refining outside the furnace, pouring and post-processing to obtain a steel.

IT 2567490-07-5, Aluminum 0-1.0, boron 0-0.1, calcium 0-0.1, carbon 0.08-0.30, cerium 0.01-0.2, chromium 0.5-1.5, copper 0.5-2.0, manganese 0-1.0, molybdenum 0.5-1.5, niobium 0-0.1, silicon 0-0.5, titanium 0-0.1, vanadium 0-0.3, iron bal.
RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(steel comprising specific amt. of oxygen, sulfur, and cerium, its manufg. method, and application)

RN 2567490-07-5 CAPLUS

CN Iron alloy, base, Fe 91-98, Cu 0.5-2, Cr 0.5-1.5, Mo 0.5-1.5, Al 0-1, Mn 0-1, Si 0-0.5, C 0.1-0.3, V 0-0.3, Ce 0-0.2, B 0-0.1, Ca 0-0.1, Nb 0-0.1, Ti 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
=====+=====		
Fe	91 - 98	7439-89-6
Cu	0.5 - 2	7440-50-8
Cr	0.5 - 1.5	7440-47-3
Mo	0.5 - 1.5	7439-98-7
Al	0 - 1	7429-90-5
Mn	0 - 1	7439-96-5
Si	0 - 0.5	7440-21-3
C	0.1 - 0.3	7440-44-0
V	0 - 0.3	7440-62-2
Ce	0 - 0.2	7440-45-1
B	0 - 0.1	7440-42-8
Ca	0 - 0.1	7440-70-2
Nb	0 - 0.1	7440-03-1
Ti	0 - 0.1	7440-32-6

IPCI C22C0038-02; C22C0038-04; C22C0038-06; C22C0038-20; C22C0038-22;
C22C0038-24; C21D0008-00; C21D0001-18

IPCR C22C0038-02 [I]; C21D0001-18 [I]; C21D0008-00 [I]; C22C0038-04 [I];
C22C0038-06 [I]; C22C0038-20 [I]; C22C0038-22 [I]; C22C0038-24 [I]

CC 55-3 (Ferrous Metals and Alloys)

ST oxygen sulfur cerium steel

IT Casting of metals
Forging
Hot rolling
Purification
Smelting
(steel comprising specific amt. of oxygen, sulfur, and
cerium, its manufg. method, and application)

IT 12597-69-2P, Steel, preparation
RL: IMF (Industrial manufacture); PEP (Physical, engineering or chemical
process); PRP (Properties); TEM (Technical or engineered material use);
PREP (Preparation); PROC (Process); USES (Uses)
(steel comprising specific amt. of oxygen, sulfur, and
cerium, its manufg. method, and application)

IT 2567490-07-5, Aluminum 0-1.0, boron 0-0.1, calcium 0-0.1, carbon
0.08-0.30, cerium 0.01-0.2, chromium 0.5-1.5, copper 0.5-2.0, manganese
0-1.0, molybdenum 0.5-1.5, niobium 0-0.1, silicon 0-0.5, titanium 0-0.1,
vanadium 0-0.3, iron bal.
RL: PRP (Properties); TEM (Technical or engineered material use); USES
(Uses)
(steel comprising specific amt. of oxygen, sulfur, and
cerium, its manufg. method, and application)

L12 ANSWER 7 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2020:2291871 CAPLUS Full-text

DOCUMENT NUMBER: 174:84430

TITLE: 1200Mpa grade ultra high strength thick steel plate
and production method thereof

INVENTOR(S): Bao, Haiyan; Liang, Baozhu; Zhu, Yingjun; Su, Liang;
Yan, Min; Du, Tao; Zhang, Huan; Yu, Hongwei; Yi, Xun;
Wang, Xiaodong

PATENT ASSIGNEE(S): Baowu Group Echeng Iron and Steel Co., Ltd., Peop.
Rep. China

SOURCE: Faming Zhuanli Shenqing, 9pp.
CODEN: CNXXEV

DOCUMENT TYPE: Patent

LANGUAGE: Chinese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
-----	----	-----	-----	-----
CN 111910129	A	20201110	CN 2020-10804778	20200812
PRIORITY APPLN. INFO.:			CN 2020-10804778	20200812

AB The invention discloses a 1200Mpa grade ultra-high strength thick steel
plate and its prodn. method, which has the advantages of high tensile
strength, low yield ratio and low cost. The steel plate contains the
following elements by wt.: C: 0.12-0.20; Si: 0.10-0.40; Mn: 1.10-1.50; P
≤ 0.0010; S ≤ 0.0005; Al: 0.015-0.045%; Cr: 0.10-0.50; Mo:

0.10-0.70; Ni: 0.05-0.20; N: ≤ 0.0045; H: ≤ 0.0002, Nb + Ti
+ V + B ≤ 0.10, Ti / N ≥ 3.0, balance of Fe and unavoidable
impurities.

IT 2559769-05-8P, Boron 0-0.10, carbon 0.12-0.20, chromium
0.10-0.50, manganese 1.10-1.50, molybdenum 0.10-0.70, nickel 0.05-0.20,
niobium 0-0.1, silicon 0.10-0.40, titanium 0-0.1, vanadium 0-0.1, iron
bal.
RL: IMF (Industrial manufacture); TEM (Technical or engineered material
use); PREP (Preparation); USES (Uses)
(1200Mpa grade ultra high strength thick ~~steel~~ plate and
prodn. method thereof)

RN 2559769-05-8 CAPLUS

CN Iron alloy, base, Fe 96-98, Mn 1.1-1.5, Mo 0.1-0.7, Cr 0.1-0.5, Si 0.1-0.4, C
0.1-0.2, Ni 0-0.2, B 0-0.1, Nb 0-0.1, Ti 0-0.1, V 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	96 - 98	7439-89-6
Mn	1.1 - 1.5	7439-96-5
Mo	0.1 - 0.7	7439-98-7
Cr	0.1 - 0.5	7440-47-3
Si	0.1 - 0.4	7440-21-3
C	0.1 - 0.2	7440-44-0
Ni	0 - 0.2	7440-02-0
B	0 - 0.1	7440-42-8
Nb	0 - 0.1	7440-03-1
Ti	0 - 0.1	7440-32-6
V	0 - 0.1	7440-62-2

IPCI C22C0038-02; C22C0038-04; C22C0038-06; C22C0038-44; C22C0038-46;
C22C0038-48; C22C0038-54; C21D0008-02; C22C0033-04

IPCR C22C0038-02 [I]; C21D0008-02 [I]; C22C0033-04 [I]; C22C0038-04 [I];
C22C0038-06 [I]; C22C0038-44 [I]; C22C0038-46 [I]; C22C0038-48 [I];
C22C0038-54 [I]

CC 55-3 (Ferrous Metals and Alloys)

ST ~~steel~~ plate prepn

IT Plates
Quenching (cooling)
Rolling (metals)
Tempering
(1200Mpa grade ultra high strength thick ~~steel~~ plate and
prodn. method thereof)

IT Group 8 elements
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or
engineered material use); PREP (Preparation); USES (Uses)
(1200Mpa grade ultra high strength thick ~~steel~~ plate and
prodn. method thereof)

IT 2559769-05-8P, Boron 0-0.10, carbon 0.12-0.20, chromium
0.10-0.50, manganese 1.10-1.50, molybdenum 0.10-0.70, nickel 0.05-0.20,
niobium 0-0.1, silicon 0.10-0.40, titanium 0-0.1, vanadium 0-0.1, iron
bal.
RL: IMF (Industrial manufacture); TEM (Technical or engineered material
use); PREP (Preparation); USES (Uses)
(1200Mpa grade ultra high strength thick ~~steel~~ plate and
prodn. method thereof)

L12 ANSWER 8 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2020:2054532 CAPLUS Full-text

DOCUMENT NUMBER: 173:899795

TITLE: Strong resistance to hydrogen embrittlement via
surface shielding in multi-layered
austenite/martensite ~~steel~~ sheets

AUTHOR(S): Jo, Min Cheol; Jo, Min Chul; Yoo, Jisung; Song,
Taejin; Kim, Sang-Heon; Sohn, Seok Su; Lee, Sunghak

CORPORATE SOURCE: Center for Advanced Aerospace Materials, Pohang
University of Science and Technology, Pohang, 37673,
S. Korea

SOURCE: Materials Science & Engineering, A: Structural
Materials: Properties, Microstructure and Processing
(2021), 800, 140319

DIGITAL OBJECT ID: CODEN: MSAPE3; ISSN: 0921-5093
 10.1016/j.msea.2020.140319
 PUBLISHER: Elsevier B.V.
 DOCUMENT TYPE: Journal; (online computer file)
 LANGUAGE: English

AB Layered architectures have been applied to twinning-induced plasticity (TWIP) steel in terms of configuring multi-layered TWIP and martensitic steel (MLS) sheets to overcome the limitation of low yield strength. However, hydrogen embrittlement (HE) inevitably appears in materials used for high-strength purposes, with the interfacial layers presenting localization sites of hydrogen, thereby limiting the materials' broad structural applications. Here, we present a novel design for MLS sheets that exhibit both strong resistance to HE and a good strength-ductility balance via surface shielding. Our hydrogen penetration data demonstrates that the proposed austenitic shielding structure effectively acts as a barrier to hydrogen due to the reduced hydrogen diffusivity, compared with existing MLS sheets. We propose the optimal surface thickness required to play the role of shielding layer based on the quantified diffusivity and the rule of mixts. of the layer fractions, which presents a plausible novel design for layered architectures that exhibit strong resistance to HE and possess tunable mech. properties.

RETAB

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
=====	=====	=====	=====	=====	=====
Anon	1991		261	Electron Probe Quant	
Anon	2004			ISO 17081 Method of	
Ashby, M	2003	51	5801	Acta Mater	CAPLUS
Ashby, M	2013	68	4	Scripta Mater	CAPLUS
Barabash, R	2014	45	98	Metall Mater Trans	CAPLUS
Beachem, C	1972	3	441	Metall Mater Trans B	
Bouaziz, O	2008	10	24	Adv Eng Mater	CAPLUS
Bouaziz, O	2016	18	56	Adv Eng Mater	CAPLUS
Cetin, A	2012	60	2265	Acta Mater	CAPLUS
Chin, K	2018	24	489	Met Mater Int	CAPLUS
Cho, L	2018	734	416	Mater Sci Eng, A	CAPLUS
Cho, L	2018	735	448	Mater Sci Eng, A	CAPLUS
De Cooman, B	2011			New Trends and Devel	
Devanathan, M	1962	270	90	Proc R Soc A	CAPLUS
Dunne, D	2012	706	1568	Mater Sci Forum	
Dwivedi, S	2018	43	21603	Int J Hydrogen Energ	CAPLUS
Enomoto, M	2012	43	572	Metall Mater Trans	CAPLUS
Fang, T	2011	331	1587	Science	CAPLUS
Grassel, O	2000	16	1391	Int J Plast	CAPLUS
Gutierrez-Urrutia, I	2010	527	3552	Mater Sci Eng, A	
Gwon, H	2017	696	416	Mater Sci Eng, A	CAPLUS
Han, D	2015	99	45	Scripta Mater	CAPLUS
He, J	2018	726	288	Mater Sci Eng, A	CAPLUS
Huang, M	2018	153	235	Acta Mater	CAPLUS
Ichimura, M	1991	32	1109	Mater Trans, JIM	CAPLUS
Inoue, J	2008	59	1055	Scripta Mater	CAPLUS
Jin, J	2012	60	1680	Acta Mater	CAPLUS
Jo, M	2019	50	4085	Metall Mater Trans	CAPLUS
Jo, S	2015	627	374	J Alloys Compd	CAPLUS
Kim, J	2018	147	304	Acta Mater	CAPLUS
Kim, J	2009	505	105	Mater Sci Eng, A	
Kim, J	2017	682	164	Mater Sci Eng, A	CAPLUS
Kim, J	2019	25	912	Met Mater Int	CAPLUS
Kim, J	2019	9	6829	Sci Rep	
Koseki, T	2014	55	227	Mater Trans	CAPLUS
Koyama, M	2013	61	4607	Acta Mater	CAPLUS
Koyama, M	2017	355	1055	Science	CAPLUS
Kubin, L	2003	48	119	Scripta Mater	CAPLUS
Kwon, Y	2018	43	10129	Int J Hydrogen Energ	CAPLUS
Lee, J	2019	9	5219	Sci Rep	
Li, Y	2013	61	2588	J Mech Phys Solid	CAPLUS
Mohtadi-Bonab, M	2019	25	1109	Met Mater Int	CAPLUS
Oh, S	2020	188	366	Acta Mater	CAPLUS
Park, C	2019	25	584	Met Mater Int	CAPLUS
Park, I	2015	93	63	Corrosion Sci	CAPLUS
Park, J	2017	686	160	Mater Sci Eng, A	CAPLUS
Park, J	2019	759	320	Mater Sci Eng, A	CAPLUS

Ritchie, R	2011	10	817	Nat Mater	CAPLUS
Seok, M	2016	121	164	Acta Mater	CAPLUS
Song, E	2014	87	9	Scripta Mater	CAPLUS
Takai, K	2003	43	520	ISIJ Int	CAPLUS
Wang, M	2005	398	37	Mater Sci Eng, A	
Wang, Y	2002	419	912	Nature	CAPLUS
Wang, Y	2018	150	22	Scripta Mater	CAPLUS
Wei, Y	2014	5	3580	Nat Commun	
Wu, X	2014	2	185	Mater Res Lett	CAPLUS
Yanagimoto, J	2010	59	287	CIRP Ann - Manuf Tec	
Yokota, T	2003	43	534	ISIJ Int	CAPLUS
Yu, W	2018	727	70	Mater Sci Eng, A	CAPLUS
Zhang, Y	2019	165	15	Scripta Mater	CAPLUS

IT 2522569-69-1, C 0.35, Mn 1.3, Si 0.15, Mo 0.1, Cr 0.2, Ti 0-0.06, B 0-0.06, Fe bal., processes
 RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (strong resistance to hydrogen embrittlement via surface shielding in multi-layered austenite/martensite ~~steel~~ sheets)

RN 2522569-69-1 CAPLUS

CN Steel, Fe 98, Mn 1.3, C 0.4, Cr 0.2, Si 0.2, Mo 0.1, B 0-0.1, Ti 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	98	7439-89-6
Mn	1.3	7439-96-5
C	0.4	7440-44-0
Cr	0.2	7440-47-3
Si	0.2	7440-21-3
Mo	0.1	7439-98-7
B	0 - 0.1	7440-42-8
Ti	0 - 0.1	7440-32-6

CC 55-8 (Ferrous Metals and Alloys)

ST TWIP ~~steel~~ multilayer austenite martensite shielding hydrogen embrittlement resistance

IT Diffusion
 Elongation, mechanical
 Fracture surface morphology
 Hydrogen embrittlement
 Interface
 Microstructure
 Multilayers
 Sheet materials
 Shields
 Stress-strain relationship
 Tensile strength
 Yield strength
 (strong resistance to hydrogen embrittlement via surface shielding in multi-layered austenite/martensite ~~steel~~ sheets)

IT 1333-74-0, Hydrogen, processes
 RL: OCU (Occurrence, unclassified); PEP (Physical, engineering or chemical process); OCCU (Occurrence); PROC (Process)
 (strong resistance to hydrogen embrittlement via surface shielding in multi-layered austenite/martensite ~~steel~~ sheets)

IT 12173-93-2, Martensite, processes 12244-31-4, Austenite, processes
 RL: PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)
 (strong resistance to hydrogen embrittlement via surface shielding in multi-layered austenite/martensite ~~steel~~ sheets)

IT 2362540-95-0, C 1.2, Mn 13, Si 0.2, Fe bal. 2522569-69-1, C 0.35, Mn 1.3, Si 0.15, Mo 0.1, Cr 0.2, Ti 0-0.06, B 0-0.06, Fe bal., processes 2522569-74-8, C 0.7, Mn 17, Si 0.6, V 0.3, Al 1.3, Fe bal.
 RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (strong resistance to hydrogen embrittlement via surface shielding in multi-layered austenite/martensite ~~steel~~ sheets)

ACCESSION NUMBER: 2020:1995137 CAPLUS Full-text
 DOCUMENT NUMBER: 173:735842
 TITLE: Aluminum or aluminum alloy plated steel differential strength welded part and its manufacture
 INVENTOR(S): Pan, Hua; Liu, Chengjie; Lei, Ming; Wu, Yue; Sun, Zhongqu; Jiang, Haomin
 PATENT ASSIGNEE(S): Baoshan Iron & Steel Co., Ltd., Peop. Rep. China
 SOURCE: PCT Int. Appl., 27pp.
 CODEN: PIXXD2
 DOCUMENT TYPE: Patent
 LANGUAGE: Chinese
 FAMILY ACC. NUM. COUNT: 2

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2020200110	A1	20201008	WO 2020-CN81743	20200327
CN 111215751	A	20200602	CN 2019-10249188	20190329
			CN 2019-10249188	A 20190329

PRIORITY APPLN. INFO.:

AB The different-strength steel welding component is formed by means of butt welding of a high-strength steel plate and a low-strength steel plate, and each of the high-strength steel plate and the low-strength steel plate comprises a base body and at least one pure aluminum or aluminum-alloy plating on a surface of the base body. The components of the base body of the high-strength steel plate, in percentages by wt., are: 0.08-0.8% of C, 0.05-1.0% of Si, 0.1-5% of Mn, P < 0.3%, S < 0.1%, Al < 0.3%, Ti < 0.5%, 0.0005-0.1% of B, 0.01-3% of Cr, and the remaining components are Fe and inevitable impurities. The components of the base body of the low-strength steel plate, in percentages by wt., are: 0.03-0.1% of C, 0-0.3% of Si, 0.5-2.0% of Mn, P < 0.1%, S < 0.05%, Al < 0.1%, 0-0.1% of Cr, 0-0.05% of Ti, and the remaining components are Fe and inevitable impurities. The tensile strength of a welding seam of the welding component after hot stamping is greater than the tensile strength of a low-strength steel base metal, and the elongation is greater than 4%, such that application requirements of the welding component in the field of automobile hot stamping are met. The present invention also relates to a method for manufg. a different-strength steel welding component with an aluminum or aluminum-alloy plating, a different-strength steel welding component with an aluminum or aluminum-alloy plating that is prepd. by means of the method, and a welding wire used in the method.

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
ALIPS PHILIPPE	2004			US 20040200813 A1	
BECKER JENS-ULRIK	2017			CN 106794671 A	CAPLUS
GARCIA MICHEL	2015			CN 105163895 A	CAPLUS
GU HONGPING	2017			CN 106687248 A	CAPLUS
LUZIUS SEVERIN	2015			US 20150034615 A1	
PAN HUA	2017			CN 106334875 A	CAPLUS
WANG XIAONAN	2018			CN 108838541 A	CAPLUS

IT 2067242-22-0

RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (aluminum or aluminum alloy plated steel differential strength welded part and its manuf.)

RN 2067242-22-0 CAPLUS

CN Iron alloy, base, Fe 89-100, Mn 0.1-5, Cr 0-3, Si 0-1, C 0.1-0.8, Ti 0-0.5, Al 0-0.3, P 0-0.3, B 0-0.1, S 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	89 - 100	7439-89-6
Mn	0.1 - 5	7439-96-5
Cr	0 - 3	7440-47-3
Si	0 - 1	7440-21-3
C	0.1 - 0.8	7440-44-0
Ti	0 - 0.5	7440-32-6
Al	0 - 0.3	7429-90-5
P	0 - 0.3	7723-14-0
B	0 - 0.1	7440-42-8
S	0 - 0.1	7704-34-9

IPCI B23K0026-26 [I]; B23K0026-322 [I]; B23K0026-12 [I]; C22C0038-38 [I];
C22C0038-32 [I]; C22C0038-28 [I]; C22C0038-06 [I]; C22C0038-04 [I];
C22C0038-02 [I]
IPCR B23K0026-26 [I]; B23K0026-12 [I]; B23K0026-322 [I]; C22C0038-02 [I];
C22C0038-04 [I]; C22C0038-06 [I]; C22C0038-28 [I]; C22C0038-32 [I];
C22C0038-38 [I]
CC 55-9 (Ferrous Metals and Alloys)
ST aluminum alloy plated ~~steel~~ differential strength welded part
IT Laser welding
Plating process
Tensile strength
Welds
(aluminum or aluminum alloy plated ~~steel~~ differential
strength welded part and its manuf.)
IT Welding of metals
(gas metal-arc welding; aluminum or aluminum alloy plated ~~steel~~
differential strength welded part and its manuf.)
IT 2067242-22-Q 2498542-24-6, C 0.03-0.1, Si 0-0.3, Mn 0.5-2, Al
0-0.1, Cr 0-0.1, Fe bal., processes
RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM
(Technical or engineered material use); PROC (Process); USES (Uses)
(aluminum or aluminum alloy plated ~~steel~~ differential
strength welded part and its manuf.)
IT 2490151-16-9, processes
RL: PEP (Physical, engineering or chemical process); TEM (Technical or
engineered material use); PROC (Process); USES (Uses)
(aluminum or aluminum alloy plated ~~steel~~ differential
strength welded part and its manuf.)
IT 7429-90-5, Aluminum, uses 2087430-39-3, Si 5-11, Fe 0-4, Al bal.
RL: TEM (Technical or engineered material use); USES (Uses)
(aluminum or aluminum alloy plated ~~steel~~ differential
strength welded part and its manuf.)

L12 ANSWER 10 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2020:1945589 CAPLUS Full-text

DOCUMENT NUMBER: 173:612896

TITLE: Production of hot-rolled ~~steel~~ material composite
with various properties, suppressed uncontrolled
deformation, and easier further processing

INVENTOR(S): Wolske, Vanessa; Vetter, Tobias; Fechte-Heinen,
Rainer; Becker, Jens-Ulrik

PATENT ASSIGNEE(S): ThyssenKrupp Steel Europe AG, Germany

SOURCE: PCT Int. Appl., 30pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: German

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2020193531	A1	20201001	WO 2020-EP58125	20200324
PRIORITY APPLN. INFO.:			DE 2019-102019204324 A	20190328

AB This invention discloses a method to produce a hot-rolled ~~steel~~ material
composite with suppressed uncontrolled deformation during hot rolling and
easier further processing.

RETABE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
Anon	1980			JP 5570490 A	
BALKENHOL MICHAEL	2016			DE 102014111625 A1	
BENJAMIN LIEBOWITZ	1949			US 2474682 A	CAPLUS
ETZLSTORFER CHRISTOPH	2017			EP 3241675 A1	CAPLUS

IT 2490282-01-2 2490282-02-3

RL: TEM (Technical or engineered material use); USES (Uses)
(prodn. of hot-rolled ~~steel~~ material composite with various
properties, suppressed uncontrolled deformation, and easier further
processing)

RN 2490282-01-2 CAPLUS

CN Iron alloy, base, Fe 92-100, Ni 0-1.8, Mn 0.3-1.5, Cr 0-1, Si 0-0.8, Mo 0-0.5, C

0.1-0.4,Cu 0-0.3,Al 0-0.2,Nb 0-0.2,Ti 0-0.2,V 0-0.2,As 0-0.1,B 0-0.1,Ca
0-0.1,N 0-0.1,P 0-0.1,S 0-0.1,Sn 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
=====+=====+=====		
Fe	92 - 100	7439-89-6
Ni	0 - 1.8	7440-02-0
Mn	0.3 - 1.5	7439-96-5
Cr	0 - 1	7440-47-3
Si	0 - 0.8	7440-21-3
Mo	0 - 0.5	7439-98-7
C	0.1 - 0.4	7440-44-0
Cu	0 - 0.3	7440-50-8
Al	0 - 0.2	7429-90-5
Nb	0 - 0.2	7440-03-1
Ti	0 - 0.2	7440-32-6
V	0 - 0.2	7440-62-2
As	0 - 0.1	7440-38-2
B	0 - 0.1	7440-42-8
Ca	0 - 0.1	7440-70-2
N	0 - 0.1	17778-88-0
P	0 - 0.1	7723-14-0
S	0 - 0.1	7704-34-9
Sn	0 - 0.1	7440-31-5

RN 2490282-02-3 CAPLUS

CN Iron alloy, base, Fe 92-99,Cr 0-2,Mn 0.3-1.5,C 0.4-0.9,Si 0-0.8,Ni 0-0.5,V
0-0.5,Cu 0-0.3,Mo 0-0.3,Al 0-0.2,Nb 0-0.2,As 0-0.1,B 0-0.1,Ca 0-0.1,N
0-0.1,P 0-0.1,S 0-0.1,Sn 0-0.1,Ti 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
=====+=====+=====		
Fe	92 - 99	7439-89-6
Cr	0 - 2	7440-47-3
Mn	0.3 - 1.5	7439-96-5
C	0.4 - 0.9	7440-44-0
Si	0 - 0.8	7440-21-3
Ni	0 - 0.5	7440-02-0
V	0 - 0.5	7440-62-2
Cu	0 - 0.3	7440-50-8
Mo	0 - 0.3	7439-98-7
Al	0 - 0.2	7429-90-5
Nb	0 - 0.2	7440-03-1
As	0 - 0.1	7440-38-2
B	0 - 0.1	7440-42-8
Ca	0 - 0.1	7440-70-2
N	0 - 0.1	17778-88-0
P	0 - 0.1	7723-14-0
S	0 - 0.1	7704-34-9
Sn	0 - 0.1	7440-31-5
Ti	0 - 0.1	7440-32-6

IPCI B32B0015-01 [I]; C22C0038-00 [I]; C22C0038-02 [I]; C22C0038-04 [I];
B21D0035-00 [I]; B23K0020-04 [I]; B23K0020-227 [I]; B23K0020-24 [I];
B23K0026-38 [I]; B23K0026-40 [I]; B23K0033-00 [I]; B23K0103-04 [I];
B23K0103-18 [I]; B21B0001-00 [I]

IPCR B32B0015-01 [I]; B21B0001-00 [I]; B21D0035-00 [I]; B23K0020-04 [I];
B23K0020-227 [I]; B23K0020-24 [I]; B23K0026-38 [I]; B23K0026-40 [I];
B23K0033-00 [I]; B23K0103-04 [N]; B23K0103-18 [N]; C22C0038-00 [I];
C22C0038-02 [I]; C22C0038-04 [I]

CC 56-11 (Nonferrous Metals and Alloys)

ST hot rolled ~~steel~~ composite

IT Composites

Heating

Hot rolling

(prodn. of hot-rolled ~~steel~~ material composite with various
properties, suppressed uncontrolled deformation, and easier further
processing)

IT 12597-69-2, Steel, uses 2490282-01-2
2490282-02-3

RL: TEM (Technical or engineered material use); USES (Uses)
(prodn. of hot-rolled ~~steel~~ material composite with various
properties, suppressed uncontrolled deformation, and easier further
processing)

L12 ANSWER 11 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2020:1569923 CAPLUS Full-text

DOCUMENT NUMBER: 173:359646

TITLE: Al-Fe-based plated ~~steel~~ sheet for hot press, and
method for manufacturing hot press member

INVENTOR(S): Sato, Rinta; Nakajima, Seiji; Ando, Satoru

PATENT ASSIGNEE(S): JFE Steel Corp., Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 15pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2020122202	A	20200813	JP 2019-16283	20190131
PRIORITY APPLN. INFO.:			JP 2019-16283	20190131

AB The title Al-Fe-based plated ~~steel~~ sheet can obtain a hot press member having excellent corrosion resistance after coating and excellent corrosion resistance at the joint portion while realizing a high temp. rising rate when subjected to heating by a furnace heating method performed before hot pressing. The Al-Fe-based plated ~~steel~~ sheet for hot press comprises a base ~~steel~~ sheet, an Al-Fe alloy plated layer formed on at least one surface of the base ~~steel~~ sheet with an adhesion amt. per one surface of 30-100 g/m², having a compn. including Fe 25-90% by mass, Si 0-1% by mass and Al and unavoidable impurities as balance, and unalloyed Al attached to the surface of the Al-Fe alloy plated layer with an adhesion amt. per one surface of 0-90 mg/m².

IT 1356847-15-8

RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)

(Al-Fe-based plated ~~steel~~ sheet for hot press, and method for manufg. hot press member)

RN 1356847-15-8 CAPLUS

CN Iron alloy, base, Fe 93-99, Mn 0.5-3, Si 0-2, Cr 0-1, C 0.2-0.5, Ti 0-0.2, Al 0-0.1, B 0-0.1, P 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	93 - 99	7439-89-6
Mn	0.5 - 3	7439-96-5
Si	0 - 2	7440-21-3
Cr	0 - 1	7440-47-3
C	0.2 - 0.5	7440-44-0
Ti	0 - 0.2	7440-32-6
Al	0 - 0.1	7429-90-5
B	0 - 0.1	7440-42-8
P	0 - 0.1	7723-14-0

IPCI C23C0002-12 [I]; C23C0002-28 [I]; C22C0021-00 [I]; C22C0038-00 [I]; C22C0021-02 [I]; C22C0038-60 [I]; C21D0009-00 [I]; C21D0001-18 [I];

IPCR C23C0002-12 [I]; C21D0001-18 [I]; C21D0009-00 [I]; C22C0021-00 [I]; C22C0021-02 [I]; C22C0038-00 [I]; C22C0038-60 [I]; C23C0002-28 [I];

CC 56-11 (Nonferrous Metals and Alloys)

ST aluminum iron plating ~~steel~~ sheet hot press

IT Heating

Hot-press molding

(Al-Fe-based plated ~~steel~~ sheet for hot press, and method for manufg. hot press member)

IT 7429-90-5, Aluminum, processes 1356847-15-8 2460706-65-2

RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)

(Al-Fe-based plated ~~steel~~ sheet for hot press, and method for manufg. hot press member)

L12 ANSWER 12 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2020:1063971 CAPLUS Full-text

DOCUMENT NUMBER: 173:85787

TITLE: Zinc-coated hot-stamped steel plate or strip with excellent cold bending performance and its manufacturing method

INVENTOR(S): Bi, Wenzhen; Hong, Jiyao; Wang, Li

PATENT ASSIGNEE(S): Baoshan Iron & Steel Co., Ltd., Peop. Rep. China

SOURCE: PCT Int. Appl., 23pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: Chinese

FAMILY ACC. NUM. COUNT: 2

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2020108594	A1	20200604	WO 2019-CN121860	20191129
CN 109371325	A	20190222	CN 2018-11454798	20181130
			CN 2018-11454798	A 20181130

PRIORITY APPLN. INFO.:

AB Provided are a zinc-based plated hot-formed steel plate or steel strip having excellent cold bending performance, and a manufg. method thereof; said zinc-based plated hot-formed steel plate or steel strip comprises a substrate having a surface decarburized layer thickness of less than 20 um and a zinc-based plated layer having an adhesion amt. of 10 to 100 g/m.cxa. 2; the component wt. percentages of the substrate are: C: 0.1-0.8%, Si: 0.05-2.0%, Mn: 0.5-3.0%, P≤0.1%, S≤0.05%, Al≤0.1%, N≤0.01%; the remainder is Fe and unavoidable impurities; the av. size of original austenite grains of the substrate is less than 15 um. After hot forming of the substrate, the hot-formed steel plate or steel strip has a tensile strength of 1500 MPa and elongation after fracture of 5%, and the coating is continuous and complete, there are no cracks extending to the substrate, and the steel plate has excellent cold bending performance.

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
AZUMA MASASHI	2011			JP 2011111675 A	CAPLUS
BI WENZHEN	2017			CN 107127238 A	CAPLUS
BI WENZHEN	2019			CN 109371325 A	CAPLUS
JIN KWANG-KEUN	1996			KR 960005237 B1	
KAWATA HIROYUKI	2014			CN 103874776 A	CAPLUS
TAKEDA GENTARO	2018			WO 2018207560 A1	CAPLUS
TANAKA YUKIMOTO	2012			JP 2012251229 A	CAPLUS
YUANQIANG TU	2010			CN 101880832 A	CAPLUS
ZHOU SHU	2016			CN 106244923 A	CAPLUS
ZHOU SHU	2016			CN 106244923 A	CAPLUS

IT 2293976-55-1D, Aluminum 0-0.1, carbon 0.1-0.8, manganese 0.5-3, phosphorus 0-0.1, silicon 0.05-2, Cr 0-1, Mo 0-1, Ti 0-0.2, Nb 0-0.08, V 0-1, B 0-0.08, iron bal., nitrogen 0-0.01
 RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (Zinc-coated hot-stamped steel plate or strip with excellent cold bending performance and its manufg. method)

RN 2293976-55-1 CAPLUS

CN Iron alloy, base, Fe 91-99, Mn 0.5-3, Si 0-2, Cr 0-1, Mo 0-1, V 0-1, C 0.1-0.8, Ti 0-0.2, Al 0-0.1, B 0-0.1, Nb 0-0.1, P 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	91 - 99	7439-89-6
Mn	0.5 - 3	7439-96-5
Si	0 - 2	7440-21-3
Cr	0 - 1	7440-47-3
Mo	0 - 1	7439-98-7
V	0 - 1	7440-62-2
C	0.1 - 0.8	7440-44-0
Ti	0 - 0.2	7440-32-6
Al	0 - 0.1	7429-90-5
B	0 - 0.1	7440-42-8

Nb 0 - 0.1 7440-03-1
P 0 - 0.1 7723-14-0

IPCI C22C0038-02 [I]; C22C0038-04 [I]; C22C0038-60 [I]; C22C0038-06 [I];
C23C0002-40 [I]; C21D0008-02 [I]
IPCR C22C0038-02 [I]; C21D0008-02 [I]; C22C0038-04 [I]; C22C0038-06 [I];
C22C0038-60 [I]; C23C0002-40 [I]
CC 55-3 (Ferrous Metals and Alloys)
ST cold bending performance zinc coating ~~steel~~ manuf hot stamping
IT Coating materials
(Zinc-coated hot-stamped ~~steel~~ plate or strip with excellent
cold bending performance and its manufg. method)
IT Galvanized ~~steel~~
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or
engineered material use); PREP (Preparation); USES (Uses)
(Zinc-coated hot-stamped ~~steel~~ plate or strip with excellent
cold bending performance and its manufg. method)
IT Metalworking
(stamping, hot; Zinc-coated hot-stamped ~~steel~~ plate or strip
with excellent cold bending performance and its manufg. method)
IT 2233976-55-1D, Aluminum 0-0.1, carbon 0.1-0.8, manganese 0.5-3,
phosphorus 0-0.1, silicon 0.05-2, Cr 0-1, Mo 0-1, Ti 0-0.2, Nb 0-0.08, V
0-1, B 0-0.08, iron bal., nitrogen 0-0.01
RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM
(Technical or engineered material use); PROC (Process); USES (Uses)
(Zinc-coated hot-stamped ~~steel~~ plate or strip with excellent
cold bending performance and its manufg. method)
IT 7440-66-6, Zinc, processes 98357-26-7
RL: PEP (Physical, engineering or chemical process); TEM (Technical or
engineered material use); PROC (Process); USES (Uses)
(Zinc-coated hot-stamped ~~steel~~ plate or strip with excellent
cold bending performance and its manufg. method)

L12 ANSWER 13 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2020:1063958 CAPLUS Full-text

DOCUMENT NUMBER: 173:85818

TITLE: Hot stamping method of zinc-based coated ~~steel~~ plate
or ~~steel~~ strip with excellent corrosion resistance

INVENTOR(S): Bi, Wenzhen; Hong, Jiyao; Wang, Li

PATENT ASSIGNEE(S): Baoshan Iron & Steel Co., Ltd., Peop. Rep. China

SOURCE: PCT Int. Appl., 17pp.; Chemical Indexing Equivalent to
170:379972 (CN)

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: Chinese

FAMILY ACC. NUM. COUNT: 2

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2020108593	A1	20200604	WO 2019-CN121859	20191129
CN 109365606	A	20190222	CN 2018-11453322	20181130
			CN 2018-11453322	A 20181130

PRIORITY APPLN. INFO.:

AB A method for forming a zinc-plated ~~steel~~ plate or ~~steel~~ belt having
good corrosion resistance, comprising the following steps: 1) conveying
the ~~steel~~ plate or ~~steel~~ belt into a heating furnace higher than Ac3,
austenitizing the ~~steel~~ plate or ~~steel~~ belt, and keeping the temp. for
1-7 min; 2) before the ~~steel~~ plate or ~~steel~~ belt leaves the heating
furnace and enters a forming mold, applying different cooling manners
according to different plated thicknesses, wherein when the single-sided
wt. of the plating is less than or equal to 50g/m2, only air cooling is
required before transferring to the forming mold, when the single-sided
wt. of the plating is greater than 50g/m2, aerial fog or water mist
precooling is performed before transferring to the forming mold, and the
~~steel~~ plate is cooled to be below 700°C at a cooling sped greater
than 30°C/s; and 3) rapidly transferring the ~~steel~~ plate or
~~steel~~ belt to the mold for hot stamping forming, wherein a transferring
duration does not exceed 1 min, and the temp. of the hot stamping forming
is controlled between 400-800°C. The tensile strength of the
~~steel~~ plate or ~~steel~~ belt after hot stamping is greater than 1,450
MPa, and substrate cracks caused by local press and LME in an element are
avoided.

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
AKIRA OBAYASHI	2005			CN 1600877 A	CAPLUS
BI WENZHEN	2017			CN 107127238 A	CAPLUS
BI WENZHEN	2017			CN 107127238 A	CAPLUS
BI WENZHEN	2019			CN 109365606 A	CAPLUS
KOJIMA TAKESHI	2017			CN 106756697 A	CAPLUS
SEKIDO YOSHITO	2013			JP 2013227614 A	CAPLUS
TAKEBAYASHI SHIGETO	2009			JP 2009228134 A	CAPLUS
WILHELM WARNECKE	2010			CN 101849029 A	CAPLUS
YI HONGLIANG	2015			CN 104846274 A	CAPLUS

IT 2293976-55-1
 RL: MSC (Miscellaneous); PEP (Physical, engineering or chemical process);
 TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (Hot stamping method of zinc-based coated ~~steel~~ plate or
~~steel~~ strip with excellent corrosion resistance)

RN 2293976-55-1 CAPLUS

CN Iron alloy, base, Fe 91-99, Mn 0.5-3, Si 0-2, Cr 0-1, Mo 0-1, V 0-1, C
 0.1-0.8, Ti 0-0.2, Al 0-0.1, B 0-0.1, Nb 0-0.1, P 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	91 - 99	7439-89-6
Mn	0.5 - 3	7439-96-5
Si	0 - 2	7440-21-3
Cr	0 - 1	7440-47-3
Mo	0 - 1	7439-98-7
V	0 - 1	7440-62-2
C	0.1 - 0.8	7440-44-0
Ti	0 - 0.2	7440-32-6
Al	0 - 0.1	7429-90-5
B	0 - 0.1	7440-42-8
Nb	0 - 0.1	7440-03-1
P	0 - 0.1	7723-14-0

IPCI B21D0022-02 [I]; C23C0002-06 [I]; C23C0002-40 [I]; C22C0018-00 [I];
 C21D0008-02 [I]

IPCR B21D0022-02 [I]; C21D0008-02 [I]; C22C0018-00 [I]; C23C0002-06 [I];
 C23C0002-40 [I]

CC 55-6 (Ferrous Metals and Alloys)

ST corrosion resistance zinc alloy coating ~~steel~~ hot stamping

IT Anticorrosive coating materials
 Coating materials
 (Hot stamping method of zinc-based coated ~~steel~~ plate or
~~steel~~ strip with excellent corrosion resistance)

IT Metalworking
 (stamping, hot; Hot stamping method of zinc-based coated ~~steel~~
 plate or ~~steel~~ strip with excellent corrosion resistance)

IT 2293976-55-1
 RL: MSC (Miscellaneous); PEP (Physical, engineering or chemical process);
 TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (Hot stamping method of zinc-based coated ~~steel~~ plate or
~~steel~~ strip with excellent corrosion resistance)

IT 2226545-76-0
 RL: PEP (Physical, engineering or chemical process); TEM (Technical or
 engineered material use); PROC (Process); USES (Uses)
 (Hot stamping method of zinc-based coated ~~steel~~ plate or
~~steel~~ strip with excellent corrosion resistance)

L12 ANSWER 14 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2020:1041904 CAPLUS Full-text

DOCUMENT NUMBER: 173:612711

TITLE: Aluminum or aluminum alloy plated ~~steel~~ differential
 strength welded part and its manufacture

INVENTOR(S): Pan, Hua; Liu, Chengjie; Lei, Ming; Wu, Yue; Sun,
 Zhongqu; Jiang, Haomin

PATENT ASSIGNEE(S): Baoshan Iron & Steel Co., Ltd., Peop. Rep. China

SOURCE: Faming Zhuanli Shenqing, 12pp.

CODEN: CNXXEV
DOCUMENT TYPE: Patent
LANGUAGE: Chinese
FAMILY ACC. NUM. COUNT: 2
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
CN 111215751	A	20200602	CN 2019-10249188	20190329
WO 2020200110	A1	20201008	WO 2020-CN81743	20200327
PRIORITY APPLN. INFO.:			CN 2019-10249188	A 20190329

AB The invention discloses a steel differential strength welding part with an aluminum or aluminum alloy coating and a manufg. method thereof, wherein the steel differential strength welding part is formed by butt welding a high-strength steel plate and a low-strength steel plate, and the high-strength steel plate and the low-strength steel plate comprise a substrate and at least one of the surfaces of the substrate and the substrate is a pure aluminum or aluminum alloy coating; the high-strength steel plate matrix comprises the following components in percentage by wt.: C 0.08-0.8%, Si 0.05-1.0%, Mn 0.1-5%, P <0.3%, S <0.1%, Al <0.3%, Ti <0.5%, B 0.0005-0.1%, Cr 0.01-3%, residual Fe and inevitable impurities; the low-strength steel plate matrix comprises the following components in percentage by wt.: C 0.03-0.1%, Si 0-0.1%, Mn 1.0-2.0%, P <0.1%, S <0.05%, Al <0.1%, Cr 0-0.1%, Ti 0-0.05%, balance of Fe and inevitable impurities. The tensile strength of the welded part after hot stamping is greater than that of a low-strength steel base metal, the elongation is greater than 4%, and the application requirements of the welded part in the field of automobile hot stamping are met.

IT 2067242-22-0, C 0.08-0.8, Si 0.05-1, Mn 0.1-5, P 0-0.3, S 0-0.1, Al 0-0.3, Ti 0-0.5, B 0.0005-0.1, Cr 0.01-3, Fe bal.
RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(aluminum or aluminum alloy plated steel differential strength welded part and its manuf.)

RN 2067242-22-0 CAPLUS

CN Iron alloy, base, Fe 89-100, Mn 0.1-5, Cr 0-3, Si 0-1, C 0.1-0.8, Ti 0-0.5, Al 0-0.3, P 0-0.3, B 0-0.1, S 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	89 - 100	7439-89-6
Mn	0.1 - 5	7439-96-5
Cr	0 - 3	7440-47-3
Si	0 - 1	7440-21-3
C	0.1 - 0.8	7440-44-0
Ti	0 - 0.5	7440-32-6
Al	0 - 0.3	7429-90-5
P	0 - 0.3	7723-14-0
B	0 - 0.1	7440-42-8
S	0 - 0.1	7704-34-9

IPCI B23K0026-26; B23K0026-322; B23K0026-12; C22C0038-38; C22C0038-32; C22C0038-28; C22C0038-06; C22C0038-04; C22C0038-02

IPCR B23K0026-26 [I]; B23K0026-12 [I]; B23K0026-322 [I]; C22C0038-02 [I]; C22C0038-04 [I]; C22C0038-06 [I]; C22C0038-28 [I]; C22C0038-32 [I]; C22C0038-38 [I]

CC 55-9 (Ferrous Metals and Alloys)

ST r aluminum alloy plated steel differential strength welded part

IT Laser welding
Plating process
Tensile strength
Welds
(aluminum or aluminum alloy plated steel differential strength welded part and its manuf.)

IT Welding of metals
(gas metal-arc welding; aluminum or aluminum alloy plated steel differential strength welded part and its manuf.)

IT 2067242-22-0, C 0.08-0.8, Si 0.05-1, Mn 0.1-5, P 0-0.3, S 0-0.1, Al 0-0.3, Ti 0-0.5, B 0.0005-0.1, Cr 0.01-3, Fe bal. 2490151-15-8, C 0.03-0.1, Si 0-0.1, Mn 0.5-2, Al 0-0.1, Cr 0-0.1, Fe bal., processes
RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)

(aluminum or aluminum alloy plated steel differential strength welded part and its manuf.)
 IT 2490151-16-9, C 0.1-0.25, Si 0.2-0.4, Mn 1.2-2, Al 0-0.06, Ti 0.02-0.08, Cr 0.05-0.2, Fe bal., processes
 RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (aluminum or aluminum alloy plated steel differential strength welded part and its manuf.)
 IT 7429-90-5, Aluminum, uses 1273096-81-3, Aluminum alloy
 RL: TEM (Technical or engineered material use); USES (Uses)
 (aluminum or aluminum alloy plated steel differential strength welded part and its manuf.)

L12 ANSWER 15 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2020:185423 CAPLUS Full-text
 DOCUMENT NUMBER: 172:169762
 TITLE: Manufacture of hardened steel products with aluminum-based coatings
 INVENTOR(S): Pohl, Stefan; Danger, Elisabeth; Labudde, Thorsten; Butzkamm, Juergen
 PATENT ASSIGNEE(S): Muhr und Bender KG, Germany
 SOURCE: PCT Int. Appl., 29pp.; Chemical Indexing Equivalent to 172:169761 (DE)
 CODEN: PIXXD2

DOCUMENT TYPE: Patent
 LANGUAGE: German
 FAMILY ACC. NUM. COUNT: 2

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2020020644	A1	20200130	WO 2019-EP68581	20190710
DE 102018118015	A1	20200130	DE 2018-102018118015	20180725
PRIORITY APPLN. INFO.:			DE 2018-102018118015 A	20180725

AB A method for producing a hardened steel product, comprises: providing a steel substrate made of a hardenable steel; coating the steel substrate with an aluminum pre-coating, the pre-coating being applied to the steel substrate with a thickness of at least 34µm; flexibly rolling the pre-coated steel substrate in order to produce a variable thickness over the length of the pre-coated steel substrate, the pre-coating being rolled out to a reduced first thickness of less than 33µm in thinner first portions and to a reduced second thickness, which is thicker than the reduced first thickness, in thicker second portions; creating a blank from the flexibly rolled steel substrate; heating the blank to the austenitization temp., diffusion processes between the base material and the pre-coating occurring; and hot-forming the heated blank, the heated blank being formed and being quickly cooled in such a way that a hardened steel product having a coating is produced.

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
BATISTA LEONARDO MESQUI	2019			EP 3489386 A1	CAPLUS
Hauger, A	1995	23	40	Fertigung	
KIM HEUNG-YUN	2018			US 20180142337 A1	
MACHADO AMORIM	2017			WO 2017017521 A1	CAPLUS
SCHNEIDER DR CHRISTOPH	2017			EP 3181248 A1	
TANAHASHI HIROYUKI	2014			US 20140044987 A1	
WINKLHOFFER KERRY	2008			DE 102007019196 A1	CAPLUS
Windmann, M	2014	246	17	Surface And Coatings	CAPLUS

IT 2408930-78-7
 RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (substrates; manuf. of hardened steel products with aluminum-based coatings)

RN 2408930-78-7 CAPLUS

CN Iron alloy, base, Fe 91-99, Mn 0.5-5, Cr 0-1, Mo 0-1, Si 0.1-0.9, C 0.2-0.5, Ti 0-0.2, V 0-0.2, Al 0-0.1, B 0-0.1, Cu 0-0.1, Nb 0-0.1, Ni 0-0.1, P 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
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=====+=====+=====
Fe      91    -   99      7439-89-6
Mn      0.5    -    5      7439-96-5
Cr       0     -    1      7440-47-3
Mo       0     -    1      7439-98-7
Si      0.1    -   0.9     7440-21-3
C       0.2    -   0.5     7440-44-0
Ti       0     -   0.2     7440-32-6
V        0     -   0.2     7440-62-2
Al       0     -   0.1     7429-90-5
B        0     -   0.1     7440-42-8
Cu       0     -   0.1     7440-50-8
Nb       0     -   0.1     7440-03-1
Ni       0     -   0.1     7440-02-0
P        0     -   0.1     7723-14-0

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IPCI C21D0001-673 [I]; B21B0037-24 [I]; B21B0037-26 [I]; C23C0002-12 [I]
 IPCR C21D0001-673 [I]; B21B0037-24 [I]; B21B0037-26 [I]; C23C0002-12 [I]

CC 55-6 (Ferrous Metals and Alloys)

Section cross-reference(s): 56

ST hardened ~~steel~~ aluminum alloy coating silicon austenizing rolling

IT Diffusion

Heat treatment

Hot-dip coating process

Metal forming

Rolling (metals)

Thermomechanical metalworking

(manuf. of hardened ~~steel~~ products with aluminum-based coatings)

IT Oxides (inorganic)

RL: FMU (Formation, unclassified); FORM (Formation, nonpreparative)

(manuf. of hardened ~~steel~~ products with aluminum-based coatings)

IT 7429-90-5, Aluminum, processes 77578-10-0

RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)

(coatings; manuf. of hardened ~~steel~~ products with aluminum-based coatings)

IT 12597-69-2, ~~Steel~~, processes 2408930-78-7

RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)

(substrates; manuf. of hardened ~~steel~~ products with aluminum-based coatings)

L12 ANSWER 16 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2020:178086 CAPLUS Full-text

DOCUMENT NUMBER: 172:169761

TITLE: Manufacture of hardened ~~steel~~ products with aluminum-based coatings

INVENTOR(S): Pohl, Stefan; Danger, Elisabeth; Labudde, Thorsten; Butzkamm, Juergen

PATENT ASSIGNEE(S): Muhr und Bender KG, Germany

SOURCE: Ger. Offen., 13pp.; Chemical Indexing Equivalent to 172:169762 (WO)

CODEN: GWXXBX

DOCUMENT TYPE: Patent

LANGUAGE: German

FAMILY ACC. NUM. COUNT: 2

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
DE 102018118015	A1	20200130	DE 2018-102018118015	20180725
WO 2020020644	A1	20200130	WO 2019-EP68581	20190710
PRIORITY APPLN. INFO.:			DE 2018-102018118015 A	20180725

AB A method for producing a hardened ~~steel~~ product, comprises: providing a ~~steel~~ substrate made of a hardenable ~~steel~~; coating the ~~steel~~ substrate with an aluminum pre-coating, the pre-coating being applied to the ~~steel~~ substrate with a thickness of at least 34µm; flexibly rolling the pre-coated ~~steel~~ substrate in order to produce a variable thickness over the length of the pre-coated ~~steel~~ substrate, the pre-coating being rolled out to a reduced first thickness of less than

33µm in thinner first portions and to a reduced second thickness, which is thicker than the reduced first thickness, in thicker second portions; creating a blank from the flexibly rolled ~~steel~~ substrate; heating the blank to the austenitization temp., diffusion processes between the base material and the pre-coating occurring; and hot-forming the heated blank, the heated blank being formed and being quickly cooled in such a way that a hardened ~~steel~~ product having a coating is produced.

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
Anon				DE 102005031461 A1	CAPLUS
Anon				DE 102007013739 B3	CAPLUS
Anon				DE 102007019196 A1	CAPLUS
Anon				DE 102009007909 A1	CAPLUS
Anon	2019			Feuerverzinken In:Wi	
Anon				Salzgitter Flachstah	

IT 2408930-78-7
 RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (substrates; manuf. of hardened ~~steel~~ products with aluminum-based coatings)

RN 2408930-78-7 CAPLUS

CN Iron alloy, base, Fe 91-99,Mn 0.5-5,Cr 0-1,Mo 0-1,Si 0.1-0.9,C 0.2-0.5,Ti 0-0.2,V 0-0.2,Al 0-0.1,B 0-0.1,Cu 0-0.1,Nb 0-0.1,Ni 0-0.1,P 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	91 - 99	7439-89-6
Mn	0.5 - 5	7439-96-5
Cr	0 - 1	7440-47-3
Mo	0 - 1	7439-98-7
Si	0.1 - 0.9	7440-21-3
C	0.2 - 0.5	7440-44-0
Ti	0 - 0.2	7440-32-6
V	0 - 0.2	7440-62-2
Al	0 - 0.1	7429-90-5
B	0 - 0.1	7440-42-8
Cu	0 - 0.1	7440-50-8
Nb	0 - 0.1	7440-03-1
Ni	0 - 0.1	7440-02-0
P	0 - 0.1	7723-14-0

IPCI C23F0017-00 [I]; C23C0002-12 [I]; C22C0038-04 [I]

IPCR C23F0017-00 [I]; C22C0038-04 [I]; C23C0002-12 [I]

CC 55-6 (Ferrous Metals and Alloys)
 Section cross-reference(s): 56

ST hardened ~~steel~~ aluminum alloy coating silicon austenizing rolling

IT Diffusion
 Heat treatment
 Hot-dip coating process
 Metal forming
 Rolling (metals)
 Thermomechanical metalworking
 (manuf. of hardened ~~steel~~ products with aluminum-based coatings)

IT Oxides (inorganic)
 RL: FMU (Formation, unclassified); FORM (Formation, nonpreparative)
 (manuf. of hardened ~~steel~~ products with aluminum-based coatings)

IT 7429-90-5, Aluminum, processes 77578-10-0
 RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (coatings; manuf. of hardened ~~steel~~ products with aluminum-based coatings)

IT 12597-69-2, ~~Steel~~, processes 2408930-78-7
 RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (substrates; manuf. of hardened ~~steel~~ products with aluminum-based coatings)

ACCESSION NUMBER: 2019:1450710 CAPLUS Full-text
 TITLE: The influence of the heating rate of cemented constructional ~~steels~~ on the growth of austenitic grain in the process of high-temperature holding
 AUTHOR(S): Kukareko, V. A.; Valko, A. L.; Chichin, A. N.
 CORPORATE SOURCE: Joint Institute of Mechanical Engineering of the National Academy of Sciences of Belarus, Minsk, Belarus
 SOURCE: Vestsi Natsyyanal'nai Akademii Navuk Belarusi, Seryya Fizika-Tekhnichnykh Navuk (2018), (4), 399-406
 CODEN: VABNFA; ISSN: 1561-8358
 DIGITAL OBJECT ID: 10.29235/1561-8358-2018-63-4-399-406
 PUBLISHER: Vydavetski Dom "Belaruskaya Navuka"
 DOCUMENT TYPE: Journal
 LANGUAGE: Russian

AB The influence of the heating mode of samples of constructional cemented ~~steels~~ 20KhNZA, 20KhGMR and 15KhGN2TA on the value of austenite grain after high-temp. isothermal aging at 1000 °C is studied. It is shown that the heating of ~~steels~~ at a rate of 1.2-3.0 °C/min in the phase-transformation interval stabilizes the grain structure of the ~~steels~~ and leads to a slowing down of the kinetics of the growth of austenite grains during prolonged high-temp. aging, which makes it possible to increase the temp. of the chem.-thermal treatment of ~~steels~~. It is concluded that the stabilization of the grain structure of ~~steels~~ is assocd. with the formation of segregation of impurity atoms and particles at grain boundaries with high-angle disorientation during slow heating, which prevents migration of grain boundaries in the process of prolonged high-temp. aging. A high-temp. chem.-thermal treatment of a batch of billets from ~~steel~~ 20KhNZA under exptl. conditions with stepwise heating in the phase-transformation interval provided a qual. fine-grained structure of the cemented layer.

IT INDEXING IN PROGRESS

IT 37312-00-8, 20KhGMR

RL: TEM (Technical or engineered material use); USES (Uses)
 (influence of heating rate of cemented constructional ~~steels~~
 on growth of austenitic grain in process of high-temp. holding)

RN 37312-00-8 CAPLUS

CN Iron alloy, base, Fe 95-97, Ni 0.80-1.10, Cr 0.70-1.10, Mn 0.70-1.00, Si 0.17-0.37, Cu 0-0.30, C 0.16-0.23, W 0-0.20, Mo 0-0.15, V 0-0.05, P 0-0.035, S 0-0.035, Ti 0-0.03, B 0.001 (20KhGMR) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	95 - 97	7439-89-6
Ni	0.80 - 1.10	7440-02-0
Cr	0.70 - 1.10	7440-47-3
Mn	0.70 - 1.00	7439-96-5
Si	0.17 - 0.37	7440-21-3
Cu	0 - 0.30	7440-50-8
C	0.16 - 0.23	7440-44-0
W	0 - 0.20	7440-33-7
Mo	0 - 0.15	7439-98-7
V	0 - 0.05	7440-62-2
P	0 - 0.035	7723-14-0
S	0 - 0.035	7704-34-9
Ti	0 - 0.03	7440-32-6
B	0.001	7440-42-8

CC 55 (Ferrous Metals and Alloys)

ST ~~steel~~ austenitic grain growth heating rate holding temp

IT Grain boundaries

Grain size

Heat treatment

Microhardness

Microstructure

Quenching (cooling)

(influence of heating rate of cemented constructional ~~steels~~
 on growth of austenitic grain in process of high-temp. holding)

IT 37312~00~8, 20KhGNR 61431-72-9, 15KhGN2TA
 RL: TEM (Technical or engineered material use); USES (Uses)
 (influence of heating rate of cemented constructional steels
 on growth of austenitic grain in process of high-temp. holding)

L12 ANSWER 18 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2019:1382711 CAPLUS Full-text
 DOCUMENT NUMBER: 171:194698
 TITLE: Electric resistance welded steel pipe with excellent
 fatigue strength and its manufacture for oil wells
 INVENTOR(S): Sadasue, Teruki; Handa, Tsunehisa; Ikeda, Michimasa
 PATENT ASSIGNEE(S): JFE Steel Corp., Japan
 SOURCE: Jpn. Kokai Tokkyo Koho, 20pp.
 CODEN: JKXXAF
 DOCUMENT TYPE: Patent
 LANGUAGE: Japanese
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2019116658	A	20190718	JP 2017-250540	20171227
JP 6760254	B2	20200923		

PRIORITY APPLN. INFO.: JP 2017-250540 20171227

AB The elec. resistance welding steel pipe comprises element in mass%:
 0.001-0.50 of carbon (C), 0.001-2.0 of silicon (Si), 0.001-3.0 of
 manganese (Mn), 0-0.05 of phosphorus (P), 0-0.05 of sulfur (S),
 0.010-0.060 of aluminum(Al) and balance of iron (Fe); a ferrite 0-70%,
 bainite contg. 30-50%, and the total of ferrite and bainite is 90% or
 more, and further 0-10% a structure consisting of pearlite or martensite;
 a fine carbides with a particle size of 0-500 nm are dispersed in the
 described structure, and static yield in the axial direction of the tube
 is obtained at the thickness center position obtained by the tensile test
 according to JIS Z 2241; the static yield strength in the axial direction
 is 360 MPa or more, and the static tensile strength is 520MPa or more; and
 a cyclic yield strength of 360MPa or more obtained from a cyclic stress
 distortion line obtained by applying a cyclic stress load of 0.1.
 According to the present invention, it is possible to provide a elec.
 resistance welding steel pipe with large thickness of 11.9mm or more, a
 large diam. of 219.1mm or more, and excellent fatigue strength.

IT 2363036~61~5P, C 0.001-0.50, Si 0.001-2.0, Mn 0.001-3.0, Al
 0.010-0.060, Cu 0-5.0, Ni 0-5.0, Cr 0-5.0, Mo 0-5.0, Nb 0-0.5, V 0-0.5, Ti
 0-0.5, B 0-0.1, Ca 0-0.1, Mis 0-0.1, Fe bal.
 RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or
 engineered material use); PREP (Preparation); USES (Uses)
 (elec. resistance welded steel pipe with excellent fatigue
 strength and its manuf. for oil wells)

RN 2363036-61-5 CAPLUS

CN Iron alloy, base, Fe 73-100, Cr 0-5, Cu 0-5, Mo 0-5, Ni 0-5, Mn 0-3, Si 0-2, C
 0-0.5, Nb 0-0.5, Ti 0-0.5, V 0-0.5, Al 0-0.1, B 0-0.1, Ca 0-0.1, misch metal
 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	73 - 100	7439-89-6
Cr	0 - 5	7440-47-3
Cu	0 - 5	7440-50-8
Mo	0 - 5	7439-98-7
Ni	0 - 5	7440-02-0
Mn	0 - 3	7439-96-5
Si	0 - 2	7440-21-3
C	0 - 0.5	7440-44-0
Nb	0 - 0.5	7440-03-1
Ti	0 - 0.5	7440-32-6
V	0 - 0.5	7440-62-2
Al	0 - 0.1	7429-90-5
B	0 - 0.1	7440-42-8
Ca	0 - 0.1	7440-70-2
Misch metal	0 - 0.1	8049-20-5

IPCI C22C0038-00 [I]; C21D0008-02 [I]; C21D0009-08 [I]; C21D0009-50 [I];

C22C0038-60 [I]; C22C0038-00 [I]; C21D0008-02 [I]; C21D0009-08 [I];
 C21D0009-50 [I]; C22C0038-60 [I]
 IPCR C22C0038-00 [I]; C21D0008-02 [I]; C21D0009-08 [I]; C21D0009-50 [I];
 C22C0038-60 [I]
 CC 55-9 (Ferrous Metals and Alloys)
 Section cross-reference(s): 51
 ST elec resistance welding ~~steel~~ pipe manuf oil well
 IT Casting of metals
 (continuous; elec. resistance welded ~~steel~~ pipe with
 excellent fatigue strength and its manuf. for oil wells)
 IT Fatigue, mechanical
 Hot rolling
 Melting
 Microstructure
 Oil wells
 Pipes and Tubes
 Tempering
 Tensile strength
 Yield strength
 (elec. resistance welded ~~steel~~ pipe with excellent fatigue
 strength and its manuf. for oil wells)
 IT Welding of metals
 (resistance welding; elec. resistance welded ~~steel~~ pipe with
 excellent fatigue strength and its manuf. for oil wells)
 IT 2363036-61-5P, C 0.001-0.50, Si 0.001-2.0, Mn 0.001-3.0, Al
 0.010-0.060, Cu 0-5.0, Ni 0-5.0, Cr 0-5.0, Mo 0-5.0, Nb 0-0.5, V 0-0.5, Ti
 0-0.5, B 0-0.1, Ca 0-0.1, Mis 0-0.1, Fe bal.
 RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or
 engineered material use); PREP (Preparation); USES (Uses)
 (elec. resistance welded ~~steel~~ pipe with excellent fatigue
 strength and its manuf. for oil wells)

L12 ANSWER 19 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2019:1379929 CAPLUS Full-text

DOCUMENT NUMBER: 171:194695

TITLE: Large diameter electric resistance welded thick wall
~~steel~~ pipe with excellent fatigue strength and its
 manufacture for oil wells

INVENTOR(S): Sadasue, Teruki; Handa, Tsunehisa; Ikeda, Michimasa

PATENT ASSIGNEE(S): JFE Steel Corp., Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 20pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2019116657	A	20190718	JP 2017-250538	20171227
JP 6773020	B2	20201021		

PRIORITY APPLN. INFO.: JP 2017-250538 20171227

AB The elec. resistance welded ~~steel~~ pipe comprises the following
 components in mass(%): 0.001-0.50 of carbon (C), 0.001-2.0 of silicon
 (Si), 0.001-3.0 of manganese (Mn), 0-0.05 of phosphorus, 0-0.05 of sulfur
 (S), 0.010-0.060 of aluminum (Al), balance of iron (Fe) and unavoidable
 impurities. The hot-rolled ~~steel~~ strip having a mixed phase composed of
 ferrite and pearlite as the main phase, and a structure composed of the
 main phase and the second phase of 0-30% in area ratio, and fine carbides
 with a particle size of 0-500 nm are dispersed, static yield strength of
 at least 245 MPa in the axial direction at a thickness center position,
 static tensile strength of at least 415 MPa, and stress ratio of 0.1
 obtained by a tensile test, and cyclic yield strength detd. from a cyclic
 stress distortion line obtained by applying cyclic stress is at least 245
 MPa. The manufg. method of elec. resistance welded ~~steel~~ pipe comprises
 the following steps: (1) performing hot-rolled ~~steel~~ strip to cold
 bending in the width direction of the material; (2) abutting against the
 end portions in the width direction of the open pipe, pressing, and
 welding to each other to form an elec. resistance welded ~~steel~~ pipe; and
 (3) performing low-temp. tempering treatment at a tempering temp. of 150
 -350°C. According to the present invention, it is possible to
 provide an excellent elec. resistance welded ~~steel~~ pipe to the fatigue

strength of the pipe outer diam. of at least 219.1mm, and wall thickness is at least 11.9mm.

IT 2363036-61-5P, C 0.001-0.50, Si 0.001-2.0, Mn 0.001-3.0, Al 0.010-0.060, Fe bal., Cu 0-5.0, Ni 0-5.0, Cr 0-5.0, Mo 0-5.0, Nb 0-0.5, V 0-0.5, Ti 0-0.5, B 0-0.1, Ca 0-0.1, Mis 0-0.1
 RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
 (large diam. elec. resistance welded thick wall steel pipe with excellent fatigue strength and its manuf. for oil wells)

RN 2363036-61-5 CAPLUS

CN Iron alloy, base, Fe 73-100, Cr 0-5, Cu 0-5, Mo 0-5, Ni 0-5, Mn 0-3, Si 0-2, C 0-0.5, Nb 0-0.5, Ti 0-0.5, V 0-0.5, Al 0-0.1, B 0-0.1, Ca 0-0.1, misch metal 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
=====+=====+=====		
Fe	73 - 100	7439-89-6
Cr	0 - 5	7440-47-3
Cu	0 - 5	7440-50-8
Mo	0 - 5	7439-98-7
Ni	0 - 5	7440-02-0
Mn	0 - 3	7439-96-5
Si	0 - 2	7440-21-3
C	0 - 0.5	7440-44-0
Nb	0 - 0.5	7440-03-1
Ti	0 - 0.5	7440-32-6
V	0 - 0.5	7440-62-2
Al	0 - 0.1	7429-90-5
B	0 - 0.1	7440-42-8
Ca	0 - 0.1	7440-70-2
Misch metal	0 - 0.1	8049-20-5

IPCI C22C0038-00 [I]; C21D0009-08 [I]; C22C0038-60 [I]; C21D0008-02 [I]; C21D0009-50 [I]; C21D0008-10 [I]; C22C0038-00 [I]; C21D0009-08 [I]; C22C0038-60 [I]; C21D0008-02 [I]; C21D0009-50 [I]; C21D0008-10 [I]

IPCR C22C0038-00 [I]; C21D0008-02 [I]; C21D0008-10 [I]; C21D0009-08 [I]; C21D0009-50 [I]; C22C0038-60 [I]

CC 55-9 (Ferrous Metals and Alloys)

Section cross-reference(s): 51

ST elec resistance welded steel pipe manuf oil well

IT Casting of metals

(continuous; large diam. elec. resistance welded thick wall steel pipe with excellent fatigue strength and its manuf. for oil wells)

IT Fatigue, mechanical

Hot rolling

Melting

Metalworking

Microstructure

Oil wells

Pipes and Tubes

Tempering

Tensile strength

Yield strength

(large diam. elec. resistance welded thick wall steel pipe with excellent fatigue strength and its manuf. for oil wells)

IT Carbides

RL: FMU (Formation, unclassified); FORM (Formation, nonpreparative)

(large diam. elec. resistance welded thick wall steel pipe with excellent fatigue strength and its manuf. for oil wells)

IT Welding of metals

(resistance welding; large diam. elec. resistance welded thick wall steel pipe with excellent fatigue strength and its manuf. for oil wells)

IT 2363036-61-5P, C 0.001-0.50, Si 0.001-2.0, Mn 0.001-3.0, Al

0.010-0.060, Fe bal., Cu 0-5.0, Ni 0-5.0, Cr 0-5.0, Mo 0-5.0, Nb 0-0.5, V 0-0.5, Ti 0-0.5, B 0-0.1, Ca 0-0.1, Mis 0-0.1

RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(large diam. elec. resistance welded thick wall steel pipe with excellent fatigue strength and its manuf. for oil wells)

ACCESSION NUMBER: 2019:1378836 CAPLUS Full-text

DOCUMENT NUMBER: 171:194638

TITLE: Large-diameter electric-resistance welded steel pipe having thick wall and excellent fatigue strength and its manufacture for oil wells

INVENTOR(S): Sadasue, Teruki; Handa, Tsunehisa; Ikeda, Michimasa

PATENT ASSIGNEE(S): JFE Steel Corp., Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 20pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2019116659	A	20190718	JP 2017-250541	20171227
JP 6773021	B2	20201021		

PRIORITY APPLN. INFO.: JP 2017-250541 20171227

AB The title elec.-resistance welded (ERW) steel pipe is excellent in fatigue strength, has a thickness of 11.9 mm or more and a pipe outer diam. of 219.1 mm or more. The steel pipe is manufd. from (by wt.%) a hot-rolled steel strip composed of C: 0.001-0.50%, Si: 0.001-2.0%, Mn: 0.00-3.0%, P: 0.05% or less, S: 0.05% or less, Al: 0.010-0.060%, Fe and unavoidable impurities as balance, and having an area ratio of 80% or more of bainite and less than 20% (including 0%) of ferrite or martensite, has a cylindrical shape by cold machining. The title method comprises butting the end in the width direction, pressing, elec. resistance welding, and low temp. tempering at 150-350 °C. The steel pipe has static yield strength of 450 MPa or more, static tensile strength of 535 MPa or more. The steel pipe has a cyclic yield strength of 450 MPa or more detd. from a cyclic stress distortion obtained by applying a cyclic stress load of a Charpy absorbed energy of 27 J or more and a stress ratio of 0.1 at a test temp. of 0°C.

IT 2363036-61-5P, Aluminum 0.01-0.06, boron 0-0.1, calcium 0-0.1, carbon 0.001-0.5, chromium 0-5, copper 0-5, iron bal., manganese 0.001-3, molybdenum 0-5, nickel 0-5, niobium 0-0.5, Mis 0-0.1, silicon 0.001-2, titanium 0-0.5, vanadium 0-0.5

RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(large-diam. elec.-resistance welded steel pipe having thick wall and excellent fatigue strength and its manuf. for oil wells)

RN 2363036-61-5 CAPLUS

CN Iron alloy, base, Fe 73-100, Cr 0-5, Cu 0-5, Mo 0-5, Ni 0-5, Mn 0-3, Si 0-2, C 0-0.5, Nb 0-0.5, Ti 0-0.5, V 0-0.5, Al 0-0.1, B 0-0.1, Ca 0-0.1, misch metal 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	73 - 100	7439-89-6
Cr	0 - 5	7440-47-3
Cu	0 - 5	7440-50-8
Mo	0 - 5	7439-98-7
Ni	0 - 5	7440-02-0
Mn	0 - 3	7439-96-5
Si	0 - 2	7440-21-3
C	0 - 0.5	7440-44-0
Nb	0 - 0.5	7440-03-1
Ti	0 - 0.5	7440-32-6
V	0 - 0.5	7440-62-2
Al	0 - 0.1	7429-90-5
B	0 - 0.1	7440-42-8
Ca	0 - 0.1	7440-70-2
Misch metal	0 - 0.1	8049-20-5

IPCI C22C0038-00 [I]; C21D0008-02 [I]; C22C0038-60 [I]; C21D0009-08 [I];
C21D0009-50 [I]; C21D0008-10 [I]; C22C0038-00 [I]; C21D0008-02 [I];
C22C0038-60 [I]; C21D0009-08 [I]; C21D0009-50 [I]; C21D0008-10 [I];
IPCR C22C0038-00 [I]; C21D0008-02 [I]; C21D0008-10 [I]; C21D0009-08 [I];

CC C21D0009-50 [I]; C22C0038-60 [I]
 55-3 (Ferrous Metals and Alloys)
 Section cross-reference(s): 51
 ST elec resistance welded ~~steel~~ pipe
 IT Bending
 Compression
 Fatigue, mechanical
 Microstructure
 Oil wells
 Pipes and Tubes
 Tempering
 Tensile strength
 Yield strength
 (large-diam. elec.-resistance welded ~~steel~~ pipe having thick
 wall and excellent fatigue strength and its manuf. for oil wells)
 IT Welding of metals
 (resistance welding; large-diam. elec.-resistance welded ~~steel~~
 pipe having thick wall and excellent fatigue strength and its manuf.
 for oil wells)
 IT 2363036-61-5P, Aluminum 0.01-0.06, boron 0-0.1, calcium 0-0.1,
 carbon 0.001-0.5, chromium 0-5, copper 0-5, iron bal., manganese 0.001-3,
 molybdenum 0-5, nickel 0-5, niobium 0-0.5, Mis 0-0.1, silicon 0.001-2,
 titanium 0-0.5, vanadium 0-0.5
 RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or
 engineered material use); PREP (Preparation); USES (Uses)
 (large-diam. elec.-resistance welded ~~steel~~ pipe having thick
 wall and excellent fatigue strength and its manuf. for oil wells)

L12 ANSWER 21 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2019:1254928 CAPLUS Full-text

DOCUMENT NUMBER: 171:98349

TITLE: Production of cold-rolled flat ~~steel~~ products having
 metal anti-corrosion layers

INVENTOR(S): Mraczek, Klemens; Muhr, Andreas; Haneder, Bernhard

PATENT ASSIGNEE(S): Voestalpine Stahl GmbH, Austria

SOURCE: PCT Int. Appl., 38pp.; Chemical Indexing Equivalent to
 171:98344 (DE)

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: German

FAMILY ACC. NUM. COUNT: 2

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2019121793	A1	20190627	WO 2018-EP85664	20181218
DE 102017223633	A1	20190627	DE 2017-102017223633	20171221
EP 3728654	A1	20201028	EP 2018-826307	20181218
US 20200325552	A1	20201015	US 2020-16956301	20200619
PRIORITY APPLN. INFO.:			DE 2017-102017223633 A	20171221
			WO 2018-EP85664	W 20181218

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB A cold-rolled flat ~~steel~~ contains, in addn. to iron and unavoidable
 impurities, (in wt.%): C: 0.01-0.35%, Mn: 1-4%, Si: 0.5-2.5%, Nb: up to
 0.1%, Ti: 0.015-0.1%, P: up to 0.1%, Al: up to 0.15%, S: up to 0.01%, N:
 up to 0.1%, and optionally one or more elements from the group of rare
 earth metals, Mo, Cr, Zr, V, W, Co, Ni, B, Cu, Ca, with rare earth metals:
 up to 0.2%, Mo: up to 1%, Cr: up to 3%, Zr: up to 1%, V: up to 1%, W: up
 to 1%, Co: up to 1%, Ni: up to 2%, B: up to 0.1%, Cu: up to 3%, Ca: up to
 0.015%. The flat ~~steel~~ products are manufd. by: melting then casting
 the ~~steel~~ melt to form a semi-finished product; hot-rolling the
 semi-finished product at 820-1000°C to form a hot strip; winding
 the hot strip at a temp. between room temp. and 750°C to form a
 coil; annealing the hot strip at 530-950°C for 1-50 h; cold-rolling
 the annealed hot strip to form a cold-rolled flat ~~steel~~ product in one
 or more stages with a total cold-rolling degree of at least 45%; final
 annealing of the cold-rolled flat ~~steel~~ product at 650-920°C for
 30-1500 s; and applying a zinc-based metal anti-corrosion layer by
 electrolytic galvanizing or hot dip galvanizing of the cold-rolled and
 finally-annealed flat ~~steel~~ product. As a result of the final annealing
 of the cold-rolled flat ~~steel~~ product, an Si enrichment layer is created
 between a surface and a base material of the cold-rolled and

finally-annealed flat steel product, the max. Si content of which is higher by a factor of 3-8 than the Si content of the base material and which has a depth of 10 nm to 1 µm.

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
ARLAZAROV ARTEM	2017			EP 3146083 A1	CAPLUS
HAGA JUN	2013			JP 2013032582 A	CAPLUS
NAKAGAITO TATSUYA	2007			JP 2007224416 A	CAPLUS

IT 2351042-49-3P
 RL: IMF (Industrial manufacture); PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PREP (Preparation); PROC (Process); USES (Uses)
 (sheets; prodn. of cold-rolled flat steel products having metal anti-corrosion layers)

RN 2351042-49-2 CAPLUS

CN Iron alloy, base, Fe 78-98, Mn 1-4, Cr 0-3, Cu 0-3, Si 0.5-2.5, Ni 0-2, Al 0-1.5, Co 0-1, Mo 0-1, V 0-1, W 0-1, Zr 0-1, C 0-0.4, misch metal 0-0.2, Nb 0-0.2, Ti 0-0.2, B 0-0.1, N 0-0.1, P 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	78 - 98	7439-89-6
Mn	1 - 4	7439-96-5
Cr	0 - 3	7440-47-3
Cu	0 - 3	7440-50-8
Si	0.5 - 2.5	7440-21-3
Ni	0 - 2	7440-02-0
Al	0 - 1.5	7429-90-5
Co	0 - 1	7440-48-4
Mo	0 - 1	7439-98-7
V	0 - 1	7440-62-2
W	0 - 1	7440-33-7
Zr	0 - 1	7440-67-7
C	0 - 0.4	7440-44-0
Misch metal	0 - 0.2	8049-20-5
Nb	0 - 0.2	7440-03-1
Ti	0 - 0.2	7440-32-6
B	0 - 0.1	7440-42-8
N	0 - 0.1	17778-88-0
P	0 - 0.1	7723-14-0

IPCI C21D0006-00 [I]; B21B0001-24 [I]; B21B0001-26 [I]; B21B0001-28 [I]; C21D0007-02 [I]; C21D0007-10 [I]; C21D0008-02 [I]; C21D0008-04 [I]; C23C0002-00 [I]; C21D0009-46 [I]; C21D0009-48 [I]; C21D0001-26 [I]; C22C0038-02 [I]; C22C0038-04 [I]; C22C0038-12 [I]; C22C0038-14 [I]; C25F0001-06 [I]; C23G0001-08 [I]; B21B0001-22 [I]

IPCR C21D0006-00 [I]; B21B0001-24 [I]; B21B0001-26 [I]; B21B0001-28 [I]; B21B0001-22 [I]; C21D0007-02 [I]; C21D0007-10 [I]; C21D0008-02 [I]; C21D0008-04 [I]; C21D0009-46 [I]; C21D0009-48 [I]; C22C0038-02 [I]; C22C0038-04 [I]; C22C0038-12 [I]; C22C0038-14 [I]; C23C0002-00 [I]; C23G0001-08 [I]; C25F0001-06 [I]

CC 55-3 (Ferrous Metals and Alloys)
 Section cross-reference(s): 56

ST cold rolling annealing flat steel zinc anticorrosion coating

IT Galvanizing
 (electrogalvanizing; prodn. of cold-rolled flat steel products having metal anti-corrosion layers)

IT Annealing
 Anticorrosive coating materials
 Casting of metals
 Cold rolling
 Hot rolling
 Hot-dip galvanizing
 (prodn. of cold-rolled flat steel products having metal anti-corrosion layers)

IT 7440-66-6P, Zinc, preparation
 RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
 (coatings; prodn. of cold-rolled flat steel products having

metal anti-corrosion layers)
 IT 2351042-49-2P
 RL: IMF (Industrial manufacture); PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PREP (Preparation); PROC (Process); USES (Uses)
 (sheets; prodn. of cold-rolled flat steel products having metal anti-corrosion layers)

L12 ANSWER 22 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN
 ACCESSION NUMBER: 2019:1241982 CAPLUS Full-text
 DOCUMENT NUMBER: 171:98344
 TITLE: Production of cold-rolled flat steel products having metal anti-corrosion layers
 INVENTOR(S): Mraczek, Klemens; Muhr, Andreas; Haneder, Bernhard
 PATENT ASSIGNEE(S): Voestalpine Stahl GmbH, Austria
 SOURCE: Ger. Offen., 17pp.; Chemical Indexing Equivalent to 171:98349 (WO)
 CODEN: GWXXBX
 DOCUMENT TYPE: Patent
 LANGUAGE: German
 FAMILY ACC. NUM. COUNT: 2
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
DE 102017223633	A1	20190627	DE 2017-102017223633	20171221
WO 2019121793	A1	20190627	WO 2018-EP85664	20181218
EP 3728654	A1	20201028	EP 2018-826307	20181218
US 20200325552	A1	20201015	US 2020-16956301	20200619
PRIORITY APPLN. INFO.:			DE 2017-102017223633 A	20171221
			WO 2018-EP85664 W	20181218

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB A cold-rolled flat steel contains, in addn. to iron and unavoidable impurities, (in wt.%): C: 0.01-0.35%, Mn: 1-4%, Si: 0.5-2.5%, Nb: up to 0.1%, Ti: 0.015-0.1%, P: up to 0.1%, Al: up to 0.15%, S: up to 0.01%, N: up to 0.1%, and optionally one or more elements from the group of rare earth metals, Mo, Cr, Zr, V, W, Co, Ni, B, Cu, Ca, with rare earth metals: up to 0.2%, Mo: up to 1%, Cr: up to 3%, Zr: up to 1%, V: up to 1%, W: up to 1%, Co: up to 1%, Ni: up to 2%, B: up to 0.1%, Cu: up to 3%, Ca: up to 0.015%. The flat steel products are manufd. by: melting then casting the steel melt to form a semi-finished product; hot-rolling the semi-finished product at 820-1000°C to form a hot strip; winding the hot strip at a temp. between room temp. and 750°C to form a coil; annealing the hot strip at 530-950°C for 1-50 h; cold-rolling the annealed hot strip to form a cold-rolled flat steel product in one or more stages with a total cold-rolling degree of at least 45%; final annealing of the cold-rolled flat steel product at 650-920°C for 30-1500 s; and applying a zinc-based metal anti-corrosion layer by electrolytic galvanizing or hot dip galvanizing of the cold-rolled and finally-annealed flat steel product. As a result of the final annealing of the cold-rolled flat steel product, an Si enrichment layer is created between a surface and a base material of the cold-rolled and finally-annealed flat steel product, the max. Si content of which is higher by a factor of 3-8 than the Si content of the base material and which has a depth of 10 nm to 1 µm.

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
Anon				DE 102012013113 A1	CAPLUS
Anon				DE 102015111866 A1	CAPLUS
Anon				DE 102015112886 A1	CAPLUS
Anon				DE 102015112889 A1	CAPLUS
Anon				EP 2383353 A2	CAPLUS

IT 2351042-49-2P
 RL: IMF (Industrial manufacture); PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PREP (Preparation); PROC (Process); USES (Uses)
 (sheets; prodn. of cold-rolled flat steel products having metal anti-corrosion layers)

RN 2351042-49-2 CAPLUS
 CN Iron alloy, base, Fe 78-98, Mn 1-4, Cr 0-3, Cu 0-3, Si 0.5-2.5, Ni 0-2, Al

0-1.5,Co 0-1,Mo 0-1,V 0-1,W 0-1,Zr 0-1,C 0-0.4,misch metal 0-0.2,Nb
0-0.2,Ti 0-0.2,B 0-0.1,N 0-0.1,P 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	78 - 98	7439-89-6
Mn	1 - 4	7439-96-5
Cr	0 - 3	7440-47-3
Cu	0 - 3	7440-50-8
Si	0.5 - 2.5	7440-21-3
Ni	0 - 2	7440-02-0
Al	0 - 1.5	7429-90-5
Co	0 - 1	7440-48-4
Mo	0 - 1	7439-98-7
V	0 - 1	7440-62-2
W	0 - 1	7440-33-7
Zr	0 - 1	7440-67-7
C	0 - 0.4	7440-44-0
Misch metal	0 - 0.2	8049-20-5
Nb	0 - 0.2	7440-03-1
Ti	0 - 0.2	7440-32-6
B	0 - 0.1	7440-42-8
N	0 - 0.1	17778-88-0
P	0 - 0.1	7723-14-0

IPCI C22C0038-04 [I]; C22C0038-38 [I]; C22C0038-42 [I]; C22C0038-20 [I]
IPCR C22C0038-04 [I]; C22C0038-20 [I]; C22C0038-38 [I]; C22C0038-42 [I]
CC 55-3 (Ferrous Metals and Alloys)
Section cross-reference(s): 56
ST cold rolling annealing flat ~~steel~~ zinc anticorrosion coating
IT Galvanizing
(electrogalvanizing; prodn. of cold-rolled flat ~~steel~~
products having metal anti-corrosion layers)
IT Annealing
Anticorrosive coating materials
Casting of metals
Cold rolling
Hot rolling
Hot-dip galvanizing
(prodn. of cold-rolled flat ~~steel~~ products having metal
anti-corrosion layers)
IT 7440-66-6P, Zinc, preparation
RL: IMF (Industrial manufacture); TEM (Technical or engineered material
use); PREP (Preparation); USES (Uses)
(coatings; prodn. of cold-rolled flat ~~steel~~ products having
metal anti-corrosion layers)
IT ~~2351042-49-2P~~
RL: IMF (Industrial manufacture); PEP (Physical, engineering or chemical
process); TEM (Technical or engineered material use); PREP (Preparation);
PROC (Process); USES (Uses)
(sheets; prodn. of cold-rolled flat ~~steel~~ products having
metal anti-corrosion layers)

L12 ANSWER 23 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN
ACCESSION NUMBER: 2019:1102670 CAPLUS Full-text
DOCUMENT NUMBER: 171:64050
TITLE: Manufacture of bainite-martensite-austenite multiphase
abrasion-resistant ~~steel~~
INVENTOR(S): Liu, Xin; Zhu, Ming; Zhang, Chi; Liu, Wenli
PATENT ASSIGNEE(S): Zijong Slurry Pipeline Engineering Co., Ltd., Peop.
Rep. China
SOURCE: Faming Zhuanli Shenqing, 11pp.
CODEN: CNXXEV
DOCUMENT TYPE: Patent
LANGUAGE: Chinese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:
PATENT NO. KIND DATE APPLICATION NO. DATE

CN 109825774 A 20190531 CN 2019-10287951 20190411

CN 109825774 B 20201211
 PRIORITY APPLN. INFO.: CN 2019-10287951 20190411
 AB The invention discloses a prepn. method of bainite/martensite austenite multiphase abrasion-resistant ~~steel~~, which adopts mutual restriction of multiple alloy elements and small addn. amt., namely, an upper bainite structure is started to widen and obtain a structure range, a heat treatment mode adopts quick cooling from austenite to BS point, an upper bainite structure and a lower bainite structure are obtained at an intermediate temp. through slow cooling and temp. change, a martensite retained austenite structure is obtained at an isothermal temp. in a low temp. range, and the whole process is continuously and continuously produced. The wear-resistant ~~steel~~ composed of a plurality of composite structures of upper bainite martensite austenite and lower bainite martensite austenite is obtained, and the wear-resistant ~~steel~~ can resist impact and cutting wear and corrosion under various environments. The prodn. process simplifies the process for controlling the cooling speed, and is convenient for large-scale prodn., simple control, good in quality and high in wear resistance.
 IT 2345668-52-QP, C 0.2-0.6, Mn 1.5-5, Cr 0.1-3, Al 0.1-3, Si 0.1-3, Mo 0.1-1, Ni 0.1-2, Cu 0.1-1, P 0-0.2, B 0-0.3, V 0-1, W 0-1, Ti 0-0.3, Nb 0-0.3, Re 0-0.3, Ca 0-0.3, Sn 0-0.3, W 0-1, Fe bal.
 RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
 (manuf. of bainite-martensite-austenite multiphase abrasion-resistant ~~steel~~)
 RN 2345668-52-0 CAPLUS
 CN Iron alloy, base, Fe 77-98, Mn 1.5-5, Al 0.1-3, Cr 0.1-3, Si 0.1-3, Ni 0.1-2, Cu 0.1-1, Mo 0.1-1, V 0-1, W 0-1, C 0.2-0.6, B 0-0.3, Ca 0-0.3, Nb 0-0.3, Re 0-0.3, Sn 0-0.3, Ti 0-0.3, P 0-0.2 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
=====+=====		
Fe	77 - 98	7439-89-6
Mn	1.5 - 5	7439-96-5
Al	0.1 - 3	7429-90-5
Cr	0.1 - 3	7440-47-3
Si	0.1 - 3	7440-21-3
Ni	0.1 - 2	7440-02-0
Cu	0.1 - 1	7440-50-8
Mo	0.1 - 1	7439-98-7
V	0 - 1	7440-62-2
W	0 - 1	7440-33-7
C	0.2 - 0.6	7440-44-0
B	0 - 0.3	7440-42-8
Ca	0 - 0.3	7440-70-2
Nb	0 - 0.3	7440-03-1
Re	0 - 0.3	7440-15-5
Sn	0 - 0.3	7440-31-5
Ti	0 - 0.3	7440-32-6
P	0 - 0.2	7723-14-0

IPCI C22C0038-02; C22C0038-04; C22C0038-06; C22C0038-42; C22C0038-44;
 C22C0038-58; C22C0038-54; C22C0038-46; C22C0038-50; C22C0038-48;
 C21D0008-00; C21D0001-18
 IPCR C22C0038-02 [I]; C21D0001-18 [I]; C21D0008-00 [I]; C22C0038-04 [I];
 C22C0038-06 [I]; C22C0038-42 [I]; C22C0038-44 [I]; C22C0038-46 [I];
 C22C0038-48 [I]; C22C0038-50 [I]; C22C0038-54 [I]; C22C0038-58 [I]
 CC 55-3 (Ferrous Metals and Alloys)
 ST bainite martensite austenite multiphase abrasion resistant ~~steel~~ manuf
 IT Abrasion-resistant materials
 Casting of metals
 Forging
 Heat treatment
 Hot rolling
 Melting
 Microstructure
 (manuf. of bainite-martensite-austenite multiphase abrasion-resistant ~~steel~~)
 IT 2345668-52-QP, C 0.2-0.6, Mn 1.5-5, Cr 0.1-3, Al 0.1-3, Si 0.1-3, Mo 0.1-1, Ni 0.1-2, Cu 0.1-1, P 0-0.2, B 0-0.3, V 0-1, W 0-1, Ti 0-0.3, Nb 0-0.3, Re 0-0.3, Ca 0-0.3, Sn 0-0.3, W 0-1, Fe bal.

RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(manuf. of bainite-martensite-austenite multiphase abrasion-resistant steel)

L12 ANSWER 24 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2019:1019962 CAPLUS Full-text

DOCUMENT NUMBER: 171:30626

TITLE: Ultra-high strength and excellent ductility in multi-layer steel sheet of austenitic hadfield and martensitic hot-press-forming steels

AUTHOR(S): Park, Jaeyeong; Jo, Min Cheol; Song, Taejin; Kim, Hyoung Seop; Sohn, Seok Su; Lee, Sunghak

CORPORATE SOURCE: Center for Advanced Aerospace Materials, Pohang University of Science and Technology, Pohang, 790-784, S. Korea

SOURCE: Materials Science & Engineering, A: Structural Materials: Properties, Microstructure and Processing (2019), 759, 320-328

CODEN: MSAPE3; ISSN: 0921-5093

DIGITAL OBJECT ID: 10.1016/j.msea.2019.05.046

PUBLISHER: Elsevier B.V.

DOCUMENT TYPE: Journal; (online computer file)

LANGUAGE: English

AB An austenitic Hadfield steel sheet shows a relatively low yield strength of 0.4-0.5 GPa and serrated flows in spite of excellent tensile strength and ductility along with highly-sustained strain hardening. In order to overcome the shortcomings, a multi-layer steel (MLS) sheet was fabricated by a roll-bonding with an ultra-high-strength martensitic hot-press-forming (HPF) steel sheet. Near the Hadfield/HPF interface, the carburized and decarburized layers were formed by the carbon diffusion from the Hadfield (1.2% of C) to HPF (0.23% of C) layers, and could generate a kind of very thin multi-layers of 35 µm in thickness. All tensile properties of the Hadfield/HPF MLS sheet (yield strength; 946 MPa, tensile strength; 1291 MPa, elongation; 44.5%) were superior to those of the Hadfield sheet. Interestingly, the persistent elongation up to 44.5%, which is higher than that of the Hadfield steel, in the present MLS sheet is a quite unique and interesting characteristic. The simultaneous enhancement of strength and ductility of the MLS sheet was explained by the contributions of (1) populated twin formation, (2) generation of geometrically necessary dislocations (GNDs), and (3) increase of back stress inside thin interfacial layers.

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
=====	=====	=====	=====	=====	=====
Anon				K. Sato, Q. Yu, J. H	
Barbier, D	2009	500	196	Mater Sci Eng A	
Bouaziz, O	2016	18	56	Adv Eng Mater	CAPLUS
Calcagnotto, M	2011	59	658	Acta Mater	CAPLUS
Cetin, A	2012	60	2265	Acta Mater	CAPLUS
Chateau, J	2010	240	012023	J Phys Conf Ser	
Chen, L	2007	47	1804	ISIJ Int	CAPLUS
Curtze, S	2010	58	5129	Acta Mater	CAPLUS
Dini, G	2010	64	15	Mater Lett	CAPLUS
Dinsdale, A	1991	15		Calphad	CAPLUS
Dumay, A	2008	483-4	184	Mater Sci Eng A	
Eshelby, J	1951	42	351	Lond Edinb Dublin Ph	
Fan, D	2009	80	241	Steel Res Int	CAPLUS
Frommeyer, G	2003	43	438	ISIJ Int	CAPLUS
Grassel, O	2000	16	1391	Int J Plast	CAPLUS
Gwon, H	2019	25	594	Met Mater Int	CAPLUS
Han, Y	2012	553	192	Mater Sci Eng A	CAPLUS
Hild, F	2006	42	69	Strain	
Hirth, J	1982			Theory of Dislocatio	
Inoue, J	2008	59	1055	Scripta Mater	CAPLUS
Kang, M	2017	700	387	Mater Sci Eng A	CAPLUS
Kang, S	2010	527	745	Mater Sci Eng A	
Kim, J	2019			Met Mater Int	
Koseki, T	2014	55	227	Mater Trans	CAPLUS
Kubin, L	2003	48	119	Scripta Mater	CAPLUS

Kurt, B	2009	60	1035	Mater Char	CAPLUS
Laws, N	1977	7	91	J Elast	
Lebedkina, T	2009	519	147	Mater Sci Eng A	
Lee, D	1988	23	558	J Mater Sci	CAPLUS
Lee, Y	2000	31	355	Metall Mater Trans A	
Li, Y	2018	731	377	Mater Sci Eng A	CAPLUS
Liu, B	2017	679	172	Mater Sci Eng A	CAPLUS
Ma, X	2016	116	43	Acta Mater	CAPLUS
Matlock, D	2012	15	1	JESTECH	
Morito, S	2005	45	91	ISIJ Int	CAPLUS
Nambu, S	2009	69	1936	Compos Sci Technol	CAPLUS
Nambu, S	2009	60	221	Scripta Mater	CAPLUS
Ojima, M	2009	529	16	Mater Sci Eng A	
Ojima, M	2012	66	139	Scripta Mater	CAPLUS
Pan, B	2009	20	1	Meas Sci Technol	
Park, J	2017	7	40231	Sci Rep	CAPLUS
Park, K	2001	7	95	Met Mater Int	CAPLUS
Saleh, A	2011	528	4537	Mater Sci Eng A	
Scott, C	2011	102	538	Int J Mater Res	CAPLUS
Semiatiin, S	1979	10	85	Metall Trans A	
Seok, M	2016	121	164	Acta Mater	CAPLUS
Srivastava, A	2008	43	5654	J Mater Sci	CAPLUS
Ueji, R	2012	47	7946	J Mater Sci	CAPLUS
Ueji, R	2008	59	963	Scripta Mater	CAPLUS
Wu, X	2015	112	14501	Proc Natl Acad Sci U	CAPLUS
Xie, G	2011	52	1709	Mater Trans	CAPLUS
Yan, F	2014	81	487	Acta Mater	CAPLUS
Yang, M	2016	4	145	Mater Res Lett	CAPLUS
Yang, W	1990	25	1821	J Mater Sci	CAPLUS
Zuidema, B	1987	18	1629	Metall Trans A	

IT 2334123-60-1, Fe bal., C 0.23, Mn 1.2, Si 0.41, Cr 0.2, Ti

0-0.06, B 0-0.06, processes

RL: PEP (Physical, engineering or chemical process); PRP (Properties);

PROC (Process)

(ultra-high strength and excellent ductility in multi-layer

steel sheet of austenitic hadfield and martensitic

hot-press-forming steels)

RN 2334123-60-1 CAPLUS

CN Steel, Fe 98,Mn 1.2,Si 0.4,C 0.2,Cr 0.2,B 0-0.1,Ti 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
=====+=====+=====		
Fe	98	7439-89-6
Mn	1.2	7439-96-5
Si	0.4	7440-21-3
C	0.2	7440-44-0
Cr	0.2	7440-47-3
B	0 - 0.1	7440-42-8
Ti	0 - 0.1	7440-32-6

CC 55-12 (Ferrous Metals and Alloys)

ST steel multilayer sheet strength ductility microstructure

IT Elongation, mechanical

Hot-press molding

Microstructure

Multilayers

Sheet materials

Solid-solid interface

Strain hardening

Stress-strain relationship

Tensile strength

Yield strength

(ultra-high strength and excellent ductility in multi-layer

steel sheet of austenitic hadfield and martensitic

hot-press-forming steels)

IT 2334123-57-6, Fe bal., C 1.2, Mn 13.6, Si 0.2 2334123-60-1, Fe

bal., C 0.23, Mn 1.2, Si 0.41, Cr 0.2, Ti 0-0.06, B 0-0.06, processes

RL: PEP (Physical, engineering or chemical process); PRP (Properties);

PROC (Process)

(ultra-high strength and excellent ductility in multi-layer

steel sheet of austenitic hadfield and martensitic

hot-press-forming steels)
 OS.CITING REF COUNT: 3 THERE ARE 3 CAPLUS RECORDS THAT CITE THIS RECORD
 (3 CITINGS)

L12 ANSWER 25 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN
 ACCESSION NUMBER: 2019:949375 CAPLUS Full-text
 DOCUMENT NUMBER: 170:609630
 TITLE: Al plated steel pipe parts by STAF method
 INVENTOR(S): Maki, Jun; Fujita, Soshi; Nakamura, Toyomitsu
 PATENT ASSIGNEE(S): Nippon Steel & Sumitomo Metal Corporation, Japan
 SOURCE: Jpn. Kokai Tokkyo Koho, 21pp.
 CODEN: JKXXAF

DOCUMENT TYPE: Patent
 LANGUAGE: Japanese
 FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2019073778	A	20190516	JP 2017-201702	20171018
PRIORITY APPLN. INFO.:			JP 2017-201702	20171018

AB The present invention relates to an Al plated steel pipe parts comprising a hollow portion having a predetd. cross-sectional shape; and a flange portion projecting from the outer surface of the hollow portion; wherein the hollow portion and the flange portion are made of the same steel material as a material, and the surface of the hollow portion and the flange portion is coated with a plating layer contg. at least one of an Al-Fe-based alloy and an Al-Fe-Si-based alloy. The Al plated steel pipe parts has thickness of the plating layer is in the range of 5-50 µm, and the surface roughness of the plating layer at the flange portion is in the range of 0.3-1.2 µm as a center line av. roughness Ra defined by JIS B0610. The Al-plated steel pipe part has excellent spot weldability manufd. by processing an Al-plated steel pipe by the STAF method.

IT 2320493-55-6, Aluminum 0-0.1, boron 0.0001-0.1, carbon 0.15-0.5, chromium 0-1.5, iron bal., manganese 0.6-3, nitrogen 0-0.006, phosphorus 0-0.01, silicon 0.01-2, titanium 0.01-0.1
 RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (aluminum plated steel pipe parts by STAF method)

RN 2320493-55-6 CAPLUS

CN Iron alloy, base, Fe 93-99, Mn 0.6-3, Si 0-2, Cr 0-1.5, C 0.2-0.5, Al 0-0.1, B 0-0.1, Ti 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	93 - 99	7439-89-6
Mn	0.6 - 3	7439-96-5
Si	0 - 2	7440-21-3
Cr	0 - 1.5	7440-47-3
C	0.2 - 0.5	7440-44-0
Al	0 - 0.1	7429-90-5
B	0 - 0.1	7440-42-8
Ti	0 - 0.1	7440-32-6

IPCI C23C0002-12 [I]; C23C0002-26 [I]; C22C0038-00 [I]; C22C0038-04 [I]; C22C0038-38 [I]; B21D0026-035 [N]; B21D0026-059 [N]; C22C0021-02 [N]; C21D0009-08 [N]

IPCR C23C0002-12 [I]; C22C0038-00 [I]; C22C0038-04 [I]; C22C0038-38 [I]; C23C0002-26 [I]

CC 55-6 (Ferrous Metals and Alloys)

ST aluminum plating steel pipe parts

IT Coating materials

Pipes and Tubes

(aluminum plated steel pipe parts by STAF method)

IT 12043-58-2

RL: FMU (Formation, unclassified); FORM (Formation, nonpreparative)

(aluminum plated steel pipe parts by STAF method)

IT 2320493-55-6, Aluminum 0-0.1, boron 0.0001-0.1, carbon 0.15-0.5, chromium 0-1.5, iron bal., manganese 0.6-3, nitrogen 0-0.006, phosphorus 0-0.01, silicon 0.01-2, titanium 0.01-0.1

RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (aluminum plated ~~steel~~ pipe parts by STAF method)
 IT 1314-13-2, Zinc oxide, uses 7429-90-5, Aluminum, uses 11114-60-6
 11116-16-8, Titanium nitride 11122-26-2 12705-37-2, Chromium nitride
 RL: TEM (Technical or engineered material use); USES (Uses)
 (aluminum plated ~~steel~~ pipe parts by STAF method)

L12 ANSWER 26 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2019:903363 CAPLUS Full-text

DOCUMENT NUMBER: 170:588989

TITLE: Piercer plug made of seamless ~~steel~~, and its manufacturing method

INVENTOR(S): Hidaka, Yasuyoshi; Shirasawa, Naoya; Miyai, Tatsuya

PATENT ASSIGNEE(S): Nippon Steel Corporation, Japan

SOURCE: PCT Int. Appl., 27pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2019087510	A1	20190509	WO 2018-JP29879	20180809
CN 111315906	A	20200619	CN 2018-80071094	20180809
BR 112020002943	A2	20200811	BR 2020-112020002943	20180809
EP 3705591	A1	20200909	EP 2018-874192	20180809
US 20200263282	A1	20200820	US 2020-16646739	20200312
PRIORITY APPLN. INFO.:			JP 2017-212753	A 20171102
			WO 2018-JP29879	W 20180809

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB The piercer plug comprises the following component in mass (%): 0.15-0.3 of carbon, 0.4-1.2 of silicon, 0.2-1.5 of manganese, 0.1-2 of nickel, 0-4 each of molybdenum and tungsten, 1-4 of chromium, 0-0.2 of boron, 0-1 of niobium, 0-1 of vanadium, 0-1 of titanium, and iron being balance and impurities. The piercer plug further comprises a tip section and a body section made of the same material; wherein the body section includes a cylindrical unit which is a hole for attaching a bar and the tip section is harder than the cylindrical unit. The manufg. method of piercer plug comprises a protective film forming on the surface of the piercer plug to the heating, wherein the protective film is a thermal sprayed coating and a buildup layer. According to the present invention, it is possible to provide a highly recyclable piercer plug.

IT 2315454-12-5P

RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(piercer plug made of seamless ~~steel~~, and its manufg. method)

RN 2315454-12-5 CAPLUS

CN Iron alloy, base, Fe 82-97, Cr 1-4, Mo 0-4, W 0-4, Ni 0.1-2, Mn 0.2-1.5, Si 0.4-1.2, Nb 0-1, Ti 0-1, V 0-1, C 0.2-0.3, B 0-0.2 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	82 - 97	7439-89-6
Cr	1 - 4	7440-47-3
Mo	0 - 4	7439-98-7
W	0 - 4	7440-33-7
Ni	0.1 - 2	7440-02-0
Mn	0.2 - 1.5	7439-96-5
Si	0.4 - 1.2	7440-21-3
Nb	0 - 1	7440-03-1
Ti	0 - 1	7440-32-6
V	0 - 1	7440-62-2
C	0.2 - 0.3	7440-44-0
B	0 - 0.2	7440-42-8

IPCI C22C0038-00 [I]; C21D0009-00 [I]; C22C0038-54 [I]

IPCR C22C0038-00 [I]; C21D0009-00 [I]; C22C0038-54 [I]

CC 55-3 (Ferrous Metals and Alloys)

ST carbon boron seamless ~~steel~~ piercer plug

IT 2315454-12-5P
 RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
 (piercer plug made of seamless steel, and its manufg. method)

L12 ANSWER 27 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN
 ACCESSION NUMBER: 2019:807393 CAPLUS Full-text
 DOCUMENT NUMBER: 170:538936
 TITLE: Manufacture of steel components having a metal coating protecting it against corrosion
 INVENTOR(S): Banik, Janko; Koeyer, Maria; Rosenstock, Dirk; Ruthenberg, Manuela
 PATENT ASSIGNEE(S): Thyssenkrupp Steel Europe AG, Germany; Thyssenkrupp AG
 SOURCE: PCT Int. Appl., 26pp.; Chemical Indexing Equivalent to 170:538935 (DE)
 CODEN: PIXXD2
 DOCUMENT TYPE: Patent
 LANGUAGE: German
 FAMILY ACC. NUM. COUNT: 2
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2019076720	A1	20190425	WO 2018-EP77692	20181011
DE 102017218704	A1	20190425	DE 2017-102017218704	20171019
CN 110997951	A	20200410	CN 2018-80049166	20181011
EP 3697936	A1	20200826	EP 2018-804228	20181011
US 20200216925	A1	20200709	US 2020-16647894	20200317
PRIORITY APPLN. INFO.:			DE 2017-102017218704 A	20171019
			WO 2018-EP77692 W	20181011

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT
 AB A method for producing a steel component comprising a steel substrate and an aluminum alloy-based anti-corrosion coating, is described for use in the automotive sector.

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
BANIK JANKO	2016			EP 2993248 A1	CAPLUS
COBO SEBASTIAN	2017			US 20170253941 A1	
KUSUMI K	2007			EP 1767286 A1	CAPLUS
MAKI JUN	2014			EP 2695963 A1	CAPLUS
ROSENSTOCK DIRK	2018			WO 2018234102 A1	CAPLUS

IT 2307271-66-3P
 RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
 (strips; manuf. of steel components having a metal coating protecting it against corrosion)

RN 2307271-66-3 CAPLUS
 CN Iron alloy, base, Fe 94-99, Mn 0.5-3, Cr 0-1, C 0.1-0.5, Si 0.1-0.5, Ti 0-0.2, Al 0-0.1, B 0-0.1, Nb 0-0.1, P 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	94 - 99	7439-89-6
Mn	0.5 - 3	7439-96-5
Cr	0 - 1	7440-47-3
C	0.1 - 0.5	7440-44-0
Si	0.1 - 0.5	7440-21-3
Ti	0 - 0.2	7440-32-6
Al	0 - 0.1	7429-90-5
B	0 - 0.1	7440-42-8
Nb	0 - 0.1	7440-03-1
P	0 - 0.1	7723-14-0

IPCI C21D0001-76 [I]; B21D0022-02 [I]; B21D0022-20 [I]; C21D0007-13 [I]; C23C0002-12 [I]; C23C0002-26 [I]; C23C0002-28 [I]; C21D0009-46 [I]; C21D0009-48 [I]; C21D0001-673 [I]
 IPCR C21D0001-76 [I]; B21D0022-02 [I]; B21D0022-20 [I]; C21D0001-673 [I]; C21D0007-13 [I]; C21D0009-46 [I]; C21D0009-48 [I]; C23C0002-12 [I]; C23C0002-26 [I]; C23C0002-28 [I]

CC 55-10 (Ferrous Metals and Alloys)
 Section cross-reference(s): 56
 ST ~~steel~~ metal prevention corrosion coating
 IT Automobile bodies
 (chassis; manuf. of ~~steel~~ components having a metal coating
 protecting it against corrosion)
 IT Anticorrosive coating materials
 Automobile bodies
 Automotive bumpers
 (manuf. of ~~steel~~ components having a metal coating protecting
 it against corrosion)
 IT 1273096-81-3P, Aluminum alloy 2307271-67-4P
 RL: IMF (Industrial manufacture); TEM (Technical or engineered material
 use); PREP (Preparation); USES (Uses)
 (anti-corrosion coatings; manuf. of ~~steel~~ components having a
 metal coating protecting it against corrosion)
 IT 1333-74-0, Hydrogen, uses
 RL: MOA (Modifier or additive use); USES (Uses)
 (in ~~steel~~; manuf. of ~~steel~~ components having a
 metal coating protecting it against corrosion)
 IT 12597-69-2P, ~~Steel~~, preparation 2307271-66-3P
 RL: IMF (Industrial manufacture); TEM (Technical or engineered material
 use); PREP (Preparation); USES (Uses)
 (strips; manuf. of ~~steel~~ components having a metal coating
 protecting it against corrosion)

L12 ANSWER 28 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN
 ACCESSION NUMBER: 2019:805627 CAPLUS Full-text
 DOCUMENT NUMBER: 170:527030
 TITLE: Enamelling of high-strength ~~steels~~
 INVENTOR(S): Myslowicki, Stefan
 PATENT ASSIGNEE(S): ThyssenKrupp Steel Europe AG, Germany; ThyssenKrupp AG
 SOURCE: PCT Int. Appl., 28pp.; Chemical Indexing Equivalent to
 170:527029 (DE)
 CODEN: PIXXD2

DOCUMENT TYPE: Patent
 LANGUAGE: German
 FAMILY ACC. NUM. COUNT: 2
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2019076717	A1	20190425	WO 2018-EP77686	20181011
DE 102017218434	A1	20190418	DE 2017-102017218434	20171016
EP 3697545	A1	20200826	EP 2018-786281	20181011
PRIORITY APPLN. INFO.:			DE 2017-102017218434 A	20171016
			WO 2018-EP77686	W 20181011

AB A shaped part having at least two layers, comprises at least one layer
 made of high-strength ~~steel~~ with a tensile strength ≥ 500 MPa and
 a hardness ≥ 160 HV, and at least one layer made of a ~~steel~~ that
 has an enamel layer on the outer side. The shaped part are suitable for
 producing pipelines, pressure vessels, reactors or in app. engineering, in
 particular for the transport of aq. and/or corrosive media.
 IT 2306234-82-0P
 RL: IMF (Industrial manufacture); TEM (Technical or engineered material
 use); PREP (Preparation); USES (Uses)
 (enamelling of high-strength ~~steels~~)
 RN 2306234-82-0 CAPLUS
 CN Iron alloy, base, Fe 85-99, Mn 0.5-3, Al 0-3, Si 0.1-2.5, P 0-1.5, Cr 0-1, Mo
 0-1, V 0-1, Ti 0-0.8, Nb 0-0.5, C 0-0.4, B 0-0.1, S 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	85 - 99	7439-89-6
Mn	0.5 - 3	7439-96-5
Al	0 - 3	7429-90-5
Si	0.1 - 2.5	7440-21-3
P	0 - 1.5	7723-14-0
Cr	0 - 1	7440-47-3
Mo	0 - 1	7439-98-7
V	0 - 1	7440-62-2

Ti	0	-	0.8	7440-32-6
Nb	0	-	0.5	7440-03-1
C	0	-	0.4	7440-44-0
B	0	-	0.1	7440-42-8
S	0	-	0.1	7704-34-9

IPCI B21B0001-38 [I]; C21D0008-02 [I]; C21D0009-46 [I]; C22C0038-02 [I];
C23D0005-00 [I]

IPCR B21B0001-38 [I]; C21D0008-02 [I]; C21D0009-46 [I]; C22C0038-02 [I];
C23D0005-00 [I]

CC 55-6 (Ferrous Metals and Alloys)

Section cross-reference(s): 57

ST enamel strength ~~steel~~ bilayer

IT Enameling

Enamels (vitreous)

Pipelines

Pressure vessels

Reactors

(enamelling of high-strength ~~steels~~)

IT 2306234-83-1P, preparation

RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(enameled; enamelling of high-strength ~~steels~~)

IT 12597-69-2P, ~~Steel~~, preparation 59816-66-9P, preparation

~~2306234-82-0P~~

RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(enamelling of high-strength ~~steels~~)

L12 ANSWER 29 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2019:802752 CAPLUS Full-text

DOCUMENT NUMBER: 170:538935

TITLE: Manufacture of ~~steel~~ components having a metal coating protecting it against corrosion

INVENTOR(S): Banik, Janko; Koeyer, Maria; Rosenstock, Dirk; Ruthenberg, Manuela

PATENT ASSIGNEE(S): Thyssenkrupp AG, Germany; Thyssenkrupp Steel Europe AG

SOURCE: Ger. Offen., 17pp.; Chemical Indexing Equivalent to 170:538936 (WO)

CODEN: GWXXBX

DOCUMENT TYPE: Patent

LANGUAGE: German

FAMILY ACC. NUM. COUNT: 2

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
DE 102017218704	A1	20190425	DE 2017-102017218704	20171019
WO 2019076720	A1	20190425	WO 2018-EP77692	20181011
CN 110997951	A	20200410	CN 2018-80049166	20181011
EP 3697936	A1	20200826	EP 2018-804228	20181011
US 20200216925	A1	20200709	US 2020-16647894	20200317

PRIORITY APPLN. INFO.: DE 2017-102017218704 A 20171019
WO 2018-EP77692 W 20181011

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB A method for producing a ~~steel~~ component comprising a ~~steel~~ substrate and an aluminum alloy-based anti-corrosion coating, is described for use in the automotive sector.

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
=====	=====	=====	=====	=====	=====
Anon				EP 1767286 A1	CAPLUS
Anon				US 20120085467 A1	CAPLUS
Anon				EP 2377965 A2	CAPLUS
Anon				EP 2993248 A1	CAPLUS

IT 2307271-66-3P

RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(strips; manuf. of ~~steel~~ components having a metal coating protecting it against corrosion)

RN 2307271-66-3 CAPLUS

CN Iron alloy, base, Fe 94-99, Mn 0.5-3, Cr 0-1, C 0.1-0.5, Si 0.1-0.5, Ti 0-0.2, Al 0-0.1, B 0-0.1, Nb 0-0.1, P 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	94 - 99	7439-89-6
Mn	0.5 - 3	7439-96-5
Cr	0 - 1	7440-47-3
C	0.1 - 0.5	7440-44-0
Si	0.1 - 0.5	7440-21-3
Ti	0 - 0.2	7440-32-6
Al	0 - 0.1	7429-90-5
B	0 - 0.1	7440-42-8
Nb	0 - 0.1	7440-03-1
P	0 - 0.1	7723-14-0

IPCI C22C0038-04 [I]; C23C0002-12 [I]; C23C0002-26 [I]; C21D0001-673 [I]
IPCR C22C0038-04 [I]; C21D0001-673 [I]; C23C0002-12 [I]; C23C0002-26 [I]
CC 55-10 (Ferrous Metals and Alloys)
Section cross-reference(s): 56
ST ~~steel~~ metal prevention corrosion coating
IT Automobile bodies
(chassis; manuf. of ~~steel~~ components having a metal coating protecting it against corrosion)
IT Anticorrosive coating materials
Automobile bodies
Automotive bumpers
(manuf. of ~~steel~~ components having a metal coating protecting it against corrosion)
IT 1273096-81-3P, Aluminum alloy 2307271-67-4P
RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(anti-corrosion coatings; manuf. of ~~steel~~ components having a metal coating protecting it against corrosion)
IT 1333-74-0, Hydrogen, uses
RL: MOA (Modifier or additive use); USES (Uses)
(in ~~steel~~; manuf. of ~~steel~~ components having a metal coating protecting it against corrosion)
IT 12597-69-2P, ~~Steel~~, preparation 2307271-66-3P
RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(strips; manuf. of ~~steel~~ components having a metal coating protecting it against corrosion)

L12 ANSWER 30 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN
ACCESSION NUMBER: 2019:746016 CAPLUS Full-text
DOCUMENT NUMBER: 170:527029
TITLE: Enamelling of high-strength ~~steels~~
INVENTOR(S): Myslowicki, Stefan
PATENT ASSIGNEE(S): ThyssenKrupp AG, Germany; ThyssenKrupp Steel Europe AG
SOURCE: Ger. Offen., 20pp.; Chemical Indexing Equivalent to 170:527030 (WO)
CODEN: GWXXBX
DOCUMENT TYPE: Patent
LANGUAGE: German
FAMILY ACC. NUM. COUNT: 2

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
DE 102017218434	A1	20190418	DE 2017-102017218434	20171016
WO 2019076717	A1	20190425	WO 2018-EP77686	20181011
EP 3697545	A1	20200826	EP 2018-786281	20181011
PRIORITY APPLN. INFO.:			DE 2017-102017218434 A	20171016
			WO 2018-EP77686	W 20181011

AB A shaped part having at least two layers, comprises at least one layer made of high-strength ~~steel~~ with a tensile strength ≥ 500 MPa and a hardness ≥ 160 HV, and at least one layer made of a ~~steel~~ that has an enamel layer on the outer side. The shaped part are suitable for producing pipelines, pressure vessels, reactors or in app. engineering, in particular for the transport of aq. and/or corrosive media.

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
Anon				DE 102008022709 A1	CAPLUS
Anon				DE 1533303 C2	
Anon				EP 2227574 B1	CAPLUS
IT 2306234-82-0P					
RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses) (enamelling of high-strength steels)					
RN 2306234-82-0					CAPLUS
CN Iron alloy, base, Fe 85-99, Mn 0.5-3, Al 0-3, Si 0.1-2.5, P 0-1.5, Cr 0-1, Mo 0-1, V 0-1, Ti 0-0.8, Nb 0-0.5, C 0-0.4, B 0-0.1, S 0-0.1 (CA INDEX NAME)					

Component	Component Percent	Component Registry Number
Fe	85 - 99	7439-89-6
Mn	0.5 - 3	7439-96-5
Al	0 - 3	7429-90-5
Si	0.1 - 2.5	7440-21-3
P	0 - 1.5	7723-14-0
Cr	0 - 1	7440-47-3
Mo	0 - 1	7439-98-7
V	0 - 1	7440-62-2
Ti	0 - 0.8	7440-32-6
Nb	0 - 0.5	7440-03-1
C	0 - 0.4	7440-44-0
B	0 - 0.1	7440-42-8
S	0 - 0.1	7704-34-9

IPCI C23D0005-00 [I]; B23K0020-04 [I]

IPCR C23D0005-00 [I]; B23K0020-04 [I]

CC 55-6 (Ferrous Metals and Alloys)

Section cross-reference(s): 57

ST enamel strength ~~steel~~ bilayer

IT Enameling

Enamels (vitreous)

Pipelines

Pressure vessels

Reactors

(enamelling of high-strength ~~steels~~)

IT 2306234-83-1P, preparation

RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(enameled; enamelling of high-strength ~~steels~~)IT 12597-69-2P, ~~Steel~~, preparation 59816-66-9P, preparation

2306234-82-0P

RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(enamelling of high-strength ~~steels~~)

L12 ANSWER 31 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2019:570060 CAPLUS Full-text

DOCUMENT NUMBER: 170:493791

TITLE: Method for manufacturing hot stamped parts with aluminum-silicon alloy coating and hot stamped parts

INVENTOR(S): Tan, Ning; Fu, Jiang; Hong, Jiyao; Fang, Xuehua

PATENT ASSIGNEE(S): Baoshan Iron & Steel Co., Ltd., Peop. Rep. China

SOURCE: Faming Zhuanli Shenqing, 13pp.

CODEN: CNXXEV

DOCUMENT TYPE: Patent

LANGUAGE: Chinese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
CN 109518114	A	20190326	CN 2018-11035118	20180906
WO 2020030200	A1	20200213	WO 2019-CN104708	20190906
EP 3770295	A1	20210127	EP 2019-847997	20190906

PRIORITY APPLN. INFO.: CN 2018-10896744 A 20180808
 CN 2018-11035118 A 20180906
 WO 2019-CN104708 W 20190906

AB The title method comprises the following steps of: processing ~~steel~~ plate coated with aluminum-silicon alloy coating to form a blank of a desired shape of the part, heat treating the blank, and hot stamping. The blank heat treatment adopts two-stage or three-stage heating and heat preservation, and the heating and heat preservation are stepwise heating. The ~~steel~~ plate coated with aluminum-silicon alloy coating include a substrate and an aluminum-silicon alloy coating on at least one surface thereof. The method fully considers the characteristics of the aluminum-silicon coating, is able to effectively solve the problem of roll banding of the aluminum-silicon coating, reduces the nodulation probability of the roller of the heat treatment furnace, improves the service life of the roller, and ensures the integrity of the coating of the hot stamped part as well as the mech. property, welding property, coating property and corrosion resisting property of the part.

IT 2305367-85-3P, Aluminum 0-0.3, boron 0-0.1, carbon 0.04-0.8, chromium 0-3, manganese 0.1-5, phosphorus 0-0.3, silicon 0-1.2, sulfur 0-0.1, titanium 0-0.5, iron bal.
 RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
 (method for manufg. hot stamped parts with aluminum-silicon alloy coating and hot stamped parts)

RN 2305367-85-3 CAPLUS

CN Iron alloy, base, Fe 89-100, Mn 0.1-5, Cr 0-3, Si 0-1.2, C 0-0.8, Ti 0-0.5, Al 0-0.3, P 0-0.3, B 0-0.1, S 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	89 - 100	7439-89-6
Mn	0.1 - 5	7439-96-5
Cr	0 - 3	7440-47-3
Si	0 - 1.2	7440-21-3
C	0 - 0.8	7440-44-0
Ti	0 - 0.5	7440-32-6
Al	0 - 0.3	7429-90-5
P	0 - 0.3	7723-14-0
B	0 - 0.1	7440-42-8
S	0 - 0.1	7704-34-9

IPCI C23C0002-12; C23C0002-40; C22C0038-02; C22C0038-04; C22C0038-06; C22C0038-28; C22C0038-32; C22C0038-38; C21D0001-26; C21D0008-00; B21D0022-02

IPCR C23C0002-12 [I]; B21D0022-02 [I]; C21D0001-26 [I]; C21D0008-00 [I]; C22C0038-02 [I]; C22C0038-04 [I]; C22C0038-06 [I]; C22C0038-28 [I]; C22C0038-32 [I]; C22C0038-38 [I]; C23C0002-40 [I]

CC 56-11 (Nonferrous Metals and Alloys)

ST hot stamping ~~steel~~ aluminum silicon coating

IT 2305367-85-3P, Aluminum 0-0.3, boron 0-0.1, carbon 0.04-0.8, chromium 0-3, manganese 0.1-5, phosphorus 0-0.3, silicon 0-1.2, sulfur 0-0.1, titanium 0-0.5, iron bal. 2305367-88-6P, Iron 0-4, silicon 4-14, aluminum bal.
 RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
 (method for manufg. hot stamped parts with aluminum-silicon alloy coating and hot stamped parts)

L12 ANSWER 32 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2019:410880 CAPLUS Full-text

DOCUMENT NUMBER: 170:369087

TITLE: Austenitic abrasion resistant ~~steel~~ sheet

INVENTOR(S): Fujioka, Masaaki; Namekawa, Tetsuya; Yoshimura, Masahide; Minagawa, Masaki

PATENT ASSIGNEE(S): Nippon Steel & Sumitomo Metal Corporation, Japan

SOURCE: Jpn. Tokkyo Koho, 22pp.
 CODEN: JTXFF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 6477983	B1	20190306	JP 2018-542295	20180329
WO 2019186906	A1	20191003	WO 2018-JP13281	20180329
KR 2019115094	A	20191010	KR 2019-7027564	20180329
KR 2123604	B1	20200615		
AU 2018412622	A1	20191017	AU 2018-412622	20180329
CN 110546290	A	20191206	CN 2018-80022906	20180329
CN 110546290	B	20200915		
EP 3594374	A1	20200115	EP 2018-909269	20180329
KR 2020029060	A	20200317	KR 2020-7006862	20180329
KR 2206319	B1	20210122		
BR 112019019598	A2	20200414	BR 2019-112019019598	20180329
IN 201917036722	A	20191115	IN 2019-17036722	20190912
PRIORITY APPLN. INFO.:			WO 2018-JP13281	W 20180329
			KR 2019-7027564	A3 20180329

AB The austenite type abrasion-proof ~~steel~~ sheet has specified chem. compn., and the mass% of C and Mn satisfies $-13.75 \times C + 16.5 \leq \text{manganese} \leq -20 \times C + 30$. In the microstructure, the vol. percentage of the austenite is 40-90%, and the mean particle diam. of the austenite is 40-300 μm .

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
Anon	2011			JP 2011219809 A	CAPLUS
Anon	2012			JP 2012107325 A	CAPLUS
Anon	2015			WO 2015147166 A1	CAPLUS
Anon	2016			JP 2016196703 A	CAPLUS
Anon	2016			JP 2016507648 A	
IT 2257425-86-6, Aluminum 0.001-0.3, boron 0-0.3, carbon 0.2-1.6, chromium 0-5, cobalt 0-3, copper 0-3, iron bal., manganese 2.5-30, molybdenum 0-2, nickel 0-3, niobium 0-0.3, nitrogen 0-1, silicon 0.01-2, tantalum 0-0.3, titanium 0-0.3, tungsten 0-2, vanadium 0-0.3, zirconium 0-0.3					
RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)					
(austenitic abrasion resistant steel sheet)					
RN 2257425-86-6 CAPLUS					
CN Iron alloy, base, Fe 45-97, Mn 2.5-30, Cr 0-5, Co 0-3, Cu 0-3, Ni 0-3, Mo 0-2, Si 0-2, W 0-2, C 0.2-1.6, N 0-1, Al 0-0.3, B 0-0.3, Nb 0-0.3, Ta 0-0.3, Ti 0-0.3, V 0-0.3, Zr 0-0.3 (CA INDEX NAME)					

Component	Component Percent	Component Registry Number
Fe	45 - 97	7439-89-6
Mn	2.5 - 30	7439-96-5
Cr	0 - 5	7440-47-3
Co	0 - 3	7440-48-4
Cu	0 - 3	7440-50-8
Ni	0 - 3	7440-02-0
Mo	0 - 2	7439-98-7
Si	0 - 2	7440-21-3
W	0 - 2	7440-33-7
C	0.2 - 1.6	7440-44-0
N	0 - 1	17778-88-0
Al	0 - 0.3	7429-90-5
B	0 - 0.3	7440-42-8
Nb	0 - 0.3	7440-03-1
Ta	0 - 0.3	7440-25-7
Ti	0 - 0.3	7440-32-6
V	0 - 0.3	7440-62-2
Zr	0 - 0.3	7440-67-7

IPCI C22C0038-00 [I]; C22C0038-58 [I]; C21D0008-02 [N]; C21D0009-46 [N]

IPCR C22C0038-00 [I]; C22C0038-58 [I]

CC 55-3 (Ferrous Metals and Alloys)

ST austenitic ~~steel~~ sheet abrasion resistance

IT Abrasion resistance

Elongation, mechanical

Microstructure
Sheet materials
Tensile strength
Vickers hardness
Yield strength

(austenitic abrasion resistant steel sheet)

IT 2257425-86-6, Aluminum 0.001-0.3, boron 0-0.3, carbon 0.2-1.6, chromium 0-5, cobalt 0-3, copper 0-3, iron bal., manganese 2.5-30, molybdenum 0-2, nickel 0-3, niobium 0-0.3, nitrogen 0-1, silicon 0.01-2, tantalum 0-0.3, titanium 0-0.3, tungsten 0-2, vanadium 0-0.3, zirconium 0-0.3

RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)

(austenitic abrasion resistant steel sheet)

L12 ANSWER 33 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2019:340815 CAPLUS Full-text

DOCUMENT NUMBER: 170:379972

TITLE: Hot stamping method of zinc-based coated steel plate or steel strip with excellent corrosion resistance

INVENTOR(S): Bi, Wenzhen; Hong, Jiyao; Wang, Li

PATENT ASSIGNEE(S): Baoshan Iron & Steel Co., Ltd., Peop. Rep. China

SOURCE: Faming Zhuanli Shenqing, 7pp.; Chemical Indexing

Equivalent to 173:85818 (WO)

CODEN: CNXXEV

DOCUMENT TYPE: Patent

LANGUAGE: Chinese

FAMILY ACC. NUM. COUNT: 2

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
CN 109365606	A	20190222	CN 2018-11453322	20181130
WO 2020108593	A1	20200604	WO 2019-CN121859	20191129
PRIORITY APPLN. INFO.:			CN 2018-11453322	A 20181130

AB The invention discloses a hot stamping method of zinc-based coated steel plate or steel strip with excellent corrosion resistance, which improves the corrosion resistance of the steel plate or the steel strip and avoids cracking of the substrate. The above steel plate or steel strip includes the following components in percentage by wt.: C 0.1-0.8%, Si 0.05-2.0%, Mn 0.5-3.0%, P <0.1%, S <0.05%, Al <0.1%, N <0.01%, and balance of Fe and impurities, and also includes at least one of Cr 0.01-1.0%, Mo 0.01-1.0%, Ti <0.2%, Nb 0.01-0.08%, V 0.01-1.0%, and B 0.005-0.08%; the zinc-based coating includes the following components in percentage by wt.: Al 0.15%-6.5%, Mg 0.2-7%, RE <0.2%, Sr 0.002-0.2%, and balance of Zn and impurities, and the coating further includes at least one or more of Mn, Cr, Al, and Mg, and the total amt. thereof is more than 0.1%.

IT 2293976-55-1, Aluminum 0-0.1, boron 0.005-0.1, carbon 0.1-0.8, chromium 0.01-1, iron bal., manganese 0.5-3, molybdenum 0.01-1, niobium 0.01-0.1, phosphorus 0-0.1, silicon 0.05-2, titanium 0-0.2, vanadium 0.01-1

RL: MSC (Miscellaneous); PEP (Physical, engineering or chemical process);

TEM (Technical or engineered material use); PROC (Process); USES (Uses)

(Hot stamping method of zinc-based coated steel plate or

steel strip with excellent corrosion resistance)

RN 2293976-55-1 CAPLUS

CN Iron alloy, base, Fe 91-99, Mn 0.5-3, Si 0-2, Cr 0-1, Mo 0-1, V 0-1, C 0.1-0.8, Ti 0-0.2, Al 0-0.1, B 0-0.1, Nb 0-0.1, P 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	91 - 99	7439-89-6
Mn	0.5 - 3	7439-96-5
Si	0 - 2	7440-21-3
Cr	0 - 1	7440-47-3
Mo	0 - 1	7439-98-7
V	0 - 1	7440-62-2
C	0.1 - 0.8	7440-44-0
Ti	0 - 0.2	7440-32-6
Al	0 - 0.1	7429-90-5

B	0	-	0.1	7440-42-8
Nb	0	-	0.1	7440-03-1
P	0	-	0.1	7723-14-0

IPCI B21D0022-02; C23C0002-06; C23C0002-40; C22C0018-00; C21D0008-02
 IPCR B21D0022-02 [I]; C21D0008-02 [I]; C22C0018-00 [I]; C23C0002-06 [I];
 C23C0002-40 [I]
 CC 55-6 (Ferrous Metals and Alloys)
 ST corrosion resistance zinc alloy coating ~~steel~~ hot stamping
 IT Anticorrosive coating materials
 (Hot stamping method of zinc-based coated ~~steel~~ plate or
~~steel~~ strip with excellent corrosion resistance)
 IT Metalworking
 (stamping, hot; Hot stamping method of zinc-based coated ~~steel~~
 plate or ~~steel~~ strip with excellent corrosion resistance)
 IT 2293976-55-1, Aluminum 0-0.1, boron 0.005-0.1, carbon 0.1-0.8,
 chromium 0.01-1, iron bal., manganese 0.5-3, molybdenum 0.01-1, niobium
 0.01-0.1, phosphorus 0-0.1, silicon 0.05-2, titanium 0-0.2, vanadium
 0.01-1
 RL: MSC (Miscellaneous); PEP (Physical, engineering or chemical process);
 TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (Hot stamping method of zinc-based coated ~~steel~~ plate or
~~steel~~ strip with excellent corrosion resistance)
 IT 2226545-76-0
 RL: PEP (Physical, engineering or chemical process); TEM (Technical or
 engineered material use); PROC (Process); USES (Uses)
 (Hot stamping method of zinc-based coated ~~steel~~ plate or
~~steel~~ strip with excellent corrosion resistance)
 OS.CITING REF COUNT: 1 THERE ARE 1 CAPLUS RECORDS THAT CITE THIS RECORD
 (1 CITINGS)

L12 ANSWER 34 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN
 ACCESSION NUMBER: 2019:269683 CAPLUS Full-text
 DOCUMENT NUMBER: 170:345639
 TITLE: 20CrNiB ~~steel~~ for carburized gear
 INVENTOR(S): Sun, Hongping; Cao, Hongfu; Huang, Zhen; Xu, Xiaohong;
 Lu, Mingxia; Dou, Shengtao; Yang, Gaocheng; Zhang,
 Xuecheng
 PATENT ASSIGNEE(S): Jiangyin Xingcheng Special Steel Works Co., Ltd.,
 Peop. Rep. China
 SOURCE: Faming Zhuanli Shenqing, 7pp.
 CODEN: CNXXEV
 DOCUMENT TYPE: Patent
 LANGUAGE: Chinese
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
CN 109321712	A	20190212	CN 2018-11322890	20181108
PRIORITY APPLN. INFO.:			CN 2018-11322890	20181108
AB A 20CrNiB steel for carburized gear has the advantages of high hardenability, high strength and toughness, and stability. The 20CrNiB steel for the carburized gear includes the following raw materials by mass percentages: C: 0.17-0.23%, Si: < 0.35%, Mn: 0.50-0.95%, Cr: 0.85-1.25%, S: 0.015-0.030%, P :≤ 0.025%, Ni: 0.15-0.25%, Nb: 0.015-0.035%, B: 0.0010-0.0030%, Cu: < 0.20%, Al: 0.010-0.050%, Ca: ≤ 0.0005%, and balance of Fe.				
IT 12742-15-3, 20CrNiB RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses) (20CrNiB steel for carburized gear)				
RN 12742-15-3 CAPLUS				
CN Iron alloy, base, Fe 95-98, Ni 0.80-1.10, Cr 0.70-1.10, Mn 0.60-0.90, Si 0.17-0.37, Cu 0-0.30, C 0.16-0.23, W 0-0.20, Mo 0-0.15, V 0-0.05, P 0-0.035, S 0-0.035, Ti 0-0.03, B 0.001 (20KhNR) (CA INDEX NAME)				

Component	Component Percent	Component Registry Number
Fe	95 - 98	7439-89-6
Ni	0.80 - 1.10	7440-02-0

Cr	0.70	-	1.10	7440-47-3
Mn	0.60	-	0.90	7439-96-5
Si	0.17	-	0.37	7440-21-3
Cu	0	-	0.30	7440-50-8
C	0.16	-	0.23	7440-44-0
W	0	-	0.20	7440-33-7
Mo	0	-	0.15	7439-98-7
V	0	-	0.05	7440-62-2
P	0	-	0.035	7723-14-0
S	0	-	0.035	7704-34-9
Ti	0	-	0.03	7440-32-6
B			0.001	7440-42-8

IPCI C21C0007-06; C21C0007-10; C21D0008-06; C22C0033-04; C22C0038-02;
C22C0038-04; C22C0038-06; C22C0038-42; C22C0038-48; C22C0038-54

IPCR C21C0007-06 [I]; C21C0007-10 [I]; C21D0008-06 [I]; C22C0033-04 [I];
C22C0038-02 [I]; C22C0038-04 [I]; C22C0038-06 [I]; C22C0038-42 [I];
C22C0038-48 [I]; C22C0038-54 [I]

CC 55-7 (Ferrous Metals and Alloys)

ST high hardenability carburization gear 20CrNiB steel

IT Carburizing

Gears

(20CrNiB steel for carburized gear)

IT 12742-15-3, 20CrNiB

RL: PEP (Physical, engineering or chemical process); TEM (Technical or
engineered material use); PROC (Process); USES (Uses)

(20CrNiB steel for carburized gear)

L12 ANSWER 35 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2019:186187 CAPLUS Full-text

DOCUMENT NUMBER: 170:322160

TITLE: Alloy steel material with high-temperature oxidation
resistance

INVENTOR(S): Duanmu, Shundi

PATENT ASSIGNEE(S): Peop. Rep. China

SOURCE: Faming Zhuanli Shenqing, 5pp.

CODEN: CNXXEV

DOCUMENT TYPE: Patent

LANGUAGE: Chinese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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CN 109280856	A	20190129	CN 2017-10636887	20170720
PRIORITY APPLN. INFO.:			CN 2017-10636887	20170720

AB The title alloy steel material comprises (by wt.%): nickel 0.30-0.50,
manganese 0.80-1.40, silicon 0.20-0.34, carbon 0.14-0.18, boron 0.02-0.06,
phosphorus 0.01-0.02, sulfur 0.015-0.025, chromium 0.08-0.1, vanadium
0.06-0.2, copper 0.2-0.3, molybdenum 0.02-0.08, titanium 0.08-0.1, niobium
0.02-0.04, rubidium 0.06-0.2, thorium 0.08-0.1, lanthanum and germanium
0.06-0.1, and iron as balance, wherein the content of germanium is 2-4
times of that of lanthanum. The alloy steel material has excellent
high-temp. oxidn. resistance, can be used for manufg. workpiece with high
high-temp. oxidn. resistance, and the high-temp. oxidn. resistance of the
alloy steel material is related to the content ratio of germanium and
lanthanum in the alloy steel.

IT 1960401-15-3, Boron 0.02-0.1, carbon 0.1-0.2, chromium 0.1,
copper 0.2-0.3, iron bal., lanthanum 0-0.1, germanium 0-0.1, manganese
0.8-1.4, molybdenum 0.02-0.1, nickel 0.3-0.5, rubidium 0.1-0.2, silicon
0.2-0.3, titanium 0.1, thorium 0.1, vanadium 0.1-0.2

RL: TEM (Technical or engineered material use); USES (Uses)

(alloy steel material with high-temp. oxidn. resistance)

RN 1960401-15-3 CAPLUS

CN Iron alloy, base, Fe 96-98, Mn 0.8-1.4, Ni 0.3-0.5, Cu 0.2-0.3, Si 0.2-0.3, C
0.1-0.2, Rb 0.1-0.2, V 0.1-0.2, Cr 0.1, Th 0.1, Ti 0.1, B 0-0.1, Ge 0-0.1, La
0-0.1, Mo 0-0.1 (CA INDEX NAME)

Component	Component	Component
	Percent	Registry Number
=====+	=====+	=====+
Fe	96 - 98	7439-89-6

Mn	0.8	-	1.4	7439-96-5
Ni	0.3	-	0.5	7440-02-0
Cu	0.2	-	0.3	7440-50-8
Si	0.2	-	0.3	7440-21-3
C	0.1	-	0.2	7440-44-0
Rb	0.1	-	0.2	7440-17-7
V	0.1	-	0.2	7440-62-2
Cr		0.1		7440-47-3
Th		0.1		7440-29-1
Ti		0.1		7440-32-6
B	0	-	0.1	7440-42-8
Ge	0	-	0.1	7440-56-4
La	0	-	0.1	7439-91-0
Mo	0	-	0.1	7439-98-7

IPCI C22C0038-04; C22C0038-02; C22C0038-54; C22C0038-46; C22C0038-42;
C22C0038-44; C22C0038-48; C22C0038-50
IPCR C22C0038-04 [I]; C22C0038-02 [I]; C22C0038-42 [I]; C22C0038-44 [I];
C22C0038-46 [I]; C22C0038-48 [I]; C22C0038-50 [I]; C22C0038-54 [I]
CC 55-12 (Ferrous Metals and Alloys)
ST germanium lanthanum ~~steel~~ oxidn resistance
IT ~~1960401-15-3~~, Boron 0.02-0.1, carbon 0.1-0.2, chromium 0.1,
copper 0.2-0.3, iron bal., lanthanum 0-0.1, germanium 0-0.1, manganese
0.8-1.4, molybdenum 0.02-0.1, nickel 0.3-0.5, rubidium 0.1-0.2, silicon
0.2-0.3, titanium 0.1, thorium 0.1, vanadium 0.1-0.2
RL: TEM (Technical or engineered material use); USES (Uses)
(alloy ~~steel~~ material with high-temp. oxidn. resistance)

L12 ANSWER 36 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN
ACCESSION NUMBER: 2018:2601319 CAPLUS Full-text
DOCUMENT NUMBER: 170:116258
TITLE: Method for producing a ~~steel~~ automotive component
provided with an aluminum alloy anti-corrosion coating
INVENTOR(S): Rosenstock, Dirk; Banik, Janko
PATENT ASSIGNEE(S): ThyssenKrupp Steel Europe AG, Germany; ThyssenKrupp AG
SOURCE: PCT Int. Appl., 25pp.; Chemical Indexing Equivalent to
170:116256 (DE)
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: German
FAMILY ACC. NUM. COUNT: 2
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2018234102	A1	20181227	WO 2018-EP65498	20180612
DE 102017210201	A1	20181220	DE 2017-102017210201	20170619
EP 3642371	A1	20200429	EP 2018-738199	20180612
			DE 2017-102017210201 A	20170619
			WO 2018-EP65498 W	20180612

PRIORITY APPLN. INFO.:

AB A method is described for producing a corrosion-resistant ~~steel~~
automotive component comprising a substrate and an anticorrosive coating.
IT ~~2254829-63-3P~~
RL: IMF (Industrial manufacture); TEM (Technical or engineered material
use); PREP (Preparation); USES (Uses)
(strips; method for producing a ~~steel~~ automotive component
provided with an aluminum alloy anti-corrosion coating)
RN 2254829-63-3 CAPLUS
CN Iron alloy, base, Fe 94-99, Mn 0.5-3, Cr 0-1, C 0.2-0.5, Si 0.1-0.5, Ti
0-0.2, Al 0-0.1, B 0-0.1, Nb 0-0.1, P 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	94 - 99	7439-89-6
Mn	0.5 - 3	7439-96-5
Cr	0 - 1	7440-47-3
C	0.2 - 0.5	7440-44-0
Si	0.1 - 0.5	7440-21-3
Ti	0 - 0.2	7440-32-6
Al	0 - 0.1	7429-90-5
B	0 - 0.1	7440-42-8

Nb 0 - 0.1 7440-03-1
P 0 - 0.1 7723-14-0

IPCI C21D0008-02 [I]; C23C0002-12 [I]; C21D0009-46 [I]; C21D0001-673 [I];
B32B0015-01 [I]
IPCR C21D0008-02 [I]; B32B0015-01 [I]; C21D0001-673 [I]; C21D0009-46 [I];
C23C0002-12 [I]
CC 55-10 (Ferrous Metals and Alloys)
Section cross-reference(s): 56
ST ~~steel~~ automobile metal coating corrosion aluminum alloy
IT Anticorrosive coating materials
(metallic; method for producing a ~~steel~~ automotive component
provided with an aluminum alloy anti-corrosion coating)
IT Automobile bodies
Automobile doors
Automobile roofs
Automotive bumpers
Heat treatment
(method for producing a ~~steel~~ automotive component provided
with an aluminum alloy anti-corrosion coating)
IT 254455-65-7P
RL: IMF (Industrial manufacture); TEM (Technical or engineered material
use); PREP (Preparation); USES (Uses)
(coatings; method for producing a ~~steel~~ automotive component
provided with an aluminum alloy anti-corrosion coating)
IT 870820-47-6P, 22MnB5 ~~2254829-63-3P~~
RL: IMF (Industrial manufacture); TEM (Technical or engineered material
use); PREP (Preparation); USES (Uses)
(strips; method for producing a ~~steel~~ automotive component
provided with an aluminum alloy anti-corrosion coating)
OS.CITING REF COUNT: 1 THERE ARE 1 CAPLUS RECORDS THAT CITE THIS RECORD
(1 CITINGS)

L12 ANSWER 37 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN
ACCESSION NUMBER: 2018:2596372 CAPLUS Full-text
DOCUMENT NUMBER: 170:106297
TITLE: High-strength ~~steel~~ sheet and its manufacture for
automobile parts
INVENTOR(S): Natsumeda, Hirokazu; Murakami, Toshio; Saito, Kenji;
Murata, Tadao
PATENT ASSIGNEE(S): Kobe Steel, Ltd., Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 23pp.; Chemical Indexing
Equivalent to 170:68139 (WO)
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 2
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2018204058	A	20181227	JP 2017-108340	20170531
WO 2018221307	A1	20181206	WO 2018-JP19594	20180522
KR 2020003010	A	20200108	KR 2019-7034838	20180522
CN 110678569	A	20200110	CN 2018-80035460	20180522
EP 3636788	A1	20200415	EP 2018-809088	20180522
IN 201947048601	A	20191206	IN 2019-47048601	20191127
US 20200190619	A1	20200618	US 2019-16617736	20191127
PRIORITY APPLN. INFO.:			JP 2017-108340	A 20170531
			WO 2018-JP19594	W 20180522

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB The high-strength ~~steel~~ sheet comprises the following compn. in mass%:
carbon of 0.15-0.35, silicon of 0.5-3, aluminum of 0.01, nitrogen of
0-0.01, manganese of 1-4, phosphorus of 0-0.05, sulfur of 0-0.01, and
remaining made up of iron and unavoidable impurities. The ~~steel~~
structure having a ferrite fraction of 0-5%, the total fraction of
tempered martensite and bainite is 60% or more, the amt. of retained
austenite is 10% or more, the av. size of martensite and austenite(MA) is
0-1 µm and retained austenite is 0-1 µm, wherein the retained
austenite having a size of 1.5 µm or more is 2% or more of the total
retained austenite amt., and a solid soln. nitrogen content of 0-0.002
mass%.

IT 2253797-76-9P
 RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
 (high-strength ~~steel~~ sheet and its manuf. for automobile parts)
 RN 2253797-76-9 CAPLUS
 CN Iron alloy, base, Fe 84-99, Mn 1-4, Al 0-3, Si 0-3, B 0-1, Cr 0-1, Cu 0-1, Mo 0-1, Ni 0-1, C 0.2-0.4, Hf 0-0.2, Nb 0-0.2, Ti 0-0.2, V 0-0.2, Zn 0-0.2 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	84 - 99	7439-89-6
Mn	1 - 4	7439-96-5
Al	0 - 3	7429-90-5
Si	0 - 3	7440-21-3
B	0 - 1	7440-42-8
Cr	0 - 1	7440-47-3
Cu	0 - 1	7440-50-8
Mo	0 - 1	7439-98-7
Ni	0 - 1	7440-02-0
C	0.2 - 0.4	7440-44-0
Hf	0 - 0.2	7440-58-6
Nb	0 - 0.2	7440-03-1
Ti	0 - 0.2	7440-32-6
V	0 - 0.2	7440-62-2
Zn	0 - 0.2	7440-66-6

IPCI C22C0038-00 [I]; C22C0038-06 [I]; C22C0038-58 [I]; C21D0009-48 [I]; C21D0009-46 [N]

IPCR C22C0038-00 [I]; C21D0009-48 [I]; C22C0038-06 [I]; C22C0038-58 [I]

CC 55-3 (Ferrous Metals and Alloys)

ST high strength ~~steel~~ sheet manuf automobile part

IT Annealing
 Automobile parts
 Cold rolling
 Elongation, mechanical
 Heat treatment
 Hot rolling
 Microstructure
 Sheet materials
 Tensile strength
 Yield strength
 (high-strength ~~steel~~ sheet and its manuf. for automobile parts)

IT 2253797-76-9P
 RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
 (high-strength ~~steel~~ sheet and its manuf. for automobile parts)

L12 ANSWER 38 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2018:2596261 CAPLUS Full-text

DOCUMENT NUMBER: 170:127894

TITLE: Wear-resistant thick ~~steel~~ sheet

INVENTOR(S): Fujioka, Masaaki; Namekawa, Tetsuya; Yoshimura, Masahide; Minagawa, Masaki; Hoshino, Manabu; Sawamura, Mitsuru

PATENT ASSIGNEE(S): Nippon Steel & Sumitomo Metal Corporation, Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 18pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2018204109	A	20181227	JP 2018-110217	20180608
PRIORITY APPLN. INFO.:			JP 2017-113421	A 20170608

AB The title wear-resistant thick ~~steel~~ sheet is excellent in both abrasion

resistance and toughness. The ~~steel~~ sheet comprises (by mass%): carbon 0.2-1.6, silicon 0.01-2, manganese 2.5-30, aluminum 0.001-0.3, phosphorus 0-0.05, sulfur 0-0.05, and iron and impurities as bal., wherein the content (mass%) of carbon and manganese satisfies $(-13.75)C + 16.5 \leq Mn \leq (-20)C + 35$.

IT 2257425-86-6
 RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (wear-resistant thick ~~steel~~ sheet)
 RN 2257425-86-6 CAPLUS
 CN Iron alloy, base, Fe 45-97, Mn 2.5-30, Cr 0-5, Co 0-3, Cu 0-3, Ni 0-3, Mo 0-2, Si 0-2, W 0-2, C 0.2-1.6, N 0-1, Al 0-0.3, B 0-0.3, Nb 0-0.3, Ta 0-0.3, Ti 0-0.3, V 0-0.3, Zr 0-0.3 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	45 - 97	7439-89-6
Mn	2.5 - 30	7439-96-5
Cr	0 - 5	7440-47-3
Co	0 - 3	7440-48-4
Cu	0 - 3	7440-50-8
Ni	0 - 3	7440-02-0
Mo	0 - 2	7439-98-7
Si	0 - 2	7440-21-3
W	0 - 2	7440-33-7
C	0.2 - 1.6	7440-44-0
N	0 - 1	17778-88-0
Al	0 - 0.3	7429-90-5
B	0 - 0.3	7440-42-8
Nb	0 - 0.3	7440-03-1
Ta	0 - 0.3	7440-25-7
Ti	0 - 0.3	7440-32-6
V	0 - 0.3	7440-62-2
Zr	0 - 0.3	7440-67-7

IPCI C22C0038-00 [I]; C22C0038-60 [I]; C21D0008-02 [I]
 IPCR C22C0038-00 [I]; C21D0008-02 [I]; C22C0038-60 [I]
 CC 55-1 (Ferrous Metals and Alloys)
 ST wear resistant ~~steel~~ sheet
 IT Wear-resistant materials
 (wear-resistant thick ~~steel~~ sheet)
 IT 12244-31-4, Austenite, formation (nonpreparative)
 RL: FMU (Formation, unclassified); OCU (Occurrence, unclassified); FORM (Formation, nonpreparative); OCCU (Occurrence)
 (wear-resistant thick ~~steel~~ sheet)
 IT 2257425-86-6
 RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (wear-resistant thick ~~steel~~ sheet)

L12 ANSWER 39 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN
 ACCESSION NUMBER: 2018:2544202 CAPLUS Full-text
 DOCUMENT NUMBER: 170:116256
 TITLE: Method for producing a ~~steel~~ automotive component provided with an aluminum alloy anti-corrosion coating
 INVENTOR(S): Rosenstock, Dirk; Banik, Janko
 PATENT ASSIGNEE(S): ThyssenKrupp AG, Germany; ThyssenKrupp Steel Europe AG
 SOURCE: Ger. Offen., 16pp.; Chemical Indexing Equivalent to 170:116258 (WO)
 CODEN: GWXXBX
 DOCUMENT TYPE: Patent
 LANGUAGE: German
 FAMILY ACC. NUM. COUNT: 2
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
DE 102017210201	A1	20181220	DE 2017-102017210201	20170619
CN 109136775	A	20190104	CN 2017-10986828	20171020
WO 2018234102	A1	20181227	WO 2018-EP65498	20180612
EP 3642371	A1	20200429	EP 2018-738199	20180612

PRIORITY APPLN. INFO.:

DE 2017-102017210201 A 20170619

WO 2018-EP65498 W 20180612

AB A method is described for producing a corrosion-resistant ~~steel~~ automotive component comprising a substrate and an anticorrosive coating.

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
Anon				DE 102007061489 A1	CAPLUS
Anon				DE 102009007909 A1	CAPLUS
Anon				WO 2015036151 A1	CAPLUS
Anon				WO 2016034476 A1	CAPLUS

IT 2254829-63-3P

RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(strips; method for producing a ~~steel~~ automotive component provided with an aluminum alloy anti-corrosion coating)

RN 2254829-63-3 CAPLUS

CN Iron alloy, base, Fe 94-99, Mn 0.5-3, Cr 0-1, C 0.2-0.5, Si 0.1-0.5, Ti 0-0.2, Al 0-0.1, B 0-0.1, Nb 0-0.1, P 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	94 - 99	7439-89-6
Mn	0.5 - 3	7439-96-5
Cr	0 - 1	7440-47-3
C	0.2 - 0.5	7440-44-0
Si	0.1 - 0.5	7440-21-3
Ti	0 - 0.2	7440-32-6
Al	0 - 0.1	7429-90-5
B	0 - 0.1	7440-42-8
Nb	0 - 0.1	7440-03-1
P	0 - 0.1	7723-14-0

IPCI C22C0038-04 [I]; C21D0008-02 [I]; C23C0002-12 [I]

IPCR C22C0038-04 [I]; C21D0008-02 [I]; C23C0002-12 [I]

CC 55-10 (Ferrous Metals and Alloys)

Section cross-reference(s): 56

ST ~~steel~~ automobile metal coating corrosion aluminum alloy

IT Anticorrosive coating materials
(metallic; method for producing a ~~steel~~ automotive component provided with an aluminum alloy anti-corrosion coating)

IT Automobile bodies

Automobile doors

Automobile roofs

Automotive bumpers

Heat treatment

(method for producing a ~~steel~~ automotive component provided with an aluminum alloy anti-corrosion coating)

IT 254455-65-7P

RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(coatings; method for producing a ~~steel~~ automotive component provided with an aluminum alloy anti-corrosion coating)

IT 870820-47-6P, 22MnB5 2254829-63-3P

RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(strips; method for producing a ~~steel~~ automotive component provided with an aluminum alloy anti-corrosion coating)

OS.CITING REF COUNT: 1 THERE ARE 1 CAPLUS RECORDS THAT CITE THIS RECORD
(1 CITINGS)

L12 ANSWER 40 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2018:2476841 CAPLUS Full-text

DOCUMENT NUMBER: 170:49883

TITLE: High-strength ~~steel~~ sheet comprising silicon and manganese, and production method for same

INVENTOR(S): Natsumeda, Hirokazu; Murakami, Toshio; Saito, Kenji; Murata, Tadao

PATENT ASSIGNEE(S): Kobe Steel, Ltd., Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 23pp.; Chemical Indexing
Equivalent to 170:35129 (WO)
CODEN: JKXXAF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 2

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2018197380	A	20181213	JP 2017-103024	20170524
WO 2018216522	A1	20181129	WO 2018-JP18489	20180514
KR 2019142354	A	20191226	KR 2019-7033765	20180514
CN 110651062	A	20200103	CN 2018-80033477	20180514
EP 3633058	A1	20200408	EP 2018-806482	20180514
IN 201947047461	A	20191129	IN 2019-47047461	20191121
US 20200071787	A1	20200305	US 2019-16615462	20191121
PRIORITY APPLN. INFO.:			JP 2017-103024	A 20170524
			WO 2018-JP18489	W 20180514

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB The high-strength ~~steel~~ sheet comprises the following compn. by mass %:
carbon of 0.15-0.35, silicon of 0.5-3, aluminum of 0.5-3, manganese of
1-4, phosphorus of 0.05, sulfur of 0.01, titanium of 0.01-0.2, with the
remainder being made up of iron balance and unavoidable impurities. The
~~steel~~ sheet structure is such that the ferrite fraction does not exceed
5, the total fraction of tempered martensite and tempered bainite is at
least 60, the retained austenite fraction is at least 10, the fresh
martensite fraction does not exceed 5, the av. particle size of retained
austenite does not exceed 0.5 µm, retained austenite having a particle
diam. of at least 1.0 µm accounts for at least 2 of total retained
austenite content, and prior austenite particle diam. does not exceed 10
µm.

IT 2252460-30-1
RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM
(Technical or engineered material use); PROC (Process); USES (Uses)
(high-strength ~~steel~~ sheet comprising silicon and manganese,
and prodn. method for same)

RN 2252460-30-1 CAPLUS

CN Iron alloy, base, Fe 88-98, Mn 1-4, Al 0-3, Si 0-3, B 0-1, Cr 0-1, Cu 0-1, Ni
0-1, C 0.2-0.4, Hf 0-0.2, Mo 0-0.2, Nb 0-0.2, Ti 0-0.2, V 0-0.2, Zr 0-0.2 (CA
INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	88 - 98	7439-89-6
Mn	1 - 4	7439-96-5
Al	0 - 3	7429-90-5
Si	0 - 3	7440-21-3
B	0 - 1	7440-42-8
Cr	0 - 1	7440-47-3
Cu	0 - 1	7440-50-8
Ni	0 - 1	7440-02-0
C	0.2 - 0.4	7440-44-0
Hf	0 - 0.2	7440-58-6
Mo	0 - 0.2	7439-98-7
Nb	0 - 0.2	7440-03-1
Ti	0 - 0.2	7440-32-6
V	0 - 0.2	7440-62-2
Zr	0 - 0.2	7440-67-7

IPCI C22C0038-00 [I]; C22C0038-14 [I]; C22C0038-58 [I]; C21D0009-46 [I];
C21D0009-48 [I]

IPCR C22C0038-00 [I]; C21D0009-46 [I]; C21D0009-48 [I]; C22C0038-14 [I];
C22C0038-58 [I]

CC 55-3 (Ferrous Metals and Alloys)

ST high strength ~~steel~~ sheet

IT Deep drawing of materials
Elongation, mechanical
Grain size
Heat treatment
Impact strength
Microstructure

Rolling (metals)
Tensile strength
Yield strength
(high-strength ~~steel~~ sheet comprising silicon and manganese,
and prodn. method for same)

IT 12173-93-2, Martensite, formation (nonpreparative) 12244-31-4,
Austenite, formation (nonpreparative) 12427-23-5, Bainite 12427-24-6,
Ferrite (ferrous metal component)
RL: FMU (Formation, unclassified); FORM (Formation, nonpreparative)
(high-strength ~~steel~~ sheet comprising silicon and manganese,
and prodn. method for same)

IT 2252460-30-1
RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM
(Technical or engineered material use); PROC (Process); USES (Uses)
(high-strength ~~steel~~ sheet comprising silicon and manganese,
and prodn. method for same)

L12 ANSWER 41 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2018:2421261 CAPLUS Full-text

DOCUMENT NUMBER: 170:106245

TITLE: Ultra-high strength ~~steel~~ having near net shaping
for automobile safety components and preparation
method thereof

INVENTOR(S): Ju, Jia; Wang, Zhangzhong; Zhang, Sibin; Liu, Zhuang;
Zhang, Baosen; Mao, Xiangyang; Ba, Zhixin; Li, Xuan;
Li, Huaguan

PATENT ASSIGNEE(S): Nanjing Institute of Technology, Peop. Rep. China

SOURCE: Faming Zhuanli Shenqing, 9pp.

CODEN: CNXXEV

DOCUMENT TYPE: Patent

LANGUAGE: Chinese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
CN 108950411	A	20181207	CN 2018-10840230	20180727
CN 108950411	B	20200519		

PRIORITY APPLN. INFO.: CN 2018-10840230 20180727

AB Raw materials include the following compns. (by wt.%): C 0.15-0.25, Mn
1.3-2.8, P ≤0.006, S ≤0.004, Si 0.25-0.85, B 0.001-0.07, Cr
0.20-0.90, Ti 0.07-0.15, Al 0.005-0.02, Nb 0.65-1.40, and Fe as balance.
The prepn. method includes the following steps of S1) formulating; S2)
subjecting to vacuum induction melting, casting to form alloy ingot; S3)
thermally treating; and S4) pressure processing. The product has the
advantages of relatively excellent mech. property and near-net forming.

IT 2254705-29-6, Boron 0-0.1, Carbon 0.2, chromium 0.2-0.9, iron
94-97, manganese 1.3-2.8, niobium 0.6-1.4, silicon 0.2-0.8, titanium
0.1-0.2

RL: IMF (Industrial manufacture); PEP (Physical, engineering or chemical
process); TEM (Technical or engineered material use); PREP (Preparation);
PROC (Process); USES (Uses)

(ultra-high strength ~~steel~~ having near net shaping for
automobile safety components and prepn. method thereof)

RN 2254705-29-6 CAPLUS

CN Iron alloy, base, Fe 94-97, Mn 1.3-2.8, Nb 0.6-1.4, Cr 0.2-0.9, Si 0.2-0.8, C
0.2, Ti 0.1-0.2, B 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	94 - 97	7439-89-6
Mn	1.3 - 2.8	7439-96-5
Nb	0.6 - 1.4	7440-03-1
Cr	0.2 - 0.9	7440-47-3
Si	0.2 - 0.8	7440-21-3
C	0.2	7440-44-0
Ti	0.1 - 0.2	7440-32-6
B	0 - 0.1	7440-42-8

IPCI C22C0038-04; C22C0038-02; C22C0038-32; C22C0038-28; C22C0038-26;
C22C0038-06; C22C0038-38; C22C0033-04; C21D0008-00

IPCR C22C0038-04 [I]; C21D0008-00 [I]; C22C0033-04 [I]; C22C0038-02 [I];
 C22C0038-06 [I]; C22C0038-26 [I]; C22C0038-28 [I]; C22C0038-32 [I];
 C22C0038-38 [I]
 CC 55-1 (Ferrous Metals and Alloys)
 Section cross-reference(s): 47
 ST ultrahigh strength ~~steel~~ near net shaping automobile safety component
 IT Heat treatment
 Magnetic stirring
 Melting
 Pipes and Tubes
 (ultra-high strength ~~steel~~ having near net shaping for
 automobile safety components and prepn. method thereof)
 IT 2254705-29-6P, Boron 0-0.1, Carbon 0.2, chromium 0.2-0.9, iron
 94-97, manganese 1.3-2.8, niobium 0.6-1.4, silicon 0.2-0.8, titanium
 0.1-0.2
 RL: IMF (Industrial manufacture); PEP (Physical, engineering or chemical
 process); TEM (Technical or engineered material use); PREP (Preparation);
 PROC (Process); USES (Uses)
 (ultra-high strength ~~steel~~ having near net shaping for
 automobile safety components and prepn. method thereof)

L12 ANSWER 42 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN
 ACCESSION NUMBER: 2018:2401537 CAPLUS Full-text
 DOCUMENT NUMBER: 170:68139
 TITLE: High-strength ~~steel~~ sheet and its manufacture for
 automobile parts
 INVENTOR(S): Natsumeda, Hirokazu; Murakami, Toshio; Saito, Kenji;
 Murata, Tadao
 PATENT ASSIGNEE(S): Kabushiki Kaisha Kobe Seiko Sho (Kobe Steel, Ltd.),
 Japan
 SOURCE: PCT Int. Appl., 42pp.; Chemical Indexing Equivalent to
 170:106297 (JP)
 CODEN: PIXXD2
 DOCUMENT TYPE: Patent
 LANGUAGE: Japanese
 FAMILY ACC. NUM. COUNT: 2
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2018221307	A1	20181206	WO 2018-JP19594	20180522
JP 2018204058	A	20181227	JP 2017-108340	20170531
KR 2020003010	A	20200108	KR 2019-7034838	20180522
CN 110678569	A	20200110	CN 2018-80035460	20180522
EP 3636788	A1	20200415	EP 2018-809088	20180522
IN 201947048601	A	20191206	IN 2019-47048601	20191127
US 20200190619	A1	20200618	US 2019-16617736	20191127
PRIORITY APPLN. INFO.:			JP 2017-108340	A 20170531
			WO 2018-JP19594	W 20180522

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB The high-strength ~~steel~~ sheet comprises the following compn. in mass%:
 carbon of 0.15-0.35, silicon of 0.5-3, aluminum of 0.01, nitrogen of
 0-0.01, manganese of 1-4, phosphorus of 0-0.05, sulfur of 0-0.01, and
 remaining made up of iron and unavoidable impurities. The ~~steel~~
 structure having a ferrite fraction of 0-5%, the total fraction of
 tempered martensite and bainite is 60% or more, the amt. of retained
 austenite is 10% or more, the av. size of martensite and austenite(MA) is
 0-1 µm and retained austenite is 0-1 µm, wherein the retained
 austenite having a size of 1.5 µm or more is 2% or more of the total
 retained austenite amt., and a solid soln. nitrogen content of 0-0.002
 mass%.

RETABLe

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
Anon	1991			JP 394017 A	
Anon	2015			JP 2015516511 A	
MURAKAMI TOSHIO	2013			JP 2013040383 A	CAPLUS
MURAKAMI TOSHIO	2017			JP 2017214648 A	CAPLUS
MURATA TADAO	2016			JP 2016194138 A	CAPLUS
NAKAGAITO TATSUYA	2009			JP 2009209450 A	CAPLUS
IT 2253797-76-9P, Aluminum 0-3, boron 0-1, carbon 0.15-0.35,					

chromium 0-1, copper 0-1, hafnium 0-0.2, iron bal., manganese 1-4,
molybdenum 0-1, nickel 0-1, niobium 0-0.2, silicon 0-3, titanium 0-0.2,
vanadium 0-0.2, Zn 0-0.2

RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or
engineered material use); PREP (Preparation); USES (Uses)

(high-strength ~~steel~~ sheet and its manuf. for automobile
parts)

RN 2253797-76-9 CAPLUS

CN Iron alloy, base, Fe 84-99, Mn 1-4, Al 0-3, Si 0-3, B 0-1, Cr 0-1, Cu 0-1, Mo
0-1, Ni 0-1, C 0.2-0.4, Hf 0-0.2, Nb 0-0.2, Ti 0-0.2, V 0-0.2, Zn 0-0.2 (CA
INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	84 - 99	7439-89-6
Mn	1 - 4	7439-96-5
Al	0 - 3	7429-90-5
Si	0 - 3	7440-21-3
B	0 - 1	7440-42-8
Cr	0 - 1	7440-47-3
Cu	0 - 1	7440-50-8
Mo	0 - 1	7439-98-7
Ni	0 - 1	7440-02-0
C	0.2 - 0.4	7440-44-0
Hf	0 - 0.2	7440-58-6
Nb	0 - 0.2	7440-03-1
Ti	0 - 0.2	7440-32-6
V	0 - 0.2	7440-62-2
Zn	0 - 0.2	7440-66-6

IPCI C22C0038-00 [I]; C21D0009-48 [I]; C22C0038-06 [I]; C22C0038-58 [I];
C21D0009-46 [N]

IPCR C22C0038-00 [I]; C21D0009-46 [N]; C21D0009-48 [I]; C22C0038-06 [I];
C22C0038-58 [I]

CC 55-3 (Ferrous Metals and Alloys)

ST high strength ~~steel~~ sheet manuf automobile part

IT Annealing

Automobile parts

Cold rolling

Elongation, mechanical

Heat treatment

Hot rolling

Microstructure

Sheet materials

Tensile strength

Yield strength

(high-strength ~~steel~~ sheet and its manuf. for automobile
parts)

IT 2253797-76-9P, Aluminum 0-3, boron 0-1, carbon 0.15-0.35,
chromium 0-1, copper 0-1, hafnium 0-0.2, iron bal., manganese 1-4,
molybdenum 0-1, nickel 0-1, niobium 0-0.2, silicon 0-3, titanium 0-0.2,
vanadium 0-0.2, Zn 0-0.2

RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or
engineered material use); PREP (Preparation); USES (Uses)

(high-strength ~~steel~~ sheet and its manuf. for automobile
parts)

L12 ANSWER 43 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2018:2338703 CAPLUS Full-text

DOCUMENT NUMBER: 170:35129

TITLE: High-strength ~~steel~~ sheet comprising silicon and
manganese, and production method for same

INVENTOR(S): Natsumeda, Hirokazu; Murakami, Toshio; Saito, Kenji;
Murata, Tadao

PATENT ASSIGNEE(S): Kabushiki Kaisha Kobe Seiko Sho (Kobe Steel, Ltd.),
Japan

SOURCE: PCT Int. Appl., 41pp.; Chemical Indexing Equivalent to
170:49883 (JP)

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 2

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2018216522	A1	20181129	WO 2018-JP18489	20180514
JP 2018197380	A	20181213	JP 2017-103024	20170524
KR 2019142354	A	20191226	KR 2019-7033765	20180514
CN 110651062	A	20200103	CN 2018-80033477	20180514
EP 3633058	A1	20200408	EP 2018-806482	20180514
IN 201947047461	A	20191129	IN 2019-47047461	20191121
US 20200071787	A1	20200305	US 2019-16615462	20191121

PRIORITY APPLN. INFO.:

JP 2017-103024	A	20170524
WO 2018-JP18489	W	20180514

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB The high-strength ~~st~~ steel sheet comprises the following compn. by mass %: carbon of 0.15-0.35, silicon of 0.5-3, aluminum of 0.5-3, manganese of 1-4, phosphorus of 0.05, sulfur of 0.01, titanium of 0.01-0.2, with the remainder being made up of iron balance and unavoidable impurities. The ~~st~~ steel sheet structure is such that the ferrite fraction does not exceed 5, the total fraction of tempered martensite and tempered bainite is at least 60, the retained austenite fraction is at least 10, the fresh martensite fraction does not exceed 5, the av. particle size of retained austenite does not exceed 0.5 µm, retained austenite having a particle diam. of at least 1.0 µm accounts for at least 2 of total retained austenite content, and prior austenite particle diam. does not exceed 10 µm.

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
KAWATA HIROYUKI	2017			WO 2017164346 A1	CAPLUS
MURAKAMI TOSHIO	2017			JP 2017214648 A	CAPLUS
SANO KOICHI	2017			JP 2017053001 A	CAPLUS
SHIBATA KOSUKE	2015			JP 2015218365 A	CAPLUS

IT 2252460-30-1, Aluminum 0-3, boron 0-1, calcium 0-0.01, carbon 0.15-0.35, chromium 0-1, copper 0-1, hafnium 0-0.2, iron bal., magnesium 0-0.01, manganese 1-4, molybdenum 0-0.2, nickel 0-1, niobium 0-0.2, phosphorus 0-0.05, mis 0-0.01, silicon 0-3, sulfur 0-0.01, titanium 0.01-0.2, vanadium 0-0.2, zirconium 0-0.2
RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(high-strength ~~st~~ steel sheet comprising silicon and manganese, and prodn. method for same)

RN 2252460-30-1 CAPLUS

CN Iron alloy, base, Fe 88-98, Mn 1-4, Al 0-3, Si 0-3, B 0-1, Cr 0-1, Cu 0-1, Ni 0-1, C 0.2-0.4, Hf 0-0.2, Mo 0-0.2, Nb 0-0.2, Ti 0-0.2, V 0-0.2, Zr 0-0.2 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	88 - 98	7439-89-6
Mn	1 - 4	7439-96-5
Al	0 - 3	7429-90-5
Si	0 - 3	7440-21-3
B	0 - 1	7440-42-8
Cr	0 - 1	7440-47-3
Cu	0 - 1	7440-50-8
Ni	0 - 1	7440-02-0
C	0.2 - 0.4	7440-44-0
Hf	0 - 0.2	7440-58-6
Mo	0 - 0.2	7439-98-7
Nb	0 - 0.2	7440-03-1
Ti	0 - 0.2	7440-32-6
V	0 - 0.2	7440-62-2
Zr	0 - 0.2	7440-67-7

IPCI C22C0038-00 [I]; C21D0009-48 [I]; C22C0038-14 [I]; C22C0038-58 [I]

IPCR C22C0038-00 [I]; C21D0009-48 [I]; C22C0038-14 [I]; C22C0038-58 [I]

CC 55-3 (Ferrous Metals and Alloys)

ST high strength ~~st~~ steel sheet

IT Deep drawing of materials
 Elongation, mechanical
 Grain size
 Heat treatment
 Impact strength
 Microstructure
 Rolling (metals)
 Tensile strength
 Yield strength
 (high-strength ~~steel~~ sheet comprising silicon and manganese,
 and prodn. method for same)

IT 12173-93-2, Martensite, formation (nonpreparative) 12244-31-4,
 Austenite, formation (nonpreparative) 12427-23-5, Bainite 12427-24-6,
 Ferrite (ferrous metal component)
 RL: FMU (Formation, unclassified); FORM (Formation, nonpreparative)
 (high-strength ~~steel~~ sheet comprising silicon and manganese,
 and prodn. method for same)

IT 2252460-30-1, Aluminum 0-3, boron 0-1, calcium 0-0.01, carbon
 0.15-0.35, chromium 0-1, copper 0-1, hafnium 0-0.2, iron bal., magnesium
 0-0.01, manganese 1-4, molybdenum 0-0.2, nickel 0-1, niobium 0-0.2,
 phosphorus 0-0.05, mis 0-0.01, silicon 0-3, sulfur 0-0.01, titanium
 0.01-0.2, vanadium 0-0.2, zirconium 0-0.2
 RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM
 (Technical or engineered material use); PROC (Process); USES (Uses)
 (high-strength ~~steel~~ sheet comprising silicon and manganese,
 and prodn. method for same)

OS.CITING REF COUNT: 1 THERE ARE 1 CAPLUS RECORDS THAT CITE THIS RECORD
 (1 CITINGS)

L12 ANSWER 44 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN
 ACCESSION NUMBER: 2018:2321302 CAPLUS Full-text
 DOCUMENT NUMBER: 170:49880
 TITLE: ~~Steel~~-based electromagnetic shield multilayer screen
 products
 INVENTOR(S): Wieschalla, Vanessa; Nierhoff, Daniel; Wolske,
 Vanessa; Becker, Jens-Ulrik
 PATENT ASSIGNEE(S): ThyssenKrupp AG, Germany; ThyssenKrupp Steel Europe AG
 SOURCE: Ger., 17pp.
 CODEN: GWXXAW
 DOCUMENT TYPE: Patent
 LANGUAGE: German
 FAMILY ACC. NUM. COUNT: 2
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
DE 102017216975	B3	20181129	DE 2017-102017216975	20170925
WO 2019057547	A1	20190328	WO 2018-EP74424	20180911
PRIORITY APPLN. INFO.:			DE 2017-102017216975 A	20170925

AB An electromagnetic radiation shielding multilayer material is manufd. for
 shielding from electromagnetic radiation, static elec. and/or static
 magnetic fields.

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
Anon				EP 1426982 A1	CAPLUS
Anon				WO 1991012960 A1	
Anon				DE 3710322 A1	CAPLUS

IT 2253656-70-9P
 RL: IMF (Industrial manufacture); TEM (Technical or engineered material
 use); PREP (Preparation); USES (Uses)
 (layers; ~~steel~~-based electromagnetic shield multilayer screen
 products)

RN 2253656-70-9 CAPLUS

CN Iron alloy, base, Fe 94-100, Mn 0.1-3, C 0-0.5, Cr 0-0.5, Cu 0-0.5, Si 0-0.5, Ti
 0-0.3, Ni 0-0.2, Al 0-0.1, As 0-0.1, B 0-0.1, Mo 0-0.1, N 0-0.1, Nb 0-0.1, P
 0-0.1, S 0-0.1, Sn 0-0.1, V 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
=====+=====+=====		

Fe	94	-	100	7439-89-6
Mn	0.1	-	3	7439-96-5
C	0	-	0.5	7440-44-0
Cr	0	-	0.5	7440-47-3
Cu	0	-	0.5	7440-50-8
Si	0	-	0.5	7440-21-3
Ti	0	-	0.3	7440-32-6
Ni	0	-	0.2	7440-02-0
Al	0	-	0.1	7429-90-5
As	0	-	0.1	7440-38-2
B	0	-	0.1	7440-42-8
Mo	0	-	0.1	7439-98-7
N	0	-	0.1	17778-88-0
Nb	0	-	0.1	7440-03-1
P	0	-	0.1	7723-14-0
S	0	-	0.1	7704-34-9
Sn	0	-	0.1	7440-31-5
V	0	-	0.1	7440-62-2

IPCI C22C0038-02 [I]; H05K0009-00 [I]; C22C0038-04 [I]; C22C0038-18 [I]
 IPCR C22C0038-02 [I]; C22C0038-04 [I]; C22C0038-18 [I]; H05K0009-00 [I]

CC 55-3 (Ferrous Metals and Alloys)

Section cross-reference(s): 73, 76, 77

ST multilayer screen electromagnetic shield stainless steel alloy

IT Electromagnetic shields

Hot rolling

Multilayers

(steel-based electromagnetic shield multilayer screen products)

IT 2253656-70-3P 2253656-71-0P

RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(layers; steel-based electromagnetic shield multilayer screen products)

L12 ANSWER 45 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2018:1991052 CAPLUS Full-text

DOCUMENT NUMBER: 169:495435

TITLE: Preparation method of high-strength steel with fatigue stress amplitude of ≥ 400 mpa

INVENTOR(S): Wang, Shisen; Du, Ming; Xu, Jinqiao; Wang, Rong; Li, Defa; Xiong, Fei; He, Yayuan; Yin, Yunyang

PATENT ASSIGNEE(S): Wuhan Iron & Steel Co., Ltd., Peop. Rep. China

SOURCE: Faming Zhuanli Shenqing, 9pp.

CODEN: CNXXEV

DOCUMENT TYPE: Patent

LANGUAGE: Chinese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
CN 108707822	A	20181026	CN 2018-10541993	20180530
CN 108707822	B	20200505		

PRIORITY APPLN. INFO.: CN 2018-10541993 20180530

AB The title steel comprises (by wt%) carbon 0.1-0.2, silicon 0.1-0.4, manganese 1.2-1.6, phosphorus+sulfur 0-0.015, chromium 0.1-0.4, molybdenum 0.4-0.8, nickel 0.05-0.2, niobium+titanium+vanadium+boron 0.045-0.1, iron balance. The steel is prepd. by smelting, continuous casting, hot rolling, quenching at 850-920°C, tempering at 380-420°C, and cooling. The steel has higher strength and elongation.

IT 2248486-84-0P, Carbon 0.1-0.2, boron 0-0.1, chromium 0.1-0.4, manganese 1.2-1.6, molybdenum 0.4-0.8, nickel 0.05-0.2, niobium 0-0.1, silicon 0.1-0.4, titanium 0-0.1, vanadium 0-0.1, iron bal.

RL: IMF (Industrial manufacture); PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); PROC (Process); USES (Uses)

(prepn. method of high-strength steel with fatigue stress amplitude of ≥ 400 mpa)

RN 2248486-84-0 CAPLUS

CN Iron alloy, base, Fe 96-98, Mn 1.2-1.6, Mo 0.4-0.8, Cr 0.1-0.4, Si 0.1-0.4, C 0.1-0.2, Ni 0-0.2, B 0-0.1, Nb 0-0.1, Ti 0-0.1, V 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
=====+=====+=====		
Fe	96 - 98	7439-89-6
Mn	1.2 - 1.6	7439-96-5
Mo	0.4 - 0.8	7439-98-7
Cr	0.1 - 0.4	7440-47-3
Si	0.1 - 0.4	7440-21-3
C	0.1 - 0.2	7440-44-0
Ni	0 - 0.2	7440-02-0
B	0 - 0.1	7440-42-8
Nb	0 - 0.1	7440-03-1
Ti	0 - 0.1	7440-32-6
V	0 - 0.1	7440-62-2

IPCI C22C0038-02; C22C0038-04; C22C0038-44; C22C0038-46; C22C0038-48;
C22C0038-50; C22C0038-54; C21D0006-00; C21D0008-02
IPCR C22C0038-02 [I]; C21D0006-00 [I]; C21D0008-02 [I]; C22C0038-04 [I];
C22C0038-44 [I]; C22C0038-46 [I]; C22C0038-48 [I]; C22C0038-50 [I];
C22C0038-54 [I]
CC 55-3 (Ferrous Metals and Alloys)
ST high strength ~~steel~~ strength
IT Casting of metals
(continuous; prepn. method of high-strength ~~steel~~ with
fatigue stress amplitude of ≥ 400 mpa)
IT Hot rolling
Quenching (cooling)
Tempering
(prepn. method of high-strength ~~steel~~ with fatigue stress
amplitude of ≥ 400 mpa)
IT ~~2248486-84-02~~, Carbon 0.1-0.2, boron 0-0.1, chromium 0.1-0.4,
manganese 1.2-1.6, molybdenum 0.4-0.8, nickel 0.05-0.2, niobium 0-0.1,
silicon 0.1-0.4, titanium 0-0.1, vanadium 0-0.1, iron bal.
RL: IMF (Industrial manufacture); PEP (Physical, engineering or chemical
process); PRP (Properties); TEM (Technical or engineered material use);
PREP (Preparation); PROC (Process); USES (Uses)
(prepn. method of high-strength ~~steel~~ with fatigue stress
amplitude of ≥ 400 mpa)

L12 ANSWER 46 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2018:1950769 CAPLUS Full-text

DOCUMENT NUMBER: 169:495369

TITLE: Microstructural features and corrosion analysis of

A517 ~~steel~~ joint processed by friction stir welding
AUTHOR(S): Ansari pour, Morteza; Soltanipour, Abdol Reza; Dehnavi,
Mohamad Reza

CORPORATE SOURCE: Materials Engineering Department, Malek Ashtar
University of Technology, Shahin Shahr, Iran

SOURCE: Materials Research Express (2018), 5(6),
066543/1-066543/13

CODEN: MREAC3; ISSN: 2053-1591

DIGITAL OBJECT ID: 10.1088/2053-1591/aacc80

PUBLISHER: IOP Publishing Ltd.

DOCUMENT TYPE: Journal; (online computer file)

LANGUAGE: English

AB Microstructural observations of friction stir welds of A517 (B) ~~steel~~
showed that within the range of welding variables, martensite phase was
hindered. Stir zone microstructure displayed coarse-grained upper bainite
assocd. with granular bainite. HAZ consisted of decompd. bainite morphol.
of lath-like and equiaxed. Electron backscatter diffraction anal. showed
a random oriented recrystd. grain. The corrosion behavior in 3.5 wt% NaCl
soln. revealed neg. shift of corrosion potential with increasing of
traverse speed. However, the effect of welding parameters on cathodic
behavior was more predominant than that on anodic behavior; assocd. with
the microstructural alterations. Pitting of corrosion rust layer was
identified as the main mechanism of corrosion attack in base material and
welds. Although, corrosion c.d. of weld in all of the applied welding
condition was slightly lower than that in the base material, however, this
study provides recommendation for application of A517 ~~steel~~ jointed by
friction stir welding in marine environment.

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
Bhadeshia, H	1999	A273-	58	Mater Sci Eng	CAPLUS
Casalino, G	2012		8239	Proc of SPIE-The Int	
Casalino, G	2014		8963	Proc of SPIE-The Int	
Chen, Y	2005	398	47	Mater Sci Eng A	
Choi, Y	2005	391	162	J Alloys Compd	CAPLUS
Cui, H	2016	681	426	J of Alloys and Comp	CAPLUS
Gao, K	2010	52	3428	Corros Sci	CAPLUS
Ghosh, M	2013	22	3890	J Mater Eng Perform	CAPLUS
Huang, H	1994	36	1027	Corros Sci	CAPLUS
Lee, W	2004	58	1041	Mater Lett	CAPLUS
Li, L	2012	7	3773	Int J Electrochem Sc	CAPLUS
Lu, B	2009	57	41	Acta Mater	CAPLUS
Manvatkar, V	2015	94	36	Scr Mater	CAPLUS
Medina, G	2016	21	146	Soldagem & Inspecao	
Meshram, S	2017	25	94	Journal of Manufactu	
Mishra, R	2005	50	1	Mater Sci Eng R	
Nelson, T	2016	231	66	Mater Process Techno	CAPLUS
Park, H	2004	371A	160	Mater Sci Eng	
Paul, C	2015	10	10246	Int J Electrochem Sc	
Ramirez, A	2013		75	Proc of the 1st Int	
Ren, R	2012	85	283	Electrochemica Acta	CAPLUS
Sato, Y	2005	53	637	Acta Mater	CAPLUS
Sato, Y	2001	32A	3033	Metall Mater Trans	CAPLUS
Sherif, E	2015	10	34	Int J Electrochem Sc	CAPLUS
Sherif, E	2011	129	961	Mater Chem Phy	CAPLUS
Sutton, M	2003	70	2215	Eng Fract Mech	
Sutton, M	2003	354A	6	Mater Sci Eng	
Wang, H	2015	10	5827	Int J Electrochem Sc	CAPLUS
Wang, X	2014	9	4574	Int J Electrochem Sc	
Wang, X	2014	21	474	J Nat Gas Sci Eng	CAPLUS
Wert, J	2003	49	607	Scr Mater	CAPLUS
Yan, J	2005	10	725	Sci Tech Weld Joinin	CAPLUS
Zajac, S	2005		387	Proc of the Int Conf	CAPLUS
Zhang, Q	2002	77	603	Mater Chem Phys	
Zhang, R	2010	41A	1448	Metall Mater Trans	CAPLUS
Zhang, S	2013	75	293	Corros Sci	CAPLUS

IT 52346-86-8, A517B, processes

RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM
 (Technical or engineered material use); PROC (Process); USES (Uses)
 (microstructural features and corrosion anal. of A517 steel
 joint processed by friction stir welding)

RN 52346-86-8 CAPLUS

CN Steel, (UNS K11630) (CA INDEX NAME)

Component	Component Percent		Component Registry Number
Fe	97	- 98	7439-89-6
Mn	0.70	- 1.00	7439-96-5
Cr	0.40	- 0.65	7440-47-3
Si	0.20	- 0.35	7440-21-3
Mo	0.15	- 0.25	7439-98-7
C	0.12	- 0.21	7440-44-0
V	0.03	- 0.08	7440-62-2
S	0	- 0.04	7704-34-9
P	0	- 0.035	7723-14-0
Ti	0.01	- 0.03	7440-32-6
B	0.0005	- 0.005	7440-42-8

CC 55-9 (Ferrous Metals and Alloys)

ST steel joint processed friction stir welding microstructural feature
corrosion

IT Corrosion

Corrosion resistance

Current density

Electric current-potential relationship

Friction welding

Friction welds

Grain size
Microstructure
Recrystallization
(microstructural features and corrosion anal. of A517 steel
joint processed by friction stir welding)

IT 12173-93-2, Martensite, formation (nonpreparative) 12427-23-5, Bainite
RL: FMU (Formation, unclassified); FORM (Formation, nonpreparative)
(microstructural features and corrosion anal. of A517 steel
joint processed by friction stir welding)

IT 52346-86-8, A517B, processes
RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM
(Technical or engineered material use); PROC (Process); USES (Uses)
(microstructural features and corrosion anal. of A517 steel
joint processed by friction stir welding)

L12 ANSWER 47 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2018:1916470 CAPLUS Full-text

DOCUMENT NUMBER: 169:454845

TITLE: Aluminum alloy plated electric resistance welded pipe
for quenching and method of manufacturing aluminum
plated hollow member

INVENTOR(S): Maki, Jun; Fujita, Soshi; Nakamura, Toyomitsu

PATENT ASSIGNEE(S): Nippon Steel & Sumitomo Metal Corporation, Japan

SOURCE: Jpn. Tokkyo Koho, 23pp.

CODEN: JTXXXF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 6406475	B1	20181017	JP 2018-513042	20171120
WO 2019097729	A1	20190523	WO 2017-JP41697	20171120
CN 111247266	A	20200605	CN 2017-80096110	20171120
IN 202017014250	A	20200814	IN 2020-17014250	20200331
US 20200347489	A1	20201105	US 2020-16753961	20200406
PRIORITY APPLN. INFO.:			WO 2017-JP41697	W 20171120

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB The aluminum alloy plated elec. resistance welded pipe for quenching
comprises a base material made of tubular steel plate and an elec.
resistance welded part provided in abutting part of steel plate and
extending in longitudinal direction. The base material comprises in
mass%: carbon 0.06-0.5, silicon 0.01-0.8, manganese 0.6-3, phosphorous
0-0.05, sulfur 0-0.05, aluminum 0-0.1, oxygen 0-0.006, nitrogen 0-0.02,
titanium 0.01-0.1, boron 0-0.1, niobium 0-0.1, vanadium 0-0.3, chromium
0-0.5, molybdenum 0-0.5, nickel 0-0.5, copper 0-0.5, calcium 0-0.005, rare
earth metal 0-0.005, iron balance and impurities. The base material is
positioned on the surface of steel sheet and has an intermetallic compd.
layer contg. an aluminum-iron-silicon based intermetallic compd. and an
aluminum plating layer located on the surface of the intermetallic compd.
layer and contg. aluminum and silicon. The thickness of intermetallic
compd. layer is X (μm), the thickness of aluminum layer is Y (μm),
and when the thickness of steel pipe is t (mm) and outer diam. of
steel pipe is D (mm), the following formula is satisfied: $70 \times X/D \leq Y/t \leq 30$. The method of manufg. aluminum plated hollow
member comprises: positioning the base material on the surface of steel
sheet, heating aluminum-plated elec. resistance welded pipe, forming the
heated aluminum-plated elec. resistance welded pipe into desired shape,
and rapidly cooling the aluminum plating elec. resistance welded pipe.
According to the present invention, it is possible to manuf. high strength
aluminum plated hollow member by hot working, and it is possible to obtain
part that has reduced wt.

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
Anon	1983			JP 58204179 A	CAPLUS
Anon	2008			JP 2008069398 A	CAPLUS
Anon	2009			WO 2009131233 A1	CAPLUS
Anon	2014			JP 2014118628 A	CAPLUS
Anon	2017			JP 2017026147 A	CAPLUS

IT 2247299-93-8
 RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM
 (Technical or engineered material use); PROC (Process); USES (Uses)
 (aluminum alloy plated elec. resistance welded pipe for quenching and
 method of manufg. aluminum plated hollow member)
 RN 2247299-93-8 CAPLUS
 CN Iron alloy, base, Fe 93-99, Mn 0.6-3, Si 0-0.8, C 0.1-0.5, Cr 0-0.5, Cu
 0-0.5, Mo 0-0.5, Ni 0-0.5, V 0-0.3, Al 0-0.1, B 0-0.1, Nb 0-0.1, Ti 0-0.1 (CA
 INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	93 - 99	7439-89-6
Mn	0.6 - 3	7439-96-5
Si	0 - 0.8	7440-21-3
C	0.1 - 0.5	7440-44-0
Cr	0 - 0.5	7440-47-3
Cu	0 - 0.5	7440-50-8
Mo	0 - 0.5	7439-98-7
Ni	0 - 0.5	7440-02-0
V	0 - 0.3	7440-62-2
Al	0 - 0.1	7429-90-5
B	0 - 0.1	7440-42-8
Nb	0 - 0.1	7440-03-1
Ti	0 - 0.1	7440-32-6

IPCI C23C0002-28 [I]; C23C0002-12 [I]; C23C0002-40 [I]; C23C0002-26 [I];
 C23C0028-00 [I]; C22C0038-00 [I]; C22C0038-60 [I]; C21D0009-08 [N];
 C21D0001-18 [N]; C21D0009-50 [N]; C22C0021-00 [N]
 IPCR C23C0002-28 [I]; C22C0038-00 [I]; C22C0038-60 [I]; C23C0002-12 [I];
 C23C0002-26 [I]; C23C0002-40 [I]; C23C0028-00 [I]
 CC 56-6 (Nonferrous Metals and Alloys)

IT 2247299-93-8
 RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM
 (Technical or engineered material use); PROC (Process); USES (Uses)
 (aluminum alloy plated elec. resistance welded pipe for quenching and
 method of manufg. aluminum plated hollow member)

L12 ANSWER 48 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN
 ACCESSION NUMBER: 2018:1651585 CAPLUS Full-text
 DOCUMENT NUMBER: 169:330484
 TITLE: Method for producing a hot-formed coated steel product
 INVENTOR(S): Beentjes, Petrus Cornelis Jozef; Van Schoonevelt, Hugo
 PATENT ASSIGNEE(S): Tata Steel IJmuiden B.V., Neth.
 SOURCE: PCT Int. Appl., 28pp.
 CODEN: PIXXD2

DOCUMENT TYPE: Patent
 LANGUAGE: English
 FAMILY ACC. NUM. COUNT: 2

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2018158166	A1	20180907	WO 2018-EP54600	20180223
CA 3051002	A1	20180907	CA 2018-3051002	20180223
MX 2019010192	A	20191002	MX 2019-10192	20180223
CN 110352260	A	20191018	CN 2018-80014405	20180223
KR 2019124211	A	20191104	KR 2019-7023413	20180223
EP 3589772	A1	20200108	EP 2018-714700	20180223
JP 2020510755	T	20200409	JP 2019-546825	20180223
BR 112019015673	A2	20200707	BR 2019-112019015673	20180223
US 20200165712	A1	20200528	US 2019-16485606	20190813
IN 201947037974	A	20190927	IN 2019-47037974	20190920
PRIORITY APPLN. INFO.:			EP 2017-158418	A 20170228
			EP 2017-158419	A 20170228
			WO 2018-EP54600	W 20180223

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB The invention relates to an Al-Si-alloy coated steel strip for hot press
 forming and to a method for producing the Al-Si-alloy coated steel strip
 in a continuous coating process.

IT 2247299-93-2D, Aluminum 0-3, boron 0-0.1, carbon 0-0.5, chromium

0-4, copper 0-2, manganese 0.4-4, molybdenum 0-1, nickel 0-2, niobium 0-0.3, phosphorus 0-0.1, silicon 0-3, titanium 0-0.3, tungsten 0-0.5, vanadium 0-0.5, iron bal., S 0-0.05, N 0.001-0.03, Ca 0-0.05, O 0-0.008
 RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (method for producing hot-formed coated ~~steel~~ product)
 RN 2243499-83-2 CAPLUS
 CN Iron alloy, base, Fe 79-100, Mn 0.4-4, Cr 0-4, Al 0-3, Si 0-3, Cu 0-2, Ni 0-2, Mo 0-1, C 0-0.5, V 0-0.5, W 0-0.5, Nb 0-0.3, Ti 0-0.3, B 0-0.1, P 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
=====+	=====+	=====
Fe	79 - 100	7439-89-6
Mn	0.4 - 4	7439-96-5
Cr	0 - 4	7440-47-3
Al	0 - 3	7429-90-5
Si	0 - 3	7440-21-3
Cu	0 - 2	7440-50-8
Ni	0 - 2	7440-02-0
Mo	0 - 1	7439-98-7
C	0 - 0.5	7440-44-0
V	0 - 0.5	7440-62-2
W	0 - 0.5	7440-33-7
Nb	0 - 0.3	7440-03-1
Ti	0 - 0.3	7440-32-6
B	0 - 0.1	7440-42-8
P	0 - 0.1	7723-14-0

IPCI C23C0002-12 [I]; C23C0002-28 [I]; C23C0002-40 [I]
 IPCR C23C0002-12 [I]; C23C0002-28 [I]; C23C0002-40 [I]
 CC 56-7 (Nonferrous Metals and Alloys)
 ST hot formed aluminum silicon alloy coated ~~steel~~ product prodn
 IT Paints
 (adhesion; method for producing hot-formed coated ~~steel~~ product)
 IT Heating
 (convective, prediffusion annealing; method for producing hot-formed coated ~~steel~~ product)
 IT Aluminizing
 (hot dip; method for producing hot-formed coated ~~steel~~ product)
 IT Hot-dip coating process
 (hot-dip aluminizing; method for producing hot-formed coated ~~steel~~ product)
 IT Metal forming
 (hot; method for producing hot-formed coated ~~steel~~ product)
 IT Automobile bodies
 Cooling
 Cutting
 Diffusion coating materials
 Immersion coating process
 Phase composition
 Surface structure
 Thickness
 (method for producing hot-formed coated ~~steel~~ product)
 IT Adhesion, physical
 (paint; method for producing hot-formed coated ~~steel~~ product)
 IT Induction heating
 Radiant heating
 (prediffusion annealing; method for producing hot-formed coated ~~steel~~ product)
 IT Annealing
 (prediffusion; method for producing hot-formed coated ~~steel~~ product)
 IT 12004-62-5 12043-58-2 596799-27-8, Aluminum iron silicide (Al₂Fe₂Si)
 RL: FMU (Formation, unclassified); FORM (Formation, nonpreparative)
 (method for producing hot-formed coated ~~steel~~ product)
 IT 7440-70-2D, Calcium, trace in ~~steel~~ 7704-34-9D, Sulfur, trace in ~~steel~~
 7727-37-9D, Nitrogen, trace in ~~steel~~
 7782-44-7D, Oxygen, trace in ~~steel~~

RL: OCU (Occurrence, unclassified); OCCU (Occurrence)
 (method for producing hot-formed coated ~~steel~~ product)

IT 2243499-83-2D, Aluminum 0-3, boron 0-0.1, carbon 0-0.5, chromium 0-4, copper 0-2, manganese 0.4-4, molybdenum 0-1, nickel 0-2, niobium 0-0.3, phosphorus 0-0.1, silicon 0-3, titanium 0-0.3, tungsten 0-0.5, vanadium 0-0.5, iron bal., S 0-0.05, N 0.001-0.03, Ca 0-0.05, O 0-0.008
 RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (method for producing hot-formed coated ~~steel~~ product)

IT 12597-69-2, ~~Steel~~, processes 2243499-81-0, Aluminum 96-100, silicon 0.4-4
 RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (method for producing hot-formed coated ~~steel~~ product)

OS.CITING REF COUNT: 1 THERE ARE 1 CAPLUS RECORDS THAT CITE THIS RECORD
 (1 CITINGS)

L12 ANSWER 49 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2018:1651584 CAPLUS Full-text
 DOCUMENT NUMBER: 169:330483
 TITLE: Method for producing a ~~steel~~ strip with an aluminum alloy coating layer
 INVENTOR(S): Hensen, Guido Cornelis
 PATENT ASSIGNEE(S): Tata Steel IJmuiden B.V., Neth.
 SOURCE: PCT Int. Appl., 29pp.
 CODEN: PIXXD2
 DOCUMENT TYPE: Patent
 LANGUAGE: English
 FAMILY ACC. NUM. COUNT: 2
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2018158165	A1	20180907	WO 2018-EP54599	20180223
CA 3051515	A1	20180907	CA 2018-3051515	20180223
CN 110352259	A	20191018	CN 2018-80014404	20180223
KR 2019124210	A	20191104	KR 2019-7023412	20180223
EP 3589771	A1	20200108	EP 2018-714699	20180223
BR 112019015695	A2	20200407	BR 2019-112019015695	20180223
JP 2020510756	T	20200409	JP 2019-546864	20180223
US 20200017948	A1	20200116	US 2019-16485655	20190813
IN 201947038244	A	20191004	IN 2019-47038244	20190923
PRIORITY APPLN. INFO.:			EP 2017-158418	A 20170228
			EP 2017-158419	A 20170228
			WO 2018-EP54599	W 20180223

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB The invention relates to a method for producing a ~~steel~~ strip with an aluminum alloy coating layer in a continuous coating process. The invention also relates to an ~~steel~~ strip coated with an aluminum alloy coating layer that can be produced in accordance with the method, the use of such a coated ~~steel~~ strip and the product made by using the coated ~~steel~~ strip.

IT 2243499-83-2D, Aluminum 0-3, boron 0-0.1, carbon 0-0.5, chromium 0-4, copper 0-2, manganese 0.4-4, molybdenum 0-1, nickel 0-2, niobium 0-0.3, phosphorus 0-0.1, silicon 0-3, titanium 0-0.3, tungsten 0-0.5, vanadium 0-0.5, iron bal., S 0-0.05, N 0.001-0.03, Ca 0-0.05, O 0-0.008
 RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (method for producing ~~steel~~ strip with aluminum alloy coating layer)

RN 2243499-83-2 CAPLUS

CN Iron alloy, base, Fe 79-100, Mn 0.4-4, Cr 0-4, Al 0-3, Si 0-3, Cu 0-2, Ni 0-2, Mo 0-1, C 0-0.5, V 0-0.5, W 0-0.5, Nb 0-0.3, Ti 0-0.3, B 0-0.1, P 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	79 - 100	7439-89-6
Mn	0.4 - 4	7439-96-5
Cr	0 - 4	7440-47-3
Al	0 - 3	7429-90-5

Si	0	-	3	7440-21-3
Cu	0	-	2	7440-50-8
Ni	0	-	2	7440-02-0
Mo	0	-	1	7439-98-7
C	0	-	0.5	7440-44-0
V	0	-	0.5	7440-62-2
W	0	-	0.5	7440-33-7
Nb	0	-	0.3	7440-03-1
Ti	0	-	0.3	7440-32-6
B	0	-	0.1	7440-42-8
P	0	-	0.1	7723-14-0

IPCI C23C0002-12 [I]; C23C0002-28 [I]; C23C0002-40 [I]
 IPCR C23C0002-12 [I]; C23C0002-28 [I]; C23C0002-40 [I]
 CC 56-7 (Nonferrous Metals and Alloys)
 ST aluminum alloy coated ~~steel~~ strip hot dip prodn method
 IT Recrystallization
 (annealing, before hot dipping; method for producing ~~steel~~
 strip with aluminum alloy coating layer)
 IT Induction heating
 Radiant heating
 (annealing; method for producing ~~steel~~ strip with aluminum
 alloy coating layer)
 IT Annealing
 (diffusion; method for producing ~~steel~~ strip with aluminum
 alloy coating layer)
 IT Aluminizing
 (hot dip, continuous; method for producing ~~steel~~ strip with
 aluminum alloy coating layer)
 IT Hot-dip coating process
 (hot-dip aluminizing, continuous; method for producing ~~steel~~
 strip with aluminum alloy coating layer)
 IT Metal forming
 (hot; method for producing ~~steel~~ strip with aluminum alloy
 coating layer)
 IT Automobile bodies
 Cooling
 Cutting
 Diffusion coating materials
 Electric heating
 Phase composition
 Temperature
 Thickness
 (method for producing ~~steel~~ strip with aluminum alloy coating
 layer)
 IT Crack propagation
 (resistance; method for producing ~~steel~~ strip with aluminum
 alloy coating layer)
 IT Wetting
 (time; method for producing ~~steel~~ strip with aluminum alloy
 coating layer)
 IT 12004-62-5 12043-58-2 596799-27-8, Aluminum iron silicide (Al₂Fe₂Si)
 RL: FMU (Formation, unclassified); FORM (Formation, nonpreparative)
 (method for producing ~~steel~~ strip with aluminum alloy coating
 layer)
 IT 7440-70-2D, Calcium, trace in ~~steel~~ 7704-34-9D, Sulfur, trace
 in ~~steel~~ 7727-37-9D, Nitrogen, trace in ~~steel~~
 7782-44-7D, Oxygen, trace in ~~steel~~
 RL: OCU (Occurrence, unclassified); OCCU (Occurrence)
 (method for producing ~~steel~~ strip with aluminum alloy coating
 layer)
 IT 12597-69-2, ~~Steel~~, processes 2243499-81-0, Aluminum 96-100,
 silicon 0.4-4 2243499-83-2D, Aluminum 0-3, boron 0-0.1, carbon
 0-0.5, chromium 0-4, copper 0-2, manganese 0.4-4, molybdenum 0-1, nickel
 0-2, niobium 0-0.3, phosphorus 0-0.1, silicon 0-3, titanium 0-0.3,
 tungsten 0-0.5, vanadium 0-0.5, iron bal., S 0-0.05, N 0.001-0.03, Ca
 0-0.05, O 0-0.008 2243499-84-3, Aluminum 97, iron 2.3, silicon 0.9
 2243499-85-4, Aluminum 96, iron 2.3, silicon 1.9 2243499-86-5, Aluminum
 96, iron 2.8, silicon 0.9
 RL: PEP (Physical, engineering or chemical process); TEM (Technical or
 engineered material use); PROC (Process); USES (Uses)
 (method for producing ~~steel~~ strip with aluminum alloy coating

layer)
IT 2243499-82-1P, Aluminum 50-55, iron 43-48, silicon 0.4-4
RL: PRP (Properties); SPN (Synthetic preparation); TEM (Technical or
engineered material use); PREP (Preparation); USES (Uses)
(method for producing ~~steel~~ strip with aluminum alloy coating
layer)

L12 ANSWER 50 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2018:1606948 CAPLUS Full-text
DOCUMENT NUMBER: 169:308769
TITLE: Manufacture of hot rolled ~~steel~~ sheet with
controllable scale peeling and thickness
INVENTOR(S): Tanei, Hiroshi; Nishioka, Kazuhiko
PATENT ASSIGNEE(S): Nippon Steel & Sumitomo Metal Corporation, Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 10pp.
CODEN: JKXXAF

DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2018134677	A	20180830	JP 2017-32373	20170223
JP 6790909	B2	20201125		

PRIORITY APPLN. INFO.: JP 2017-32373 20170223

AB The title method for manufg. a hot-rolled ~~steel~~ sheet is capable of
suppressing scale peeling of a hot-rolled ~~steel~~ sheet, particularly
scale peeling at a cooling line (runout table (ROT)) after finish rolling.
In the hot rolling of a ~~steel~~ sheet, the finish rolling is finished at a
temp. of Ar3 point or higher, and based on the relationship between the
Ar3 point scale thickness investigated in advance and the degree of scale
peeling, the scale thickness at the Ar3 point is set as a scale thickness
reflecting scale peeling of the hot rolled ~~steel~~ sheet.

IT 2243127-39-9, Aluminum 0-0.1, boron 0-0.2, carbon 0-0.2,
chromium 0-0.2, copper 0-0.2, iron 96.925-100, manganese 0-2, molybdenum
0-0.2, nickel 0-0.2, niobium 0-0.2, silicon 0-0.5, tin 0-0.2, titanium
0-0.2, vanadium 0-0.2, processes
RL: PEP (Physical, engineering or chemical process); TEM (Technical or
engineered material use); PROC (Process); USES (Uses)
(manuf. of hot rolled ~~steel~~ sheet with controllable scale
peeling and thickness)

RN 2243127-39-9 CAPLUS

CN Steel, Fe 97-100, Mn 0-2, Si 0-0.5, B 0-0.2, C 0-0.2, Cr 0-0.2, Cu 0-0.2, Mo
0-0.2, Nb 0-0.2, Ni 0-0.2, Sn 0-0.2, Ti 0-0.2, V 0-0.2, Al 0-0.1 (CA INDEX
NAME)

Component	Component Percent	Component Registry Number
Fe	97 - 100	7439-89-6
Mn	0 - 2	7439-96-5
Si	0 - 0.5	7440-21-3
B	0 - 0.2	7440-42-8
C	0 - 0.2	7440-44-0
Cr	0 - 0.2	7440-47-3
Cu	0 - 0.2	7440-50-8
Mo	0 - 0.2	7439-98-7
Nb	0 - 0.2	7440-03-1
Ni	0 - 0.2	7440-02-0
Sn	0 - 0.2	7440-31-5
Ti	0 - 0.2	7440-32-6
V	0 - 0.2	7440-62-2
Al	0 - 0.1	7429-90-5

IPCI B21B0001-26 [I]; B21B0045-00 [I]; B21B0001-26 [I]

IPCR B21B0001-26 [I]; B21B0045-00 [I]

CC 55-3 (Ferrous Metals and Alloys)

ST hot rolling ~~steel~~ sheet manuf scale peeling thickness control

IT Hot rolling
Quality control
Scale (deposits)

Sheet materials

(manuf. of hot rolled ~~steel~~ sheet with controllable scale peeling and thickness)

IT 2243127-39-9, Aluminum 0-0.1, boron 0-0.2, carbon 0-0.2, chromium 0-0.2, copper 0-0.2, iron 96.925-100, manganese 0-2, molybdenum 0-0.2, nickel 0-0.2, niobium 0-0.2, silicon 0-0.5, tin 0-0.2, titanium 0-0.2, vanadium 0-0.2, processes
 RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (manuf. of hot rolled ~~steel~~ sheet with controllable scale peeling and thickness)

L12 ANSWER 51 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2018:1585183 CAPLUS Full-text
 DOCUMENT NUMBER: 169:330066
 TITLE: The effect of stress relieving treatment on mechanical properties and microstructure of different welding areas of A517 ~~steel~~
 AUTHOR(S): Sharifi, Hassan; Raisi, Solyman; Tayebi, Morteza
 CORPORATE SOURCE: Department of Materials Science, Faculty of Engineering, University of Shahrekord, Shahrekord, Iran
 SOURCE: Materials Research Express (2017), 4(12), 126508/1-126508/12
 CODEN: MREAC3; ISSN: 2053-1591
 DIGITAL OBJECT ID: 10.1088/2053-1591/aa97c2
 PUBLISHER: IOP Publishing Ltd.
 DOCUMENT TYPE: Journal; (online computer file)
 LANGUAGE: English

AB Quench and temper ~~steels~~ are classified as low alloy ~~steels~~. In these types of ~~steel~~, post-weld heat treatment is used to obtain high toughness, elevated strength and better corrosion resistance in addn. to decline residual stress and hydrogen cracking for high pressure vessel applications. In this study, welding mech. properties were characterized by hardness measurements, tensile and impact tests. Addnl., optical microscopy and SEM (SEM) was carried out in order to characterize the microstructure and the fracture anal. of A517 ~~steel~~ before and after the post-weld heat treatment. Residual stress examns. were employed to confirm the data reliability. Results showed no changes in the weld zone microstructures. The residual stress measurements revealed the highest and the lowest residual stresses in non-treated samples and heat treated samples in 560°C, resp. On the other side, hardness and ultimate tensile strength of the specimens was decreased after heat treatment.

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
ASM International	1993			ASM Handbook, Volume	
Anon	1989			Standard Test Method	
Asm	1983			Metals Handbook, Vol	
Balasubramanian, V	2004	11	575	Eng Failure Anal	CAPLUS
Balasubramanian, V	1999	76	147	Int J Press Vessels	CAPLUS
Balasubramanian, V	2000	32	265	Mech Mater	
Bhadeshia, H	2001	41	626	ISI Int	CAPLUS
Bhadeshia, H	2006			Steels:Microstructur	
Bray, D	1995	28	235	NDT&E Int	
Brito, V	2001	10	249	J Mater Eng Perform	
Cho, J	2004	155-6	1690	J Mater Process Tech	
Dorsch, K	1978			Welding Research Rep	
Dumovic, M	1999			The WTIA 47th Annual	
Huang, C	1997	6	61	J Mater Eng Perform	CAPLUS
Javadi, Y	2014	123-4	111	Int J Press Vessels	
Lochhead, J	1972	80	187	J West Scotland ISI	
Mochizuki, M	2007	237	107	Nucl Eng Des	CAPLUS
O'Brien, M	2000	45	2000	Australas Weld J	
Rosenbrock, L	1999			The WTIA 47th Annual	
Smith, C	1997	70	183	Int J Press Vessels	CAPLUS
Soete, W	1949	28	354	Weld J	
Sterjovski, Z	2004	81	465	Int J Press Vessels	CAPLUS
Sterjovski, Z	2005			Thesis In Fulfilment	
Teng, T	2003	81	273	Comput Struct	

Totten, G | 2006 | | | Steel Heat Treatment |
Vangi, D | 2001 | 41 | 277 | Exp Mech | CAPLUS
IT 52346-86-8, A517B, processes
RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM
(Technical or engineered material use); PROC (Process); USES (Uses)
(effect of stress relieving treatment on mech. properties and
microstructure of different welding areas of A517 steel)
RN 52346-86-8 CAPLUS
CN Steel, (UNS K11630) (CA INDEX NAME)

Component	Component Percent		Component Registry Number
=====+=====+=====			
Fe	97	- 98	7439-89-6
Mn	0.70	- 1.00	7439-96-5
Cr	0.40	- 0.65	7440-47-3
Si	0.20	- 0.35	7440-21-3
Mo	0.15	- 0.25	7439-98-7
C	0.12	- 0.21	7440-44-0
V	0.03	- 0.08	7440-62-2
S	0	- 0.04	7704-34-9
P	0	- 0.035	7723-14-0
Ti	0.01	- 0.03	7440-32-6
B	0.0005	- 0.005	7440-42-8

CC 55-5 (Ferrous Metals and Alloys)
ST steel heat treatment welding mech property
IT Heat treatment
(Post-weld; effect of stress relieving treatment on mech. properties
and microstructure of different welding areas of A517 steel)
IT Corrosion
Corrosion resistance
Ductility
Fracture (materials)
Grain boundaries
Microstructure
Stress, mechanical
Tensile strength
Toughness
Vickers hardness
Yield strength
(effect of stress relieving treatment on mech. properties and
microstructure of different welding areas of A517 steel)
IT 52346-86-8, A517B, processes 344335-51-9, ER90S-G, processes
RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM
(Technical or engineered material use); PROC (Process); USES (Uses)
(effect of stress relieving treatment on mech. properties and
microstructure of different welding areas of A517 steel)

L12 ANSWER 52 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN
ACCESSION NUMBER: 2018:1359640 CAPLUS Full-text
DOCUMENT NUMBER: 169:213564
TITLE: Low cost and high hardenability HB450 grade medium
plate wear resistant steel plate and preparation
method thereof
INVENTOR(S): He, Yayuan; Yin, Yunyang; Xi, Tianhui; Cai, Zhen; Lu,
Zaixue; Du, Ming; Wang, Shisen; Ma, Yuxi; Li, Defa
PATENT ASSIGNEE(S): Wuhan Iron & Steel Co., Ltd., Peop. Rep. China
SOURCE: Faming Zhuanli Shenqing, 8pp.
CODEN: CNXXEV
DOCUMENT TYPE: Patent
LANGUAGE: Chinese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:
PATENT NO. KIND DATE APPLICATION NO. DATE

CN 108315652 A 20180724 CN 2018-10398720 20180428
CN 108315652 B 20190924
PRIORITY APPLN. INFO.: CN 2018-10398720 20180428
AB The invention provides a low-cost high-hardenability HB450 grade
medium-thick plate wear-resistant steel plate, which main components

are: carbon 0.2-0.3, iron balance, manganese 3.7-4, molybdenum 0.2-0.4, nickel 0.4, phosphorus 0-0.01, silicon 1.4-1.6, sulfur 0-0.005, vanadium 0.2. The invention also provides a method for prepg. the wear-resistant ~~steel~~ plate. The wear-resistant ~~steel~~ plate is simple in prepn., uniform in structure, high tensile strength and high hardness.

IT 1315482-08-6P, preparation
 RL: IMF (Industrial manufacture); PEP (Physical, engineering or chemical process); PREP (Preparation); PROC (Process)
 (low cost and high hardenability HB450 grade medium plate wear resistant ~~steel~~ plate and prepn. method thereof)
 RN 1315482-08-6 CAPLUS
 CN Steel, (HB450) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	97 - 98	7439-89-6
Mn	1.2 - 1.6	7439-96-5
Si	0.4 - 0.6	7440-21-3
B	0 - 0.4	7440-42-8
Cr	0 - 0.4	7440-47-3
Ti	0 - 0.4	7440-32-6
C	0.2	7440-44-0

IPCI C22C0038-02; C22C0038-04; C22C0038-08; C22C0038-12; C21D0001-18; C21D0008-02
 IPCR C22C0038-02 [I]; C21D0001-18 [I]; C21D0008-02 [I]; C22C0038-04 [I]; C22C0038-08 [I]; C22C0038-12 [I]
 CC 55-1 (Ferrous Metals and Alloys)
 ST HB450 grade plate wear resistant ~~steel~~ plate prepn
 IT Melting
 Rolling (metals)
 Wear-resistant materials

(low cost and high hardenability HB450 grade medium plate wear resistant ~~steel~~ plate and prepn. method thereof)

IT 1315482-08-6P, preparation
 RL: IMF (Industrial manufacture); PEP (Physical, engineering or chemical process); PREP (Preparation); PROC (Process)
 (low cost and high hardenability HB450 grade medium plate wear resistant ~~steel~~ plate and prepn. method thereof)

L12 ANSWER 53 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2018:1216619 CAPLUS Full-text

DOCUMENT NUMBER: 169:149309

TITLE: Preparation method of low-chromium impact-resistant high temperature wear resistant alloy ~~steel~~

INVENTOR(S): Chen, Zhanghua

PATENT ASSIGNEE(S): Peop. Rep. China

SOURCE: Faming Zhuanli Shenqing, 10pp.

CODEN: CNXXEV

DOCUMENT TYPE: Patent

LANGUAGE: Chinese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
CN 108220816	A	20180629	CN 2017-11474500	20171229

PRIORITY APPLN. INFO.: CN 2017-11474500 20171229

AB The title low-chromium impact-resistant high temp. wear resistant alloy ~~steel~~ comprises the following components by wt. percentages: carbon 0.1-0.5, silicon 0.4-2.2, manganese 0.5-1.5, phosphorus 0-0.04, sulfur 0-0.04, chromium 0.5-3.5, nickel 0.2-2.2, molybdenum 0.1-0.7, boron 0-0.2, aluminum 0.1-0.5, cerium 0.2-1.2, tin 0.02-0.20, vanadium 0-0.8, tungsten 0.1-1.5, copper 0.05-0.4, tantalum 0.005-0.02, cobalt 0.05-0.2, holmium 0.05-0.2, magnesium 0.01-0.04, calcium 0.003-0.015, titanium 0.05-0.1, niobium 0-0.2, iron bal. The invention also discloses a prepn. method of the alloy ~~steel~~. The alloy ~~steel~~ prepd. by special process can ensure high toughness and impact resistance, and improve the wear resistance and hardness.

IT 2231423-67-4P, Carbon 0.1-0.5, silicon 0.4-2.2, manganese 0.5-1.5, chromium 0.5-3.5, nickel 0.2-2.2, molybdenum 0.1-0.7, boron

0-0.2, aluminum 0.1-0.5, cerium 0.2-1.2, tin 0.02-0.2, vanadium 0-0.8, tungsten 0.1-1.5, copper 0.05-0.4, cobalt 0.05-0.2, holmium 0.05-0.2, titanium 0.05-0.1, niobium 0-0.2, iron bal.
 RL: IMF (Industrial manufacture); PEP (Physical, engineering or chemical process); PREP (Preparation); PROC (Process)
 (prepn. method of low-chromium impact-resistant high temp. wear resistant alloy ~~steel~~)
 RN 2231422-67-4 CAPLUS
 CN Iron alloy, base, Fe 84-98, Cr 0.5-3.5, Si 0.4-2.2, Ni 0.2-2.2, Mn 0.5-1.5, W 0.1-1.5, Ce 0.2-1.2, V 0-0.8, Mo 0.1-0.7, Al 0.1-0.5, C 0.1-0.5, Cu 0-0.4, B 0-0.2, Co 0-0.2, Ho 0-0.2, Nb 0-0.2, Sn 0-0.2, Ti 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
=====+	=====+	=====+
Fe	84 - 98	7439-89-6
Cr	0.5 - 3.5	7440-47-3
Si	0.4 - 2.2	7440-21-3
Ni	0.2 - 2.2	7440-02-0
Mn	0.5 - 1.5	7439-96-5
W	0.1 - 1.5	7440-33-7
Ce	0.2 - 1.2	7440-45-1
V	0 - 0.8	7440-62-2
Mo	0.1 - 0.7	7439-98-7
Al	0.1 - 0.5	7429-90-5
C	0.1 - 0.5	7440-44-0
Cu	0 - 0.4	7440-50-8
B	0 - 0.2	7440-42-8
Co	0 - 0.2	7440-48-4
Ho	0 - 0.2	7440-60-0
Nb	0 - 0.2	7440-03-1
Sn	0 - 0.2	7440-31-5
Ti	0 - 0.1	7440-32-6

IPCI C22C0038-54; C22C0038-52; C22C0038-50; C22C0038-48; C22C0038-46; C22C0038-44; C22C0038-42; C22C0038-06; C22C0038-04; C22C0038-02; C22C0033-04
 IPCR C22C0038-54 [I]; C22C0033-04 [I]; C22C0038-02 [I]; C22C0038-04 [I]; C22C0038-06 [I]; C22C0038-42 [I]; C22C0038-44 [I]; C22C0038-46 [I]; C22C0038-48 [I]; C22C0038-50 [I]; C22C0038-52 [I]
 CC 55-1 (Ferrous Metals and Alloys)
 ST low chromium alloy ~~steel~~ prepn
 IT Deoxidation
 Wear-resistant materials
 (prepn. method of low-chromium impact-resistant high temp. wear resistant alloy ~~steel~~)
 IT ~~2231422-67-4~~, Carbon 0.1-0.5, silicon 0.4-2.2, manganese 0.5-1.5, chromium 0.5-3.5, nickel 0.2-2.2, molybdenum 0.1-0.7, boron 0-0.2, aluminum 0.1-0.5, cerium 0.2-1.2, tin 0.02-0.2, vanadium 0-0.8, tungsten 0.1-1.5, copper 0.05-0.4, cobalt 0.05-0.2, holmium 0.05-0.2, titanium 0.05-0.1, niobium 0-0.2, iron bal.
 RL: IMF (Industrial manufacture); PEP (Physical, engineering or chemical process); PREP (Preparation); PROC (Process)
 (prepn. method of low-chromium impact-resistant high temp. wear resistant alloy ~~steel~~)
 IT 409-21-2, Silicon carbide (SiC), processes 7429-90-5, Aluminum, processes 12597-69-2, ~~steel~~, processes 71965-70-3
 RL: NUU (Other use, unclassified); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
 (prepn. method of low-chromium impact-resistant high temp. wear resistant alloy ~~steel~~)

L12 ANSWER 54 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN
 ACCESSION NUMBER: 2018:1170345 CAPLUS Full-text
 DOCUMENT NUMBER: 169:96882
 TITLE: High-strength ~~steel~~ sheet and its manufacture for automobile parts
 INVENTOR(S): Otani, Shigeo; Murakami, Toshio; Kakiuchi, Elijah; Nimura, Yuichi; Murata, Tadao
 PATENT ASSIGNEE(S): Kobe Steel, Ltd., Japan
 SOURCE: Jpn. Kokai Tokkyo Koho, 27pp.

CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2018095896	A	20180621	JP 2016-238742	20161208
PRIORITY APPLN. INFO.:			JP 2016-238742	20161208

AB The title high-strength ~~steel~~ sheet has high tensile strength, tensile strength $\times$ total elongation, deep drawability, hole expanding ratio, limiting dome height, thickness redn. rate of a broken part during tensile test, and cross tension strength of spot weld. The ~~steel~~ sheet comprises (by wt.%): C 0.15-0.35, Si + Al 0.5-3.0, Mn 1.0-4.0, P $\leq$ 0.05, S $\leq$ 0.01, and Fe and inevitable impurities as bal. The ~~steel~~ structure has a ferrite fraction $\leq$ 5%, a total fraction of tempered martensite and tempered bainite $\geq$ 60%, a retained austenite amt. $\geq$ 10%, an av. size of retained austenite $\leq$ 1.0 μ m, and an av. size of MA $\leq$ 1.0 μ m. The amt. of retained austenite with size of 1.5 μ m or more is 2% or more of the total amt. of retained austenite. A half width of a concn. distribution of Mn in carbon concd. region equal to the amt. of the retained austenite is $\geq$ 0.3 wt.%. A scattering intensity of the ~~steel~~ structure at q value of 1 nm⁻¹ in a small angle X-ray scattering is 1.0 cm⁻¹ or less.

IT 2228951-13-9P, Aluminum 0-3, silicon 0-3, carbon 0.15-0.35, chromium 0-1, copper 0-1, hafnium 0-0.2, iron 91.38-98.35, manganese 1-4, molybdenum 0-1, nickel 0-1, niobium 0-0.2, titanium 0-0.2, vanadium 0-0.2, zirconium 0-0.2, B 0-1
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(high-strength ~~steel~~ sheet and its manuf. for automobile parts)

RN 2228951-13-9 CAPLUS

CN Iron alloy, base, Fe 91-98, Mn 1-4, Al 0-3, Si 0-3, B 0-1, Cr 0-1, Cu 0-1, Mo 0-1, Ni 0-1, C 0.2-0.4, Hf 0-0.2, Nb 0-0.2, Ti 0-0.2, V 0-0.2, Zr 0-0.2 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	91 - 98	7439-89-6
Mn	1 - 4	7439-96-5
Al	0 - 3	7429-90-5
Si	0 - 3	7440-21-3
B	0 - 1	7440-42-8
Cr	0 - 1	7440-47-3
Cu	0 - 1	7440-50-8
Mo	0 - 1	7439-98-7
Ni	0 - 1	7440-02-0
C	0.2 - 0.4	7440-44-0
Hf	0 - 0.2	7440-58-6
Nb	0 - 0.2	7440-03-1
Ti	0 - 0.2	7440-32-6
V	0 - 0.2	7440-62-2
Zr	0 - 0.2	7440-67-7

IPCI C22C0038-00 [I]; C21D0009-46 [I]; C22C0038-06 [I]; C22C0038-58 [I]
IPCR C22C0038-00 [I]; C21D0009-46 [I]; C22C0038-06 [I]; C22C0038-58 [I]

CC 55-3 (Ferrous Metals and Alloys)
ST ~~steel~~ sheet strength manuf automobile part
IT Automobile parts
Casting of metals
Cold rolling
Cooling
Elongation, mechanical
Heat treatment
Heating
Hot rolling
Melting
Microstructure
Pickling
Sheet materials

Tempering
Tensile strength
(high-strength steel sheet and its manuf. for automobile parts)

IT 2228951-13-9P, Aluminum 0-3, silicon 0-3, carbon 0.15-0.35, chromium 0-1, copper 0-1, hafnium 0-0.2, iron 91.38-98.35, manganese 1-4, molybdenum 0-1, nickel 0-1, niobium 0-0.2, titanium 0-0.2, vanadium 0-0.2, zirconium 0-0.2, B 0-1
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(high-strength steel sheet and its manuf. for automobile parts)

OS.CITING REF COUNT: 2 THERE ARE 2 CAPLUS RECORDS THAT CITE THIS RECORD (2 CITINGS)

L12 ANSWER 55 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN
ACCESSION NUMBER: 2018:1167096 CAPLUS Full-text
DOCUMENT NUMBER: 169:54945
TITLE: Method for manufacturing steel containing low manganese and high light metal
INVENTOR(S): Hayat, Fatih
PATENT ASSIGNEE(S): Turk.
SOURCE: Turk. Pat. Appl., 26pp.
CODEN: TRXXB5

DOCUMENT TYPE: Patent
LANGUAGE: Turkish
FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
TR 2017000434	A2	20170620	TR 2017-434	20170111

PRIORITY APPLN. INFO.: TR 2017-434 20170111

AB The present invention relates to a manufg. method for a steel, that facilitates by the warm rolling method. The steel is aimed to reduce the use of manganese with normal use of nickel and boron, convenient to use in automobile products due to lowering of manganese cost. The ultra high strength steel compn. is hard, pull resistance is high, tough, ductile, magnetism strength used in the construction of dampers and armor steel, firearms, military equipment, pressure tubes, containers, tanks, gun barrel, road refills, ballistic steel.

IT 2227442-11-5P, Aluminum 0-41, boron 0-0.2, carbon 0.01-2, chromium 0-9, cobalt 0-5, copper 0-6, manganese 2-2.7, molybdenum 0-6, nickel 0-27, nickel 0-5, nitrogen 0-6, silicon 0-11, tantalum 0-5, titanium 0-5, tungsten 0-5, vanadium 0-5, iron bal.
RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(method for manufg. steel contg. low manganese and high light metal)

RN 2227442-11-5 CAPLUS

CN Iron alloy, base, Fe 0-98, Al 0-41, Ni 0-27, Si 0-11, Cr 0-9, Cu 0-6, Mo 0-6, N 0-6, Co 0-5, Nb 0-5, Ta 0-5, Ti 0-5, V 0-5, W 0-5, Mn 2-2.7, C 0-2, B 0-0.2 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	0 - 98	7439-89-6
Al	0 - 41	7429-90-5
Ni	0 - 27	7440-02-0
Si	0 - 11	7440-21-3
Cr	0 - 9	7440-47-3
Cu	0 - 6	7440-50-8
Mo	0 - 6	7439-98-7
N	0 - 6	17778-88-0
Co	0 - 5	7440-48-4
Nb	0 - 5	7440-03-1
Ta	0 - 5	7440-25-7
Ti	0 - 5	7440-32-6
V	0 - 5	7440-62-2
W	0 - 5	7440-33-7
Mn	2 - 2.7	7439-96-5

C	0	-	2	7440-44-0
B	0	-	0.2	7440-42-8

IPCI C22C0038-44 [I]
 CC 55-1 (Ferrous Metals and Alloys)
 ST manufg ~~steel~~ low manganese light metal
 IT Automobile parts
 Rolling (metals)
 (method for manufg. ~~steel~~ contg. low manganese and high light metal)
 IT 2237442-11-5P, Aluminum 0-41, boron 0-0.2, carbon 0.01-2, chromium 0-9, cobalt 0-5, copper 0-6, manganese 2-2.7, molybdenum 0-6, nickel 0-27, nickel 0-5, nitrogen 0-6, silicon 0-11, tantalum 0-5, titanium 0-5, tungsten 0-5, vanadium 0-5, iron bal.
 RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
 (method for manufg. ~~steel~~ contg. low manganese and high light metal)

L12 ANSWER 56 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2018:1120703 CAPLUS Full-text
 DOCUMENT NUMBER: 169:78182
 TITLE: High-strength ~~steel~~ sheet and its manufacture for automobile parts
 INVENTOR(S): Otani, Shigeo; Murakami, Toshio; Kakiuchi, Elijah; Futamura, Yuichi; Murata, Tadao
 PATENT ASSIGNEE(S): Kobe Steel, Ltd., Japan
 SOURCE: Jpn. Kokai Tokkyo Koho, 22pp.
 CODEN: JKXXAF
 DOCUMENT TYPE: Patent
 LANGUAGE: Japanese
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2018090877	A	20180614	JP 2016-237032	20161206
			JP 2016-237032	20161206

PRIORITY APPLN. INFO.:
 AB The ~~steel~~ sheet comprises the following components in mass%: 0.15-0.35 of carbon, 0.5-3 of aluminum, 0.5-3 of silicon, 1-4 of manganese, 0-0.05 of phosphorous, 0-0.01 of sulfur, balance iron and inevitable impurities. The ferrite fraction is 5% or less, the total fraction of tempered martensite and tempered bainite is 60% or more, the amt. of retained austenite is 10% or more, the av. size of retained austenite is 1.0 µm or less. The retained austenite having a size of 1.5 µm or more is 2% or more of the total residual austenite amt., the av. size of MA is 1.0 µm or less and a half-value width of the concn. distribution of manganese in the carbon concd. region which is equal to the amt. of retained austenite is 0.3% by mass or more. According to the present invention, it is possible to provide a ~~steel~~ sheet having good tensile strength used for various applications including automobile parts is provided.

IT 2228951-13-9P, Aluminum 0-3, boron 0-1, carbon 0.15-0.35, chromium 0-1, copper 0-1, iron 91.38-98.35, manganese 1-4, molybdenum 0-1, nickel 0-1, niobium 0-0.2, silicon 0-3, titanium 0-0.2, vanadium 0-0.2, zirconium 0-0.2, hafnium 0-0.2
 RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
 (high-strength ~~steel~~ sheet and its manuf. for automobile parts)

RN 2228951-13-9 CAPLUS
 CN Iron alloy, base, Fe 91-98, Mn 1-4, Al 0-3, Si 0-3, B 0-1, Cr 0-1, Cu 0-1, Mo 0-1, Ni 0-1, C 0.2-0.4, Hf 0-0.2, Nb 0-0.2, Ti 0-0.2, V 0-0.2, Zr 0-0.2 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	91 - 98	7439-89-6
Mn	1 - 4	7439-96-5
Al	0 - 3	7429-90-5
Si	0 - 3	7440-21-3

B	0	-	1	7440-42-8
Cr	0	-	1	7440-47-3
Cu	0	-	1	7440-50-8
Mo	0	-	1	7439-98-7
Ni	0	-	1	7440-02-0
C	0.2	-	0.4	7440-44-0
Hf	0	-	0.2	7440-58-6
Nb	0	-	0.2	7440-03-1
Ti	0	-	0.2	7440-32-6
V	0	-	0.2	7440-62-2
Zr	0	-	0.2	7440-67-7

IPCI C22C0038-00 [I]; C22C0038-06 [I]; C22C0038-58 [I]; C21D0009-46 [I]
 IPCR C22C0038-00 [I]; C21D0009-46 [I]; C22C0038-06 [I]; C22C0038-58 [I]

CC 55-3 (Ferrous Metals and Alloys)

ST high strength ~~steel~~ sheet manuf automobile part

IT Automobile parts

Casting of metals

Cold rolling

Elongation, mechanical

Heat treatment

Hot rolling

Melting

Microstructure

Pickling

Sheet materials

Tensile strength

(high-strength ~~steel~~ sheet and its manuf. for automobile parts)

IT Forging

(hot; high-strength ~~steel~~ sheet and its manuf. for automobile parts)

IT ~~2228951-13-9P~~, Aluminum 0-3, boron 0-1, carbon 0.15-0.35, chromium 0-1, copper 0-1, iron 91.38-98.35, manganese 1-4, molybdenum 0-1, nickel 0-1, niobium 0-0.2, silicon 0-3, titanium 0-0.2, vanadium 0-0.2, zirconium 0-0.2, hafnium 0-0.2

RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(high-strength ~~steel~~ sheet and its manuf. for automobile parts)

OS.CITING REF COUNT: 1 THERE ARE 1 CAPLUS RECORDS THAT CITE THIS RECORD
 (1 CITINGS)

L12 ANSWER 57 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2018:975370 CAPLUS Full-text

DOCUMENT NUMBER: 169:42654

TITLE: HB450 crack resistant duplex structure wear-resistant ~~steel~~ and preparation method thereof

INVENTOR(S): Li, Defa; Guan, Jisheng; Yan, Xiang; Wang, Shisen; Ma, Yuxi

PATENT ASSIGNEE(S): Wuhan Iron & Steel Co., Ltd., Peop. Rep. China

SOURCE: Faming Zhuanli Shenqing, 9pp.

CODEN: CNXXEV

DOCUMENT TYPE: Patent

LANGUAGE: Chinese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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CN 108060362	A	20180522	CN 2017-11392536	20171221
			CN 2017-11392536	20171221

PRIORITY APPLN. INFO.:

AB The invention discloses a HB450 crack resistant duplex structure wear-resistant ~~steel~~ and prepn. method thereof, which has high use safety and high efficiency. The ~~steel~~ includes the following components in mass percentage: C 0.15-0.20%, Si 0.80-1.20%, Mn 1.20-1.55%, P≤0.015%, S≤0.010%, Cr 0.85-1.25%, Mo 0.25-0.55%, Nb 0.02-0.04%, Ti 0.005-0.025%, B 0.001-0.005%, Als 0.010-0.040%, N≤0.0055%, Fe balance.

IT ~~1315482-08-6~~, HB450, processes

RL: PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)

(hB450 crack resistant duplex structure wear-resistant ~~steel~~
and prepn. method thereof)

RN 1315482-08-6 CAPLUS

CN Steel, (HB450) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	97 - 98	7439-89-6
Mn	1.2 - 1.6	7439-96-5
Si	0.4 - 0.6	7440-21-3
B	0 - 0.4	7440-42-8
Cr	0 - 0.4	7440-47-3
Ti	0 - 0.4	7440-32-6
C	0.2	7440-44-0

IPCI C22C0038-38; C22C0038-04; C22C0038-02; C22C0038-22; C22C0038-26;
C22C0038-28; C22C0038-32; C22C0038-06; C21D0008-02; C21D0001-18;
C21D0006-00

IPCR C22C0038-38 [I]; C21D0001-18 [I]; C21D0006-00 [I]; C21D0008-02 [I];
C22C0038-02 [I]; C22C0038-04 [I]; C22C0038-06 [I]; C22C0038-22 [I];
C22C0038-26 [I]; C22C0038-28 [I]; C22C0038-32 [I]

CC 55-3 (Ferrous Metals and Alloys)

ST ~~steel~~

IT Wear-resistant materials

(hB450 crack resistant duplex structure wear-resistant ~~steel~~
and prepn. method thereof)

IT 1315482-08-6, HB450, processes

RL: PEP (Physical, engineering or chemical process); PRP (Properties);

PROC (Process)

(hB450 crack resistant duplex structure wear-resistant ~~steel~~
and prepn. method thereof)

L12 ANSWER 58 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2018:863056 CAPLUS Full-text

DOCUMENT NUMBER: 168:486049

TITLE: ~~Steel~~ welding part with aluminum or aluminum alloy
plating layer and manufacture method thereof

INVENTOR(S): Pan, Hua; Su, Yongchao; Lei, Ming; Shi, Lei; Jiang,
Haomin

PATENT ASSIGNEE(S): Baoshan Iron & Steel Co., Ltd., Peop. Rep. China

SOURCE: PCT Int. Appl., 17pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: Chinese

FAMILY ACC. NUM. COUNT: 2

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2018077067	A1	20180503	WO 2017-CN106516	20171017
CN 106334875	A	20170118	CN 2016-10953787	20161027
MX 2019004121	A	20190606	MX 2019-4121	20171017
KR 2019069471	A	20190619	KR 2019-7013481	20171017
EP 3533558	A1	20190904	EP 2017-864438	20171017
JP 2019535894	T	20191212	JP 2019-520992	20171017
US 20200038998	A1	20200206	US 2019-16339215	20190403
IN 201917015151	A	20190719	IN 2019-17015151	20190415
PRIORITY APPLN. INFO.:			CN 2016-10953787	A 20161027
			WO 2017-CN106516	W 20171017

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB The invention discloses a ~~steel~~ welding part with aluminum or aluminum
alloy plating layer and manuf. method thereof. The ~~steel~~ welding part
with aluminum or aluminum alloy plating layer comprises a ~~steel~~
substrate and a plating layer, the plating layer comprises an
intermetallic compd. alloy layer in contact with the substrate, and a
metal alloy layer thereon; which is characterized in that on at least one
of the plated surfaces of the weld blank, the plating layer located in the
area to be welded of the weld blank is completely removed, and the end
face of the welding blank part plating layer removed the region to be
welded is perpendicular to the surface of the substrate which is parallel
to weld seam to form an included angle β , and the included angle

$\beta = 0-80^\circ$. A method of manufg. ~~steel~~ welding part with aluminum or aluminum alloy plating layer is characterized in that it includes the steps of: obtaining weld blank by welding according to the requirements of ~~steel~~ welding part with aluminum or aluminum alloy plating layer, welding the area to be welded of the weld blank where the plating layer has been completely removed to form a welded joint; obtaining a part by hot stamping, selecting a cooling rate which is greater than the crit. transformation speed of the matrix martensite quenching, and cooling. This invention ensures tensile strength, elongation rate and corrosion resistance of welding joint after hot stamping.

IT 2067242-22-0, Aluminum 0-0.3, boron 0-0.1, carbon 0.1-0.8, chromium 0-3, manganese 0.1-5, phosphorus 0-0.3, silicon 0-1, sulfur 0-0.1, titanium 0-0.5, iron bal.
 RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (~~steel~~ welding part with aluminum or aluminum alloy plating layer and manuf. method thereof)

RN 2067242-22-0 CAPLUS

CN Iron alloy, base, Fe 89-100, Mn 0.1-5, Cr 0-3, Si 0-1, C 0.1-0.8, Ti 0-0.5, Al 0-0.3, P 0-0.3, B 0-0.1, S 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	89 - 100	7439-89-6
Mn	0.1 - 5	7439-96-5
Cr	0 - 3	7440-47-3
Si	0 - 1	7440-21-3
C	0.1 - 0.8	7440-44-0
Ti	0 - 0.5	7440-32-6
Al	0 - 0.3	7429-90-5
P	0 - 0.3	7723-14-0
B	0 - 0.1	7440-42-8
S	0 - 0.1	7704-34-9

IPCI B23K0026-32 [I]; C22C0038-04 [I]
 IPCR B23K0026-32 [I]; C22C0038-04 [I]
 CC 56-9 (Nonferrous Metals and Alloys)
 Section cross-reference(s): 47

ST ~~steel~~ laser welding corrosion strength
 IT Corrosion resistance
 Elongation, mechanical
 Laser welding
 Plating process
 Tensile strength
 (~~steel~~ welding part with aluminum or aluminum alloy plating layer and manuf. method thereof)

IT Intermetallic compounds
 RL: FMU (Formation, unclassified); FORM (Formation, nonpreparative)
 (~~steel~~ welding part with aluminum or aluminum alloy plating layer and manuf. method thereof)

IT 2067242-22-0, Aluminum 0-0.3, boron 0-0.1, carbon 0.1-0.8, chromium 0-3, manganese 0.1-5, phosphorus 0-0.3, silicon 0-1, sulfur 0-0.1, titanium 0-0.5, iron bal.
 RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (~~steel~~ welding part with aluminum or aluminum alloy plating layer and manuf. method thereof)

IT 1273096-81-3, Aluminum alloy
 RL: TEM (Technical or engineered material use); USES (Uses)
 (~~steel~~ welding part with aluminum or aluminum alloy plating layer and manuf. method thereof)

L12 ANSWER 59 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN
 ACCESSION NUMBER: 2018:228290 CAPLUS Full-text
 DOCUMENT NUMBER: 168:225095
 TITLE: Low-carbon ~~steel~~ sheet and plated ~~steel~~ sheet for automobile parts
 INVENTOR(S): Sano, Kohichi; Uno, Makoto; Nishiyama, Ryoichi; Yamaguchi, Yuji; Sugiura, Natsuko; Nakata, Masahiro

PATENT ASSIGNEE(S): Nippon Steel & Sumitomo Metal Corporation, Japan
 SOURCE: PCT Int. Appl., 54pp.
 CODEN: PIXXD2
 DOCUMENT TYPE: Patent
 LANGUAGE: Japanese
 FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2018026015	A1	20180208	WO 2017-JP28478	20170804
TW I629367	B	20180711	TW 2017-126478	20170804
JP 6358406	B2	20180718	JP 2017-562089	20170804
KR 2019012262	A	20190208	KR 2019-7000430	20170804
KR 2205432	B1	20210120		
MX 2019000051	A	20190401	MX 2019-51	20170804
CN 109563586	A	20190402	CN 2017-80047871	20170804
BR 112019000422	A2	20190430	BR 2019-112019000422	20170804
EP 3495529	A1	20190612	EP 2017-837116	20170804
US 20190233926	A1	20190801	US 2018-16312222	20181220
US 10889879	B2	20210112		
IN 201817049387	A	20190322	IN 2018-17049387	20181227
PRIORITY APPLN. INFO.:			JP 2016-155090	A 20160805
			WO 2017-JP28478	W 20170804

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB The ~~steel~~ plate has chem. compn. as: aluminum 0.010-0.6, boron 0.0005-0.1, calcium 0.0001-0.05, carbon 0.008-0.15, chromium 0.05-1, copper 0.01-2, iron and impurities balance, magnesium 0.0001-0.05, manganese 0.60-2.5, molybdenum 0.01-1, nickel 0.01-2, niobium 0-0.2, nitrogen 0-0.006, phosphorus 0-0.05, rare earth metal 0.0001-0.05, silicon 0.01-1.7, sulfur 0-0.02, titanium 0-0.2, titanium and niobium 0.015-0.2, zirconium 0.0001-0.05, in mass%, and is provided with a structure represented by, in terms of area ratio, 5-95% ferrite and 5-95% bainite. When a crystal grain is defined as a region which is surrounded by grain boundaries having disorientation of 15°-or higher and for which the equiv. circle diam. is 0.3µm or larger, the proportion of crystal grains having an intragranular disorientation of 5-14°-relative to all of crystal grains is 20-100% in terms of area ratio. The ~~steel~~ plate comprises hard material crystal grains A in which ppts. or clusters with max. diam. of no larger than 8 nm are distributed in no. d. of 1×10¹⁶-1×10¹⁹ particles/cm³, and soft material crystal grains B in which ppts. or clusters with a max. diam. of no larger than 8 nm are distributed in no. d. of no higher than 1×10¹⁵ particles/cm³, and the vol.% of hard material crystal grains A/(vol.% of hard material crystal grains A+vol.% of soft material crystal grains B) is 0.1-0.9. The plated ~~steel~~ plate has galvanized plated layer. The ~~steel~~ plate has high strength, good ductility and stretch flangeability, and high yield stress.

IT 2178084-33-6
 RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
 (low-carbon ~~steel~~ sheet and plated ~~steel~~ sheet for automobile parts)

RN 2178084-33-6 CAPLUS

CN Iron alloy, base, Fe 89-99, Mn 0.6-2.5, Cu 0-2, Ni 0-2, Si 0-1.7, Cr 0-1, Mo 0-1, Al 0-0.6, C 0-0.2, Nb 0-0.2, Ti 0-0.2, B 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	89 - 99	7439-89-6
Mn	0.6 - 2.5	7439-96-5
Cu	0 - 2	7440-50-8
Ni	0 - 2	7440-02-0
Si	0 - 1.7	7440-21-3
Cr	0 - 1	7440-47-3
Mo	0 - 1	7439-98-7
Al	0 - 0.6	7429-90-5
C	0 - 0.2	7440-44-0
Nb	0 - 0.2	7440-03-1
Ti	0 - 0.2	7440-32-6
B	0 - 0.1	7440-42-8

IPCI C22C0038-00 [I]; C22C0038-58 [I]; C21D0009-46 [N]
 IPCR C22C0038-00 [I]; C21D0009-46 [N]; C22C0038-58 [I]
 CC 55-3 (Ferrous Metals and Alloys)
 ST low carbon ~~steel~~ sheet plating automobile part
 IT Automobile parts
 Elongation, mechanical
 Galvannealing
 Grain size
 Hot-dip galvanizing
 Microstructure
 Sheet materials
 Tensile strength
 Yield strength
 (low-carbon ~~steel~~ sheet and plated ~~steel~~ sheet for automobile parts)
 IT 2178004-33-6
 RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
 (low-carbon ~~steel~~ sheet and plated ~~steel~~ sheet for automobile parts)
 OS.CITING REF COUNT: 1 THERE ARE 1 CAPLUS RECORDS THAT CITE THIS RECORD (1 CITINGS)

L12 ANSWER 60 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN
 ACCESSION NUMBER: 2018:228269 CAPLUS Full-text
 DOCUMENT NUMBER: 168:225078
 TITLE: ~~Steel~~ sheet having ferrite and bainite structure and plated ~~steel~~ sheet
 INVENTOR(S): Sano, Kohichi; Uno, Makoto; Nishiyama, Ryoichi; Yamaguchi, Yuji; Sugiura, Natsuko; Nakata, Masahiro
 PATENT ASSIGNEE(S): Nippon Steel & Sumitomo Metal Corporation, Japan
 SOURCE: PCT Int. Appl., 53pp.
 CODEN: PIXXD2
 DOCUMENT TYPE: Patent
 LANGUAGE: Japanese
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2018026014	A1	20180208	WO 2017-JP28477	20170804
TW 1629369	B	20180711	TW 2017-126479	20170804
JP 6358407	B2	20180718	JP 2017-562090	20170804
KR 2019014077	A	20190211	KR 2019-7000254	20170804
KR 2186320	B1	20201203		
CN 109563580	A	20190402	CN 2017-80046261	20170804
BR 112019000766	A2	20190424	BR 2019-112019000766	20170804
EP 3495528	A1	20190612	EP 2017-837115	20170804
MX 2019000576	A	20190902	MX 2019-576	20170804
IN 201817048127	A	20190301	IN 2018-17048127	20181219
US 20190226061	A1	20190725	US 2019-16315120	20190103
PRIORITY APPLN. INFO.:			JP 2016-155100	A 20160805
			WO 2017-JP28477	W 20170804

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB The present invention relates to a ~~steel~~ sheet having a specific chem. compn. and structure, in terms of area ratio, 30 - 95% ferrite and 5 - 70% bainite. The crystal grain is defined as a region which is surrounded by grain boundaries having a misorientation of 15° or higher and for which the equiv. circle diam. is 0.3 µm or larger, the proportion of crystal grains having an intragranular misorientation of 5 - 14° relative to all of the crystal grains is 20 - 100% in terms of area ratio. The av. aspect ratio of ellipses equiv. to the crystal grains is 5 or low. The av. distribution d. of the total of Ti carbides and Nb carbides having a particle size of 20 nm or larger in the ferrite grain boundaries is 10 particles/µm or low.

IT 2176433-58-0, Aluminum 0.01-0.6, boron 0-0.1, carbon 0.008-0.2, chromium 0-1, copper 0-2, manganese 0.6-2.5, molybdenum 0-1, nickel 0-2, niobium 0-0.2, silicon 0.01-1.7, titanium 0-0.2, iron bal.
 RL: TEM (Technical or engineered material use); USES (Uses)
 (~~steel~~ sheet with ferrite and bainite structure and plated ~~steel~~ sheet)
 RN 2176433-58-0 CAPLUS

CN Iron alloy, base, Fe 88-99, Mn 0.6-2.5, Cu 0-2, Ni 0-2, Si 0-1.7, Cr 0-1, Mo 0-1, Al 0-0.6, C 0-0.2, Nb 0-0.2, Ti 0-0.2, B 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	88 - 99	7439-89-6
Mn	0.6 - 2.5	7439-96-5
Cu	0 - 2	7440-50-8
Ni	0 - 2	7440-02-0
Si	0 - 1.7	7440-21-3
Cr	0 - 1	7440-47-3
Mo	0 - 1	7439-98-7
Al	0 - 0.6	7429-90-5
C	0 - 0.2	7440-44-0
Nb	0 - 0.2	7440-03-1
Ti	0 - 0.2	7440-32-6
B	0 - 0.1	7440-42-8

IPCI C22C0038-00 [I]; C22C0038-58 [I]; C21D0009-46 [N]

IPCR C22C0038-00 [I]; C21D0009-46 [N]; C22C0038-58 [I]

CC 55-1 (Ferrous Metals and Alloys)

ST ~~steel~~ sheet ferrite bainite structure

IT Automobile parts

Grain boundaries

Particle size

Plates

(~~steel~~ sheet with ferrite and bainite structure and plated

steel sheet)

IT 7440-66-6, Zinc, uses 12173-93-2, Martensite, uses 12427-23-5, Bainite

12427-24-6, Ferrite (ferrous metal component) 12427-27-9, Pearlite

12597-69-2, ~~Steel~~, uses 2176433-58-0, Aluminum

0.01-0.6, boron 0-0.1, carbon 0.008-0.2, chromium 0-1, copper 0-2,

manganese 0.6-2.5, molybdenum 0-1, nickel 0-2, niobium 0-0.2, silicon

0.01-1.7, titanium 0-0.2, iron bal.

RL: TEM (Technical or engineered material use); USES (Uses)

(~~steel~~ sheet with ferrite and bainite structure and plated

steel sheet)

L12 ANSWER 61 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2018:228265 CAPLUS Full-text

DOCUMENT NUMBER: 168:213107

TITLE: ~~Steel~~ sheet containing ferrite and bainite and
plated ~~steel~~ sheet

INVENTOR(S): Sano, Kohichi; Uno, Makoto; Nishiyama, Ryoichi;
Yamaguchi, Yuji; Sugiura, Natsuko; Nakata, Masahiro

PATENT ASSIGNEE(S): Nippon Steel & Sumitomo Metal Corporation, Japan

SOURCE: PCT Int. Appl., 55pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2018026013	A1	20180208	WO 2017-JP28472	20170804
JP 6354916	B2	20180711	JP 2017-562103	20170804
TW I629368	B	20180711	TW 2017-126480	20170804
KR 2019015539	A	20190213	KR 2019-7000428	20170804
CN 109477184	A	20190315	CN 2017-80046243	20170804
BR 112019001331	A2	20190507	BR 2019-112019001331	20170804
MX 2018016223	A	20190530	MX 2018-16223	20170804
EP 3495527	A1	20190612	EP 2017-837114	20170804
IN 201817047671	A	20190222	IN 2018-17047671	20181217
US 20190309398	A1	20191010	US 2019-16314945	20190103

PRIORITY APPLN. INFO.: JP 2016-155101 A 20160805
WO 2017-JP28472 W 20170804

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB The title ~~steel~~ sheet has a structure contg. ferrite 5-60 area% and
bainite 40-95 area%. The ~~steel~~ sheet comprises (by wt.): C
0.008-0.150, Si 0.01-1.70, Mn 0.60-2.50, Al 0.010-0.60, Ti 0-0.200, Nb

0-0.200, Ti+Nb 0.015-0.200, Cr 0-1.0, B 0-0.10, Mo 0-1.0, Cu 0-2.0, Ni 0-2.0, Mg 0-0.05, REM 0-0.05, Ca 0-0.05, Zr 0-0.05, P 0-0.05, S 0-0.0200, N 0-0.0060, and Fe and unavoidable impurities as balance. When a crystal grain is defined as a region which is surrounded by grain boundaries having a misorientation of 15° or higher and for which the equiv. circle diam. is 0.3 µm or larger, the proportion of crystal grains having an intragranular misorientation of 5-14° relative to all of the crystal grains is 20-100% in terms of area ratio. The ppt. d. of Ti (C, N) and Nb (C, N) particles having an equiv. circle diam. of 10 nm or smaller is at least 1010 particles/mm³. The ratio (Hvs/Hvc) of the hardness (Hvs) at a depth of 20 µm from the surface and the hardness (Hvc) at the center in terms of the sheet thickness is 0.85 or higher.

IT 2176433-58-0
 RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
 (steel sheet contg. ferrite and bainite and plated steel sheet)
 RN 2176433-58-0 CAPLUS
 CN Iron alloy, base, Fe 88-99, Mn 0.6-2.5, Cu 0-2, Ni 0-2, Si 0-1.7, Cr 0-1, Mo 0-1, Al 0-0.6, C 0-0.2, Nb 0-0.2, Ti 0-0.2, B 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	88 - 99	7439-89-6
Mn	0.6 - 2.5	7439-96-5
Cu	0 - 2	7440-50-8
Ni	0 - 2	7440-02-0
Si	0 - 1.7	7440-21-3
Cr	0 - 1	7440-47-3
Mo	0 - 1	7439-98-7
Al	0 - 0.6	7429-90-5
C	0 - 0.2	7440-44-0
Nb	0 - 0.2	7440-03-1
Ti	0 - 0.2	7440-32-6
B	0 - 0.1	7440-42-8

IPCI C22C0038-00 [I]; C22C0038-58 [I]; C21D0009-46 [N]

IPCR C22C0038-00 [I]; C21D0009-46 [N]; C22C0038-58 [I]

CC 55-3 (Ferrous Metals and Alloys)

ST steel sheet plating

IT Elongation, mechanical

Fatigue, mechanical

Sheet materials

Tensile strength

Vickers hardness

Yield strength

(steel sheet contg. ferrite and bainite and plated

steel sheet)

IT Galvanized steel

RL: PRP (Properties); TEM (Technical or engineered material use); USES

(Uses)

(steel sheet contg. ferrite and bainite and plated

steel sheet)

IT 2176433-58-0

RL: PRP (Properties); TEM (Technical or engineered material use); USES

(Uses)

(steel sheet contg. ferrite and bainite and plated

steel sheet)

IT 12427-23-5, Bainite 12427-24-6, Ferrite (ferrous metal component)

12627-33-7, Titanium carbide nitride 12687-87-5, Niobium carbide nitride

RL: TEM (Technical or engineered material use); USES (Uses)

(steel sheet contg. ferrite and bainite and plated

steel sheet)

L12 ANSWER 62 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2018:227877 CAPLUS Full-text

DOCUMENT NUMBER: 168:225093

TITLE: Low-carbon steel sheet and plated steel sheet for automobile parts

INVENTOR(S): Sano, Kohichi; Uno, Makoto; Nishiyama, Ryoichi;

PATENT ASSIGNEE(S): Yamaguchi, Yuji; Sugiura, Natsuko; Nakata, Masahiro
SOURCE: Nippon Steel & Sumitomo Metal Corporation, Japan
PCT Int. Appl., 47pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2018026016	A1	20180208	WO 2017-JP28481	20170804
JP 6354917	B2	20180711	JP 2017-562104	20170804
TW I649430	B	20190201	TW 2017-126476	20170804
KR 2019016099	A	20190215	KR 2019-7000765	20170804
BR 112019000306	A2	20190416	BR 2019-112019000306	20170804
CN 109642279	A	20190416	CN 2017-80046220	20170804
EP 3495530	A1	20190612	EP 2017-837117	20170804
MX 2019000577	A	20190704	MX 2019-577	20170804
IN 201817050008	A	20190329	IN 2018-17050008	20181231
US 20190241996	A1	20190808	US 2019-16314951	20190103
PRIORITY APPLN. INFO.:			JP 2016-155097	A 20160805
			WO 2017-JP28481	W 20170804

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB The present invention relates to a steel sheet having a specific chem. compn. and is provided with a structure represented by in terms of area ratio, 0-30% ferrite and 70-100% bainite. When a crystal grain is defined as a region which is surrounded by grain boundaries having a misorientation of 15° or high and for which the equiv. circle diam. is 0.3 μm or large, the proportion of crystal grains having an intragranular misorientation of 5-14° relative to all of the crystal grains is 20-100% in terms of area ratio. The grain boundary no. d. of a solid soln. of C, or the total grain boundary no. d. of a solid soln. of C and a solid soln. of B is 1 particle/nm² to 4.5 particles/nm² inclusive. The av. particle size of cementite pptd. in the grain boundaries is no larger than 2 μm.

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
KAWANO KAORI	2014			WO 2014014120 A1	CAPLUS
KOBAYASHI YUKIKO	2014			WO 2014002941 A1	CAPLUS
OTSUKA KAZUYA	2009			JP 2009019265 A	CAPLUS
SUGIURA NATSUKO	2008			WO 2008056812 A1	CAPLUS
YOKOI TATSUO	2008			WO 2008123366 A1	CAPLUS

IT 2178084-33-6

RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)

(low-carbon steel sheet and plated steel sheet for automobile parts)

RN 2178084-33-6 CAPLUS

CN Iron alloy, base, Fe 89-99, Mn 0.6-2.5, Cu 0-2, Ni 0-2, Si 0-1.7, Cr 0-1, Mo 0-1, Al 0-0.6, C 0-0.2, Nb 0-0.2, Ti 0-0.2, B 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	89 - 99	7439-89-6
Mn	0.6 - 2.5	7439-96-5
Cu	0 - 2	7440-50-8
Ni	0 - 2	7440-02-0
Si	0 - 1.7	7440-21-3
Cr	0 - 1	7440-47-3
Mo	0 - 1	7439-98-7
Al	0 - 0.6	7429-90-5
C	0 - 0.2	7440-44-0
Nb	0 - 0.2	7440-03-1
Ti	0 - 0.2	7440-32-6
B	0 - 0.1	7440-42-8

IPCI C22C0038-00 [I]; C22C0038-58 [I]; C21D0009-46 [N]

IPCR C22C0038-00 [I]; C21D0009-46 [N]; C22C0038-58 [I]

CC 55-3 (Ferrous Metals and Alloys)

ST carbon steel sheet plating automobile part
IT Automobile parts
Elongation, mechanical
Galvannealing
Grain size
Hot-dip galvanizing
Microstructure
Phase composition
Plating process
Sheet materials
Tensile strength
Yield strength
(low-carbon steel sheet and plated steel sheet for automobile parts)
IT 2178084-33-6
RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(low-carbon steel sheet and plated steel sheet for automobile parts)
OS.CITING REF COUNT: 1 THERE ARE 1 CAPLUS RECORDS THAT CITE THIS RECORD (1 CITINGS)

L12 ANSWER 63 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN
ACCESSION NUMBER: 2017:2019857 CAPLUS Full-text
DOCUMENT NUMBER: 169:78116
TITLE: Effect of the method of steel microalloying by titanium on its absorption rate
AUTHOR(S): Nazyuta, L. Yu.; Orlichenko, M. P.; Kostyrya, I. N.
CORPORATE SOURCE: GVUZ "PGTU", Ukraine
SOURCE: Metallurgicheskaya i Gornorudnaya Promyshlennost (2016), (4), 8-15
CODEN: MGPNAI; ISSN: 0543-5749
PUBLISHER: OOO Ukrmetallurginform "NTA"
DOCUMENT TYPE: Journal
LANGUAGE: Russian

AB Relevance of titan use as the microalloying element when smelting of high-quality steel is shown. In the conditions of PJSC "Azovstal Iron and Steel Works" dynamics of smelting of titaniferous steel over the last 5 years is analyzed. Basing on the anal. of theor. and exptl. studies, technol. of microalloying by titan of various steel grades, including low-carbon pipe steel (X70-X80), intermediate-carbon constructional (A514B) and low-silicon steel is analyzed (B431). Recovery extent of titan and influence of deoxidn. modes on it are analyzed. It is shown that for the purpose of decrease in waste of titan and increase of qual. indexes of low-carbon steel, its input should be performed after final deoxidn. of metal by aluminum in case of content in metal at least 0,022 % of acidsol. aluminum together with aluminum additive (in case of ratio of aluminum and titan at least 0,8 pieces). In case of prodn. of medium and high carbon steel, content of acid-sol. aluminum during titan introduction should be more than 0,012 %, and ratio of aluminum and calcium at least 1,2 pieces.

IT 52346-86-8P, A514B, preparation
RL: IMF (Industrial manufacture); PREP (Preparation)
(effect of method of steel microalloying by titanium on its absorption rate)
RN 52346-86-8 CAPLUS
CN Steel, (UNS K11630) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	97 - 98	7439-89-6
Mn	0.70 - 1.00	7439-96-5
Cr	0.40 - 0.65	7440-47-3
Si	0.20 - 0.35	7440-21-3
Mo	0.15 - 0.25	7439-98-7
C	0.12 - 0.21	7440-44-0
V	0.03 - 0.08	7440-62-2
S	0 - 0.04	7704-34-9
P	0 - 0.035	7723-14-0
Ti	0.01 - 0.03	7440-32-6

CC 55-1 (Ferrous Metals and Alloys)
 ST titanium ~~steel~~ microalloying absorption rate
 IT Absorption
 Microalloying
 Smelting
 (effect of method of ~~steel~~ microalloying by titanium on its
 absorption rate)
 IT 52346-86-8P, A514B, preparation 57621-31-5P, X70, preparation
 2229696-68-6P, B431, preparation
 RL: IMF (Industrial manufacture); PREP (Preparation)
 (effect of method of ~~steel~~ microalloying by titanium on its
 absorption rate)
 IT 7440-32-6, Titanium, uses
 RL: MOA (Modifier or additive use); USES (Uses)
 (effect of method of ~~steel~~ microalloying by titanium on its
 absorption rate)

L12 ANSWER 64 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2017:1596511 CAPLUS Full-text

DOCUMENT NUMBER: 167:461742

TITLE: High strength ~~steel~~ sheet and its manufacture for
 automobile parts

INVENTOR(S): Murata, Tadao; Murakami, Toshio; Kakiuchi, Elijah;
 Otani, Shigeo; Futamura, Yuichi

PATENT ASSIGNEE(S): Kabushiki Kaisha Kobe Seiko Sho (Kobe Steel, Ltd.),
 Japan

SOURCE: PCT Int. Appl., 41pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2017169329	A1	20171005	WO 2017-JP6608	20170222
JP 2017186647	A	20171012	JP 2016-253902	20161227
JP 6762868	B2	20200930		
CN 108779533	A	20181109	CN 2017-80017681	20170222
CN 108779533	B	20201103		
KR 2018125560	A	20181123	KR 2018-7030749	20170222
KR 2184257	B1	20201130		
MX 2018010467	A	20181129	MX 2018-10467	20170222
EP 3438309	A1	20190206	EP 2017-773875	20170222
US 20190071757	A1	20190307	US 2018-16082519	20180905
IN 201847040082	A	20181102	IN 2018-47040082	20181024
PRIORITY APPLN. INFO.:			JP 2016-72740	A 20160331
			JP 2016-253902	A 20161227
			WO 2017-JP6608	W 20170222

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB The high-strength ~~steel~~ sheet, characterized in that the component
 compn. thereof includes, in terms of mass%, carbon 0.15-0.35, a total of
 silicon and aluminum 0.5-2.5, manganese 1.0-4.0, phosphorous 0-0.05, and
 sulfur 0-0.01, the remainder comprising iron and unavoidable impurities,
 the ~~steel~~ structure thereof in terms of the ratio of the entire
 structure satisfies a ratio of more than 5 area% to no more than 50 area%
 ferrite, a total of at least 30 area% of tempered martensite and bainite,
 and at least 10 vol% residual austenite, and furthermore has MA, the av.
 circle-equiv. diam. of the MA being 1.0 µm or less, the av.
 circle-equiv. diam. of the residual austenite being 1.0 µm or less, and
 residual austenite having a circle-equiv. diam. of 1.5 µm or greater
 satisfies a vol. ratio of 5% or greater with respect to the total amt. of
 residual austenite.

IT 2135697-12-8P
 RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or
 engineered material use); PREP (Preparation); USES (Uses)
 (high strength ~~steel~~ sheet and its manuf. for automobile
 parts)

RN 2135697-12-8 CAPLUS

CN Iron alloy, base, Fe 92-98,Mn 1-4,Al 0-2.5,Si 0-2.5,B 0-1,Cr 0-1,Mo 0-1,Ni 0-1,C 0.2-0.4,Hf 0-0.2,Nb 0-0.2,Ti 0-0.2,V 0-0.2,Cu 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	92 - 98	7439-89-6
Mn	1 - 4	7439-96-5
Al	0 - 2.5	7429-90-5
Si	0 - 2.5	7440-21-3
B	0 - 1	7440-42-8
Cr	0 - 1	7440-47-3
Mo	0 - 1	7439-98-7
Ni	0 - 1	7440-02-0
C	0.2 - 0.4	7440-44-0
Hf	0 - 0.2	7440-58-6
Nb	0 - 0.2	7440-03-1
Ti	0 - 0.2	7440-32-6
V	0 - 0.2	7440-62-2
Cu	0 - 0.1	7440-50-8

IPCI C22C0038-00 [I]; C21D0009-48 [I]; C22C0038-06 [I]; C22C0038-58 [I]

IPCR C22C0038-00 [I]; C21D0009-48 [I]; C22C0038-06 [I]; C22C0038-58 [I]

CC 55-3 (Ferrous Metals and Alloys)

ST ~~steel~~ sheet strength manuf automobile part

IT Automobile parts

Casting of metals

Cold rolling

Cooling

Elongation, mechanical

Heating

Hot rolling

Melting

Microstructure

Pickling

Quenching (cooling)

Sheet materials

Tensile strength

Yield strength

(high strength ~~steel~~ sheet and its manuf. for automobile parts)

IT Forging

(hot; high strength ~~steel~~ sheet and its manuf. for automobile parts)

IT 2135697~12~8P

RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(high strength ~~steel~~ sheet and its manuf. for automobile parts)

OS.CITING REF COUNT: 2 THERE ARE 2 CAPLUS RECORDS THAT CITE THIS RECORD (2 CITINGS)

L12 ANSWER 65 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2017:1052138 CAPLUS Full-text

DOCUMENT NUMBER: 167:166695

TITLE: Formula of ~~steel~~ for military high-pressure gas cylinder

INVENTOR(S): Wu, Chuanmin; Xu, Jinyuan; Xu, Sangbo; Lu, Hongdi

PATENT ASSIGNEE(S): Zhejiang Jindun Firefighting Equipment Co., Ltd.,
Peop. Rep. China

SOURCE: Faming Zhuanli Shenqing, 7pp.

CODEN: CNXXEV

DOCUMENT TYPE: Patent

LANGUAGE: Chinese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
CN 106893935	A	20170627	CN 2017-10196443	20170329

PRIORITY APPLN. INFO.: CN 2017-10196443 20170329

AB The compn. of the ~~steel~~ for military high-pressure gas cylinder contains

C 0.30-0.37, Si ≤0.40, Mn 0.60-0.90, P ≤0.020, S ≤0.020, Cr 0.90-1.20, Ni ≤0.3, Mo 0.15-0.30, Cu ≤0.20, Nb+V+Ti+B+Zr ≤0.15wt% and Fe bal. The steel for military high-pressure gas cylinder has higher corrosion resistance, and is practical.

IT 2102689-28-9, Carbon 0.3-0.4, chromium 0.9-1.2, copper 0-0.2, iron bal., manganese 0.6-0.9, molybdenum 0.2-0.3, nickel 0-0.3, niobium 0-0.2, V 0-0.2, Ti 0-0.2, B 0-0.2, Zr 0-0.2, silicon 0-0.4
 RL: TEM (Technical or engineered material use); USES (Uses)
 (formula of steel for military high-pressure gas cylinder)

RN 2102689-28-9 CAPLUS

CN Iron alloy, base, Fe 95-98, Cr 0.9-1.2, Mn 0.6-0.9, C 0.3-0.4, Si 0-0.4, Mo 0.2-0.3, Ni 0-0.3, B 0-0.2, Cu 0-0.2, Nb 0-0.2, Ti 0-0.2, V 0-0.2, Zr 0-0.2 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	95 - 98	7439-89-6
Cr	0.9 - 1.2	7440-47-3
Mn	0.6 - 0.9	7439-96-5
C	0.3 - 0.4	7440-44-0
Si	0 - 0.4	7440-21-3
Mo	0.2 - 0.3	7439-98-7
Ni	0 - 0.3	7440-02-0
B	0 - 0.2	7440-42-8
Cu	0 - 0.2	7440-50-8
Nb	0 - 0.2	7440-03-1
Ti	0 - 0.2	7440-32-6
V	0 - 0.2	7440-62-2
Zr	0 - 0.2	7440-67-7

IPCI C22C0038-04; C22C0038-02; C22C0038-22; C22C0038-20; C22C0038-44;
 C22C0038-42; C22C0038-24; C22C0038-26; C22C0038-28; C22C0038-32;
 C22C0038-46; C22C0038-48; C22C0038-50; C22C0038-54

IPCR C22C0038-04 [I]; C22C0038-02 [I]; C22C0038-20 [I]; C22C0038-22 [I];
 C22C0038-24 [I]; C22C0038-26 [I]; C22C0038-28 [I]; C22C0038-32 [I];
 C22C0038-42 [I]; C22C0038-44 [I]; C22C0038-46 [I]; C22C0038-48 [I];
 C22C0038-50 [I]; C22C0038-54 [I]

CC 55-12 (Ferrous Metals and Alloys)

ST military high pressure gas cylinder steel corrosion resistance

IT Cylinders
 (gas; formula of steel for military high-pressure gas cylinder)

IT 2102689-28-9, Carbon 0.3-0.4, chromium 0.9-1.2, copper 0-0.2, iron bal., manganese 0.6-0.9, molybdenum 0.2-0.3, nickel 0-0.3, niobium 0-0.2, V 0-0.2, Ti 0-0.2, B 0-0.2, Zr 0-0.2, silicon 0-0.4
 RL: TEM (Technical or engineered material use); USES (Uses)
 (formula of steel for military high-pressure gas cylinder)

L12 ANSWER 66 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2017:1035509 CAPLUS Full-text

DOCUMENT NUMBER: 167:130838

TITLE: Carbon steel strips for reinforcing rubber motor vehicle tires

INVENTOR(S): Verleene, Arnaud

PATENT ASSIGNEE(S): Compagnie Generale des Etablissements Michelin, Fr.;
 Michelin Recherche et Technique S.A.

SOURCE: PCT Int. Appl., 32pp.; Chemical Indexing Equivalent to
 167:130837 (FR)
 CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: French

FAMILY ACC. NUM. COUNT: 2

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2017103516	A1	20170622	WO 2016-FR53485	20161216
FR 3045670	A1	20170623	FR 2015-62493	20151216
PRIORITY APPLN. INFO.:			FR 2015-62493	A 20151216

AB A narrow carbon steel strip with a very low carbon content, high

resistance in the cold-worked state, comprises, in wt.: 0.05-0.4% carbon; 0.5-4% manganese, 0.1-2.5% silicon, optionally 0-1.5% aluminum, 0-0.5% of each of B, Cr, Co, Cu, Mo, Ni, Nb, Ti, W, V, and/or Zr, and/or 0-0.05% of each of P, S, N, and/or rare earth metal, the remainder consisting of iron and inevitable impurities. The microstructure of the cold-worked carbon steel is primarily martensitic or ferritic-martensitic. The resistance of the strip is greater than 1200 MPa, and its elongation at break is 1-5%. The carbon steel strips may be used as reinforcement in rubber composites such as for motor vehicle tires.

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
=====	+	=====	=====	=====	=====
ARNAUD JEAN-CLAUDE	1992			WO 9214811 A1	CAPLUS
ARNAUD JEAN-CLAUDE	1997			WO 9726379 A1	CAPLUS
KUSINSKI GRZEGORZ J	2004			WO 2004046400 A1	CAPLUS
THOMAS GARETH	1986			WO 8601231 A1	CAPLUS

IT 2101768-32-3P

RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(strips; carbon steel strips for reinforcing rubber motor vehicle tires)

RN 2101768-32-3 CAPLUS

CN Iron alloy, base, Fe 86-99, Mn 0.5-4, Si 0.1-2.5, Al 0-1.5, B 0-0.5, Co 0-0.5, Cr 0-0.5, Cu 0-0.5, Mo 0-0.5, Nb 0-0.5, Ni 0-0.5, Ti 0-0.5, V 0-0.5, W 0-0.5, Zr 0-0.5, C 0-0.4 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
=====	=====	=====
Fe	86 - 99	7439-89-6
Mn	0.5 - 4	7439-96-5
Si	0.1 - 2.5	7440-21-3
Al	0 - 1.5	7429-90-5
B	0 - 0.5	7440-42-8
Co	0 - 0.5	7440-48-4
Cr	0 - 0.5	7440-47-3
Cu	0 - 0.5	7440-50-8
Mo	0 - 0.5	7439-98-7
Nb	0 - 0.5	7440-03-1
Ni	0 - 0.5	7440-02-0
Ti	0 - 0.5	7440-32-6
V	0 - 0.5	7440-62-2
W	0 - 0.5	7440-33-7
Zr	0 - 0.5	7440-67-7
C	0 - 0.4	7440-44-0

IPCI C21D0007-10 [I]; B32B0015-06 [I]; C21D0009-34 [I]; C21D0009-52 [I];
D07B0001-06 [I]; C22C0038-02 [I]; C22C0038-04 [I]; C22C0038-18 [I];
B21B0001-28 [I]; C21D0009-46 [I]

IPCR C21D0007-10 [I]; B21B0001-28 [I]; B32B0015-06 [I]; C21D0009-34 [I];
C21D0009-46 [I]; C21D0009-52 [I]; C22C0038-02 [I]; C22C0038-04 [I];
C22C0038-18 [I]; D07B0001-06 [I]

CC 55-3 (Ferrous Metals and Alloys)

Section cross-reference(s): 39

ST carbon steel strip reinforced rubber tire

IT Tires

(carbon steel strips for reinforcing rubber motor vehicle tires)

IT Synthetic rubber

RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(carbon steel-reinforced; carbon steel strips for reinforcing rubber motor vehicle tires)

IT 2101768-32-3P

RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(strips; carbon steel strips for reinforcing rubber motor vehicle tires)

ACCESSION NUMBER: 2017:1035507 CAPLUS Full-text
 DOCUMENT NUMBER: 167:130837
 TITLE: Carbon ~~steel~~ strips for reinforcing rubber motor vehicle tires
 INVENTOR(S): Verleene, Arnaud
 PATENT ASSIGNEE(S): Compagnie Generale des Etablissements Michelin, Fr.; Michelin Recherche et Technique S.A.
 SOURCE: Fr. Demande, 29pp.; Chemical Indexing Equivalent to 167:130838 (WO)
 CODEN: FRXXBL
 DOCUMENT TYPE: Patent
 LANGUAGE: French
 FAMILY ACC. NUM. COUNT: 2
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
FR 3045670	A1	20170623	FR 2015-62493	20151216
WO 2017103516	A1	20170622	WO 2016-FR53485	20161216
PRIORITY APPLN. INFO.:			FR 2015-62493	A 20151216

AB A narrow carbon ~~steel~~ strip with a very low carbon content, high resistance in the cold-worked state, comprises, in wt.: 0.05-0.4% carbon; 0.5-4% manganese, 0.1-2.5% silicon, optionally 0-1.5% aluminum, 0-0.5% of each of B, Cr, Co, Cu, Mo, Ni, Nb, Ti, W, V, and/or Zr, and/or 0-0.05% of each of P, S, N, and/or rare earth metal, the remainder consisting of iron and inevitable impurities. The microstructure of the cold-worked carbon ~~steel~~ is primarily martensitic or ferritic-martensitic. The resistance of the strip is greater than 1200 MPa, and its elongation at break is 1-5%. The carbon ~~steel~~ strips may be used as reinforcement in rubber composites such as for motor vehicle tires.

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
ARNAUD JEAN-CLAUDE	1992			WO 9214811 A1	CAPLUS
ARNAUD JEAN-CLAUDE	1997			WO 9726379 A1	CAPLUS
KUSINSKI GRZEGORZ J	2004			WO 2004046400 A1	CAPLUS
THOMAS GARETH	1986			WO 8601231 A1	CAPLUS

IT 2101768-32-3P

RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
 (strips; carbon ~~steel~~ strips for reinforcing rubber motor vehicle tires)

RN 2101768-32-3 CAPLUS

CN Iron alloy, base, Fe 86-99, Mn 0.5-4, Si 0.1-2.5, Al 0-1.5, B 0-0.5, Co 0-0.5, Cr 0-0.5, Cu 0-0.5, Mo 0-0.5, Nb 0-0.5, Ni 0-0.5, Ti 0-0.5, V 0-0.5, W 0-0.5, Zr 0-0.5, C 0-0.4 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	86 - 99	7439-89-6
Mn	0.5 - 4	7439-96-5
Si	0.1 - 2.5	7440-21-3
Al	0 - 1.5	7429-90-5
B	0 - 0.5	7440-42-8
Co	0 - 0.5	7440-48-4
Cr	0 - 0.5	7440-47-3
Cu	0 - 0.5	7440-50-8
Mo	0 - 0.5	7439-98-7
Nb	0 - 0.5	7440-03-1
Ni	0 - 0.5	7440-02-0
Ti	0 - 0.5	7440-32-6
V	0 - 0.5	7440-62-2
W	0 - 0.5	7440-33-7
Zr	0 - 0.5	7440-67-7
C	0 - 0.4	7440-44-0

IPCI C22C0038-04 [I]; B32B0025-04 [I]; B60C0009-18 [I]; B60C0001-00 [I]
 IPCR C22C0038-04 [I]; B32B0025-04 [I]; B60C0001-00 [I]; B60C0009-18 [I]

CC 55-3 (Ferrous Metals and Alloys)
 Section cross-reference(s): 39

ST carbon ~~steel~~ strip reinforced rubber tire

IT Tires
(carbon ~~steel~~ strips for reinforcing rubber motor vehicle
tires)

IT Synthetic rubber
RL: IMF (Industrial manufacture); TEM (Technical or engineered material
use); PREP (Preparation); USES (Uses)
(carbon ~~steel~~-reinforced; carbon ~~steel~~ strips for
reinforcing rubber motor vehicle tires)

IT 2101768-32-3P
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or
engineered material use); PREP (Preparation); USES (Uses)
(strips; carbon ~~steel~~ strips for reinforcing rubber motor
vehicle tires)

L12 ANSWER 68 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN
ACCESSION NUMBER: 2017:1034863 CAPLUS Full-text
DOCUMENT NUMBER: 167:130836
TITLE: Tire reinforced by a carbon ~~steel~~ strip
INVENTOR(S): Verleene, Arnaud
PATENT ASSIGNEE(S): Compagnie Generale des Etablissements Michelin, Fr.;
Michelin Recherche et Technique S.A.
SOURCE: Fr. Demande, 29pp.; Chemical Indexing Equivalent to
167:116100 (WO)
CODEN: FRXXBL

DOCUMENT TYPE: Patent
LANGUAGE: French
FAMILY ACC. NUM. COUNT: 2

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
FR 3045671	A1	20170623	FR 2015-62495	20151216
FR 3045671	B1	20171208		
WO 2017103515	A1	20170622	WO 2016-FR53484	20161216
EP 3390675	A1	20181024	EP 2016-825529	20161216
US 20200290401	A1	20200917	US 2018-16062765	20180615
PRIORITY APPLN. INFO.:			FR 2015-62495	A 20151216
			WO 2016-FR53484	W 20161216

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB A motor vehicle tire is reinforced by at least one carbon ~~steel~~ strip
that has a low carbon content and high resistance in the cold-worked
state. The ~~steel~~ comprises (in % by wt.) 0.05-0.4% carbon, 0.5-4%
manganese, 0.1-2.5% silicon, optionally 0-1.5% aluminum, 0-0.5% of each of
boron, chromium, cobalt, copper, molybdenum, nickel, niobium, titanium,
tungsten, vanadium, zirconium, and 0-0.05% of each of phosphorus, sulfur,
nitrogen or rare earth metal, the remainder consisting of iron and
inevitable impurities resulting from the process. The microstructure of
the cold-worked carbon ~~steel~~ is primarily martensitic or
ferritic-martensitic; the tensile strength of the strip is >1200 MPa, and
its elongation at break is 1-5%.

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
ARNAUD JEAN-CLAUDE	1992			WO 9214811 A1	CAPLUS
ARNAUD JEAN-CLAUDE	1997			WO 9726379 A1	CAPLUS
KUSINSKI GRZEGORZ J	2004			WO 2004046400 A1	CAPLUS
OBLATH RICHARD MICHAEL	1985			EP 0157716 A1	
THOMAS GARETH	1986			WO 8601231 A1	CAPLUS

IT 2101768-32-3
RL: PRP (Properties); TEM (Technical or engineered material use); USES
(Uses)
(tire reinforced by carbon ~~steel~~ strip)

RN 2101768-32-3 CAPLUS

CN Iron alloy, base, Fe 86-99, Mn 0.5-4, Si 0.1-2.5, Al 0-1.5, B 0-0.5, Co
0-0.5, Cr 0-0.5, Cu 0-0.5, Mo 0-0.5, Nb 0-0.5, Ni 0-0.5, Ti 0-0.5, V 0-0.5, W
0-0.5, Zr 0-0.5, C 0-0.4 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	86 - 99	7439-89-6

Mn	0.5	-	4	7439-96-5
Si	0.1	-	2.5	7440-21-3
Al	0	-	1.5	7429-90-5
B	0	-	0.5	7440-42-8
Co	0	-	0.5	7440-48-4
Cr	0	-	0.5	7440-47-3
Cu	0	-	0.5	7440-50-8
Mo	0	-	0.5	7439-98-7
Nb	0	-	0.5	7440-03-1
Ni	0	-	0.5	7440-02-0
Ti	0	-	0.5	7440-32-6
V	0	-	0.5	7440-62-2
W	0	-	0.5	7440-33-7
Zr	0	-	0.5	7440-67-7
C	0	-	0.4	7440-44-0

IPCI C22C0038-04 [I]; B32B0025-04 [I]; B60C0009-18 [I]; B60C0001-00 [I]
 IPCR C22C0038-04 [I]; B32B0025-04 [I]; B60C0001-00 [I]; B60C0009-18 [I]
 CC 55-3 (Ferrous Metals and Alloys)
 Section cross-reference(s): 39
 ST tire reinforced carbon ~~steel~~ strip mech property
 IT Microstructure
 Tire cords
 (tire reinforced by carbon ~~steel~~ strip)
 IT 2101768-32-3
 RL: PRP (Properties); TEM (Technical or engineered material use); USES
 (Uses)
 (tire reinforced by carbon ~~steel~~ strip)

L12 ANSWER 69 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN
 ACCESSION NUMBER: 2017:1034861 CAPLUS Full-text
 DOCUMENT NUMBER: 167:116100
 TITLE: Tire reinforced by a carbon ~~steel~~ strip
 INVENTOR(S): Verleene, Arnaud
 PATENT ASSIGNEE(S): Compagnie Generale des Etablissements Michelin, Fr.;
 Michelin Recherche et Technique S.A.
 SOURCE: PCT Int. Appl., 34pp.; Chemical Indexing Equivalent to
 167:130836 (FR)
 CODEN: PIXXD2
 DOCUMENT TYPE: Patent
 LANGUAGE: French
 FAMILY ACC. NUM. COUNT: 2
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2017103515	A1	20170622	WO 2016-FR53484	20161216
FR 3045671	A1	20170623	FR 2015-62495	20151216
FR 3045671	B1	20171208		
EP 3390675	A1	20181024	EP 2016-825529	20161216
US 20200290401	A1	20200917	US 2018-16062765	20180615
PRIORITY APPLN. INFO.:			FR 2015-62495	A 20151216
			WO 2016-FR53484	W 20161216

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB Disclosed is a motor vehicle tire reinforced by at least one carbon ~~steel~~ strip that has a low carbon content and high resistance in the cold-worked state. The ~~steel~~ comprises (in % by wt.) 0.05% to 0.4% carbon, 0.5% to 4% manganese, 0.1% to 2.5% silicon, optionally (i) \<1.5% aluminum, (ii) \<0.5% of each of the metals boron, chromium, cobalt, copper, molybdenum, nickel, niobium, titanium, tungsten, vanadium, zirconium, et (iii) \<0.05% of each of the elements phosphorus, sulfur, nitrogen or rare earth metal, the remainder consisting of iron and inevitable impurities resulting from the process. The microstructure of the cold-worked carbon ~~steel~~ is primarily martensitic or ferritic-martensitic; the tensile strength Rm of the strip is greater than 1200 MPa, and its elongation at break At ranges from 1% to 5%.

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
ARNAUD JEAN-CLAUDE	1992			WO 9214811 A1	CAPLUS
ARNAUD JEAN-CLAUDE	1997			WO 9726379 A1	CAPLUS

KUSINSKI GRZEGORZ J | 2004 | | | WO 2004046400 A1 | CAPLUS
OBLATH RICHARD MICHAEL | 1985 | | | EP 0157716 A1 |
THOMAS GARETH | 1986 | | | WO 8601231 A1 | CAPLUS
IT 2101768-32-3
RL: PRP (Properties); TEM (Technical or engineered material use); USES
(Uses)
(tire reinforced by carbon steel strip)
RN 2101768-32-3 CAPLUS
CN Iron alloy, base, Fe 86-99, Mn 0.5-4, Si 0.1-2.5, Al 0-1.5, B 0-0.5, Co
0-0.5, Cr 0-0.5, Cu 0-0.5, Mo 0-0.5, Nb 0-0.5, Ni 0-0.5, Ti 0-0.5, V 0-0.5, W
0-0.5, Zr 0-0.5, C 0-0.4 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	86 - 99	7439-89-6
Mn	0.5 - 4	7439-96-5
Si	0.1 - 2.5	7440-21-3
Al	0 - 1.5	7429-90-5
B	0 - 0.5	7440-42-8
Co	0 - 0.5	7440-48-4
Cr	0 - 0.5	7440-47-3
Cu	0 - 0.5	7440-50-8
Mo	0 - 0.5	7439-98-7
Nb	0 - 0.5	7440-03-1
Ni	0 - 0.5	7440-02-0
Ti	0 - 0.5	7440-32-6
V	0 - 0.5	7440-62-2
W	0 - 0.5	7440-33-7
Zr	0 - 0.5	7440-67-7
C	0 - 0.4	7440-44-0

IPCI C21D0007-10 [I]; B60C0009-00 [I]; B21B0001-28 [I]; B32B0015-06 [I];
C21D0009-34 [I]; C21D0009-46 [I]; C21D0009-52 [I]; D07B0001-06 [I];
C22C0038-02 [I]; C22C0038-04 [I]; C22C0038-18 [I]
IPCR C21D0007-10 [I]; B21B0001-28 [I]; B32B0015-06 [I]; B60C0009-00 [I];
C21D0009-34 [I]; C21D0009-46 [I]; C21D0009-52 [I]; C22C0038-02 [I];
C22C0038-04 [I]; C22C0038-18 [I]; D07B0001-06 [I]

CC 55-3 (Ferrous Metals and Alloys)
ST tire reinforced carbon steel strip mech property
IT Mechanical properties
Microstructure
Tire cords
(tire reinforced by carbon steel strip)

IT 2101768-32-3
RL: PRP (Properties); TEM (Technical or engineered material use); USES
(Uses)
(tire reinforced by carbon steel strip)

L12 ANSWER 70 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2017:848898 CAPLUS Full-text
TITLE: Contact Fatigue Resistance of Carburized Gears from
Chromium-Nickel Steels
AUTHOR(S): Rudenko, S. P.; Val'ko, A. L.
CORPORATE SOURCE: United Institute for Mechanical Engineering, National
Academy of Sciences of Belarus, Minsk, Belarus
SOURCE: Metal Science and Heat Treatment (2017), 59(1-2),
60-64
CODEN: MHTRAN; ISSN: 0026-0673
DIGITAL OBJECT ID: 10.1007/s11041-017-0103-3
PUBLISHER: Springer
DOCUMENT TYPE: Journal; (online computer file)
LANGUAGE: English

AB The contact fatigue resistance of carburized gears produced from
chromium-nickel steels is studied. The curves of deep contact fatigue of
the material of the gears are plotted in terms of the criterion of
equality of the characteristics of diffusion layers. An expression for
ultimate deep contact fatigue resistance of carburized gears is derived.

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
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=====+=====+=====+=====+=====+=====
Anon      |      |      |      | A A Susin, Thermoche|
Anon      |      |      |      | A I Petrusevich, Con|
Anon      |      |      |      | A N Utkina, Yu Yu Ch|
Anon      |      |      |      | B A Balashov, R R Ga|
Anon      |      |      |      | B V Gold, E P Obolen|
Anon      |      |      |      | E B Vulgakov (ed.), |
Anon      |      |      |      | E I Tesker, Advanced|
Anon      |      |      |      | N M Ryzhov, "Technol|
Anon      |      |      |      | S P Rudenko and A L |
Anon      |      |      |      | S P Rudenko, "A stud|
Anon      |      |      |      | S P Rudenko, "Comput|
Anon      |      |      |      | S P Rudenko, "Fatigu|
Anon      |      |      |      | S P Rudenko, A L Val|
Anon      |      |      |      | V E Antonyuk, B V Iv|
Anon      |      |      |      | Yu S Eliseev, V V Kr|

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IT INDEXING IN PROGRESS

IT 37312-00-8

RL: PEP (Physical, engineering or chemical process); PRP (Properties);
PROC (Process)

(contact fatigue resistance of carburized gears from chromium-nickel
steels)

RN 37312-00-8 CAPLUS

CN Iron alloy, base, Fe 95-97, Ni 0.80-1.10, Cr 0.70-1.10, Mn 0.70-1.00, Si
0.17-0.37, Cu 0-0.30, C 0.16-0.23, W 0-0.20, Mo 0-0.15, V 0-0.05, P 0-0.035, S
0-0.035, Ti 0-0.03, B 0.001 (20KhGMR) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	95 - 97	7439-89-6
Ni	0.80 - 1.10	7440-02-0
Cr	0.70 - 1.10	7440-47-3
Mn	0.70 - 1.00	7439-96-5
Si	0.17 - 0.37	7440-21-3
Cu	0 - 0.30	7440-50-8
C	0.16 - 0.23	7440-44-0
W	0 - 0.20	7440-33-7
Mo	0 - 0.15	7439-98-7
V	0 - 0.05	7440-62-2
P	0 - 0.035	7723-14-0
S	0 - 0.035	7704-34-9
Ti	0 - 0.03	7440-32-6
B	0.001	7440-42-8

CC 55-7 (Ferrous Metals and Alloys)

ST chromium nickel steel carburized gear contact fatigue resistance

IT Diffusion

Fatigue resistance

Gears

Microhardness

Microstructure

(contact fatigue resistance of carburized gears from chromium-nickel
steels)

IT 12681-03-7 12742-08-4 37312-00-8 39411-21-7

RL: PEP (Physical, engineering or chemical process); PRP (Properties);
PROC (Process)

(contact fatigue resistance of carburized gears from chromium-nickel
steels)

L12 ANSWER 71 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2017:342418 CAPLUS Full-text

DOCUMENT NUMBER: 166:297159

TITLE: Method for manufacturing steel plate with aluminum
or aluminum alloy coating by hot stamping

INVENTOR(S): Liu, Xin; Hong, Zhenjun; Tan, Ning; Jin, Xinyan; Liu,
Junxiang; Hong, Jiayao

PATENT ASSIGNEE(S): Baoshan Iron & Steel Co., Ltd., Peop. Rep. China

SOURCE: Faming Zhuanli Shenqing, 15pp.

CODEN: CNXXEV

DOCUMENT TYPE: Patent

LANGUAGE: Chinese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
CN 106466697	A	20170301	CN 2016-10664566	20160812
CN 106466697	B	20200131		

PRIORITY APPLN. INFO.: CN 2016-10664566 20160812

AB The invention discloses a manuf. method of ~~steel~~ plate, which comprises the following steps: blanking the ~~steel~~ plate with aluminum or aluminum alloy coating by blanking or laser cutting, induction heating, hot stamping in die, and cooling. The temp. and time of heating are detd. by the thickness of ~~steel~~ plate. The components of the ~~steel~~ plate is as follows: C 0.08-0.8%, Si 0.05-1.0%, Mn 0.1-5%, P<0.3%, S<0.1%, Al<0.3%, Ti<0.5%, B 0.0005-0.1%, Cr 0.01-3%, and balance of Fe and inevitable impurities. The coating comprises alloy layer, aluminum enriched intermetallic compd. layer, intermediate layer and surface layer. The components of the alloy layer is Si 0-6%, Fe 75-96%, Al 2-12%; the components of the aluminum enriched intermetallic compd. layer is Si 0-2%, Fe 30-50%, Al 40-60%; the components of the intermediate layer is Si 2-6%, Fe 50-65%, Al 20-35%; and the components of the surface layer is Si 2-6%, Fe 50-65%, Al 20-35%. The product has high strength, complex shape, good formability, high precision, and small springback, which can be used for automobile parts such as bumper, pillar reinforced plate, floor inside passage, and stiffening beam, etc..

IT 2067242-22-0P, Aluminum 0-0.3, boron 0-0.1, carbon 0.1-0.8, chromium 0-3, manganese 0.1-5, phosphorus 0-0.3, silicon 0-1, sulfur 0-0.1, titanium 0-0.5, iron bal.
RL: IMF (Industrial manufacture); PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PREP (Preparation); PROC (Process); USES (Uses)

(method for manufg. ~~steel~~ plate with aluminum or aluminum alloy coating by hot stamping)

RN 2067242-22-0 CAPLUS

CN Iron alloy, base, Fe 89-100, Mn 0.1-5, Cr 0-3, Si 0-1, C 0.1-0.8, Ti 0-0.5, Al 0-0.3, P 0-0.3, B 0-0.1, S 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	89 - 100	7439-89-6
Mn	0.1 - 5	7439-96-5
Cr	0 - 3	7440-47-3
Si	0 - 1	7440-21-3
C	0.1 - 0.8	7440-44-0
Ti	0 - 0.5	7440-32-6
Al	0 - 0.3	7429-90-5
P	0 - 0.3	7723-14-0
B	0 - 0.1	7440-42-8
S	0 - 0.1	7704-34-9

IPCI B21D0053-88; C22C0038-02; C22C0038-04; C22C0038-06; C22C0038-32; C22C0038-60; C23C0002-12; C23C0002-40

IPCR B21D0053-88 [I]; C22C0038-02 [I]; C22C0038-04 [I]; C22C0038-06 [I]; C22C0038-32 [I]; C22C0038-60 [I]; C23C0002-12 [I]; C23C0002-40 [I]

CC 55-1 (Ferrous Metals and Alloys)

ST hot stamping aluminum alloy ~~steel~~ plate coating manuf

IT Coating materials

Cooling

Induction heating

Industrial manufacturing

Laser cutting

Quenching (cooling)

Transmissions (mechanical)

(method for manufg. ~~steel~~ plate with aluminum or aluminum alloy coating by hot stamping)

IT Metalworking

(stamping, hot; method for manufg. ~~steel~~ plate with aluminum or aluminum alloy coating by hot stamping)

IT 2067242-22-0P, Aluminum 0-0.3, boron 0-0.1, carbon 0.1-0.8, chromium 0-3, manganese 0.1-5, phosphorus 0-0.3, silicon 0-1, sulfur 0-0.1, titanium 0-0.5, iron bal. 2087430-40-6P, Aluminum 2-12, iron

75-96, silicon 0-6 2087430-41-7P, Aluminum 40-60, iron 30-50, silicon 0-2 2087430-42-8P, Aluminum 20-35, iron 50-65, silicon 2-6
 RL: IMF (Industrial manufacture); PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PREP (Preparation); PROC (Process); USES (Uses)
 (method for manufg. ~~steel~~ plate with aluminum or aluminum alloy coating by hot stamping)
 IT 2087430-39-3, Iron 0-4, silicon 5-11, Aluminum bal.
 RL: PEP (Physical, engineering or chemical process); PROC (Process)
 (method for manufg. ~~steel~~ plate with aluminum or aluminum alloy coating by hot stamping)
 IT 7429-90-5, Aluminum, processes
 RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (method for manufg. ~~steel~~ plate with aluminum or aluminum alloy coating by hot stamping)

L12 ANSWER 72 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2017:227313 CAPLUS Full-text
 DOCUMENT NUMBER: 166:249360
 TITLE: Hot rolled ~~steel~~ sheet and its manufacture for automobile parts
 INVENTOR(S): Sakakibara, Chikami; Sugiura, Natsuko; Tanaka, Yasuaki; Tanei, Hiroshi; Fujii, Takashi; Yokoyama, Takashi
 PATENT ASSIGNEE(S): Nippon Steel & Sumitomo Metal Corporation, Japan
 SOURCE: Jpn. Kokai Tokkyo Koho, 16pp.
 CODEN: JKXXAF
 DOCUMENT TYPE: Patent
 LANGUAGE: Japanese
 FAMILY ACC. NUM. COUNT: 2
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2017031454	A	20170209	JP 2015-150831	20150730
JP 6620446	B2	20191218		
WO 2017022025	A1	20170209	WO 2015-JP71845	20150731
PRIORITY APPLN. INFO.:			JP 2015-150831	TO 20150730

AB To provide hot-rolled ~~steel~~ plate excellent in pickling property and without an increase in equipment cost, generation of internal oxide layer of a high strength hot rolled ~~steel~~ sheet contg. relatively large amts. of Si and Mn is suppressed, and method for manufg. thereof. Hot-rolled ~~steel~~ plate comprises C: 0.04-0.6%, Si: 0.01-3%, Mn: 0.1-5%, P: 0.04% or less, S: 0.05% or less, Al: 0.001-2%, N: 0.01% or less, O: 0.01% or less, one or more of Sb, Sn and Te: total amt. of 0.01-0.3% and remainder of Fe and unavoidable impurities, and has thickness of the internal oxide layer of 5 µm or less, a concd. layer of Sb, Sn and Te as an upper layer of the internal oxide layer, and has mech. properties with a tensile strength of 590 MPa or more.

IT 2079034-18-5P
 RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
 (high strength hot rolled ~~steel~~ sheet and its manuf. for automobile parts)

RN 2079034-18-5 CAPLUS

CN Iron alloy, base, Fe 80-100, Mn 0.1-5, Si 0-3, Al 0-2, Cr 0-2, Cu 0-2, Ni 0-2, Mo 0-1, C 0-0.6, Nb 0-0.3, Sb 0-0.3, Sn 0-0.3, Te 0-0.3, Ti 0-0.3, V 0-0.3, B 0-0.1
 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	80 - 100	7439-89-6
Mn	0.1 - 5	7439-96-5
Si	0 - 3	7440-21-3
Al	0 - 2	7429-90-5
Cr	0 - 2	7440-47-3
Cu	0 - 2	7440-50-8
Ni	0 - 2	7440-02-0
Mo	0 - 1	7439-98-7
C	0 - 0.6	7440-44-0

Nb	0	-	0.3	7440-03-1
Sb	0	-	0.3	7440-36-0
Sn	0	-	0.3	7440-31-5
Te	0	-	0.3	13494-80-9
Ti	0	-	0.3	7440-32-6
V	0	-	0.3	7440-62-2
B	0	-	0.1	7440-42-8

IPCI C22C0038-00 [I]; C22C0038-60 [I]; C21D0009-46 [I]; C22C0038-00 [I];
C22C0038-60 [I]; C21D0009-46 [I]

IPCR C22C0038-00 [I]; C21D0009-46 [I]; C22C0038-60 [I]

CC 55-3 (Ferrous Metals and Alloys)

ST hot rolled ~~steel~~ sheet manuf automobile part

IT Automobile parts

Casting of metals

Hot rolling

Melting

Microstructure

Pickling

Sheet materials

Tensile strength

(high strength hot rolled ~~steel~~ sheet and its manuf. for
automobile parts)

IT 2079034-18-5P

RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or
engineered material use); PREP (Preparation); USES (Uses)

(high strength hot rolled ~~steel~~ sheet and its manuf. for
automobile parts)

OS.CITING REF COUNT: 1 THERE ARE 1 CAPLUS RECORDS THAT CITE THIS RECORD
(1 CITINGS)

L12 ANSWER 73 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2017:100416 CAPLUS Full-text

DOCUMENT NUMBER: 166:179501

TITLE: ~~Steel~~ welding part with aluminum or aluminum alloy
plating layer and manufacture method thereof

INVENTOR(S): Pan, Hua; Su, Yongchao; Lei, Ming; Shi, Lei; Jiang,
Haomin

PATENT ASSIGNEE(S): Baoshan Iron & Steel Co., Ltd., Peop. Rep. China

SOURCE: Faming Zhuanli Shenqing, 8pp.

CODEN: CNXXEV

DOCUMENT TYPE: Patent

LANGUAGE: Chinese

FAMILY ACC. NUM. COUNT: 2

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
CN 106334875	A	20170118	CN 2016-10953787	20161027
WO 2018077067	A1	20180503	WO 2017-CN106516	20171017
MX 2019004121	A	20190606	MX 2019-4121	20171017
KR 2019069471	A	20190619	KR 2019-7013481	20171017
EP 3533558	A1	20190904	EP 2017-864438	20171017
JP 2019535894	T	20191212	JP 2019-520992	20171017
US 20200038998	A1	20200206	US 2019-16339215	20190403
IN 201917015151	A	20190719	IN 2019-17015151	20190415
PRIORITY APPLN. INFO.:			CN 2016-10953787	A 20161027
			WO 2017-CN106516	W 20171017

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB The invention discloses a ~~steel~~ welding part with aluminum or aluminum alloy plating layer and manuf. method thereof. The ~~steel~~ welding part with aluminum or aluminum alloy plating layer comprises a ~~steel~~ substrate and a plating layer, the plating layer comprises an intermetallic compd. alloy layer in contact with the substrate, and a metal alloy layer thereon; which is characterized in that on at least one of the plated surfaces of the weld blank, the plating layer located in the area to be welded of the weld blank is completely removed, and the end face of the welding blank part plating layer removed the region to be welded is perpendicular to the surface of the substrate which is parallel to weld seam to form an included angle β , and the included angle $\beta = 0-80^\circ$. A method of manufg. ~~steel~~ welding part with aluminum or aluminum alloy plating layer is characterized in that it

includes the steps of: obtaining weld blank by welding according to the requirements of ~~steel~~ welding part with aluminum or aluminum alloy plating layer, welding the area to be welded of the weld blank where the plating layer has been completely removed to form a welded joint; obtaining a part by hot stamping, selecting a cooling rate which is greater than the crit. transformation speed of the matrix martensite quenching, and cooling. This invention ensures tensile strength, elongation rate and corrosion resistance of welding joint after hot stamping.

IT 2067242-22-0, Aluminum 0-0.3, boron 0-0.1, carbon 0.1-0.8, chromium 0-3, manganese 0.1-5, phosphorus 0-0.3, silicon 0-1, sulfur 0-0.1, titanium 0-0.5, iron bal.
 RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (~~steel~~ welding part with aluminum or aluminum alloy plating layer and manuf. method thereof)

RN 2067242-22-0 CAPLUS

CN Iron alloy, base, Fe 89-100, Mn 0.1-5, Cr 0-3, Si 0-1, C 0.1-0.8, Ti 0-0.5, Al 0-0.3, P 0-0.3, B 0-0.1, S 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	89 - 100	7439-89-6
Mn	0.1 - 5	7439-96-5
Cr	0 - 3	7440-47-3
Si	0 - 1	7440-21-3
C	0.1 - 0.8	7440-44-0
Ti	0 - 0.5	7440-32-6
Al	0 - 0.3	7429-90-5
P	0 - 0.3	7723-14-0
B	0 - 0.1	7440-42-8
S	0 - 0.1	7704-34-9

IPCI B23K0026-32; C22C0038-04; C22C0038-02; C22C0038-06; C22C0038-14;
 C22C0038-18; C23C0002-12; B23K0103-20

IPCR B23K0026-32 [I]; B23K0103-20 [N]; C22C0038-02 [I]; C22C0038-04 [I];
 C22C0038-06 [I]; C22C0038-14 [I]; C22C0038-18 [I]; C23C0002-12 [I]

CC 56-9 (Nonferrous Metals and Alloys)
 Section cross-reference(s): 47

ST ~~steel~~ welding part aluminum alloy plating layer

IT Metalworking
 (stamping, hot; ~~steel~~ welding part with aluminum or aluminum alloy plating layer and manuf. method thereof)

IT Corrosion-resistant materials
 Industrial manufacturing
 Joints, mechanical
 Laser ablation
 Laser welding
 Plating process
 Welding apparatus
 Welds
 (~~steel~~ welding part with aluminum or aluminum alloy plating layer and manuf. method thereof)

IT 12003-42-8 12004-62-5 12043-58-2
 RL: FMU (Formation, unclassified); FORM (Formation, nonpreparative)
 (~~steel~~ welding part with aluminum or aluminum alloy plating layer and manuf. method thereof)

IT 1273096-81-3P, Aluminum alloy
 RL: IMF (Industrial manufacture); PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PREP (Preparation);
 PROC (Process); USES (Uses)
 (~~steel~~ welding part with aluminum or aluminum alloy plating layer and manuf. method thereof)

IT 2067242-22-0, Aluminum 0-0.3, boron 0-0.1, carbon 0.1-0.8, chromium 0-3, manganese 0.1-5, phosphorus 0-0.3, silicon 0-1, sulfur 0-0.1, titanium 0-0.5, iron bal.
 RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (~~steel~~ welding part with aluminum or aluminum alloy plating layer and manuf. method thereof)

OS.CITING REF COUNT: 2 THERE ARE 2 CAPLUS RECORDS THAT CITE THIS RECORD

(2 CITINGS)

L12 ANSWER 74 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2017:24305 CAPLUS Full-text

DOCUMENT NUMBER: 166:137133

TITLE: High-strength carbon ~~steel~~ plate having excellent impact resistance and its production for automobile parts

INVENTOR(S): Okamoto, Riki; Toyota, Takeshi; Isogai, Eiji

PATENT ASSIGNEE(S): Nippon Steel & Sumitomo Metal Corporation, Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 20pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2017002333	A	20170105	JP 2015-114026	20150604
JP 6540245	B2	20190710		

PRIORITY APPLN. INFO.: JP 2015-114026 20150604

AB The invention provides a high-strength ~~steel~~ plate which has tensile strength of 400 N/mm², excellent shape freezing property, and appropriate yield point elongation, and a method of manufg. thereof. The high-strength ~~steel~~ plate having excellent shape freezing property contains in mass%, C: 0.03-0.35%, Si: 0.01-2.00%, Mn: 0.3-4.0%, P: 0.001-0.100%, S: 0.0005-0.05%, N: 0.0005%-0.010%, Al: 0.01-2.00%, and balance being Fe and inevitable impurities, and includes a metal structure contg. an unrecrystd. ferrite phase at an area ratio of 2-35%. The yield point elongation of the ~~steel~~ plate is 4-10%.

IT 2034133-38-3P

RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(high-strength carbon ~~steel~~ plate having excellent impact resistance and its prodn. for automobile parts)

RN 2034133-38-3 CAPLUS

CN Iron alloy, base, Fe 80-100, Mn 0.3-4, Cr 0-3, Cu 0-3, Ni 0-3, Al 0-2, Si 0-2, Mo 0-1, V 0-0.5, C 0-0.4, Nb 0-0.3, Ti 0-0.3, B 0-0.1, P 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	80 - 100	7439-89-6
Mn	0.3 - 4	7439-96-5
Cr	0 - 3	7440-47-3
Cu	0 - 3	7440-50-8
Ni	0 - 3	7440-02-0
Al	0 - 2	7429-90-5
Si	0 - 2	7440-21-3
Mo	0 - 1	7439-98-7
V	0 - 0.5	7440-62-2
C	0 - 0.4	7440-44-0
Nb	0 - 0.3	7440-03-1
Ti	0 - 0.3	7440-32-6
B	0 - 0.1	7440-42-8
P	0 - 0.1	7723-14-0

IPCI C22C0038-00 [I]; C22C0038-06 [I]; C22C0038-58 [I]; C21D0009-46 [I];
C22C0038-00 [I]; C22C0038-06 [I]; C22C0038-58 [I]; C21D0009-46 [I]

IPCR C22C0038-00 [I]; C21D0009-46 [I]; C22C0038-06 [I]; C22C0038-58 [I]

CC 55-3 (Ferrous Metals and Alloys)

ST carbon ~~steel~~ plate strength impact resistance prodn automobile part

IT Annealing

Automobile parts

Cold rolling

Cooling

Elongation at break

Heating

Hot rolling

Hot-dip galvanizing

Impact strength

Microstructure
 Pickling
 Tensile strength
 Yield strength
 (high-strength carbon steel plate having excellent impact
 resistance and its prodn. for automobile parts)

IT 2034133-38-3P
 RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or
 engineered material use); PREP (Preparation); USES (Uses)
 (high-strength carbon steel plate having excellent impact
 resistance and its prodn. for automobile parts)

L12 ANSWER 75 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN
 ACCESSION NUMBER: 2017:24289 CAPLUS Full-text
 DOCUMENT NUMBER: 166:148201
 TITLE: High-strength carbon steel sheet with excellent
 processability and its manufacture for automobile
 parts
 INVENTOR(S): Okamoto, Riki; Toyota, Takeshi; Isogai, Eiji
 PATENT ASSIGNEE(S): Nippon Steel & Sumitomo Metal Corporation, Japan
 SOURCE: Jpn. Kokai Tokkyo Koho, 19pp.
 CODEN: JKXXAF
 DOCUMENT TYPE: Patent
 LANGUAGE: Japanese
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2017002332	A	20170105	JP 2015-114025	20150604
JP 6620431	B2	20191218		

PRIORITY APPLN. INFO.: JP 2015-114025 20150604

AB The high-strength steel sheet with excellent processability, contains in
 mass%, carbon:0.03-0.35%, silicon:0.01-2.00%, manganese:0.3-4.0%,
 phosphorus:0.001-0.100%, sulfur:0.0005-0.05%, nitrogen: 0.0005%-0.010%,
 aluminum: 0.01-2.00%, and balance being iron and inevitable impurities and
 includes a metal structure contg. an unrecrystd. ferrite phase at an area
 ratio of 2-20%. The ratio (yield stress (N/mm²)/tensile strength (Nmm²)
 of the yield stress with respect to the tensile strength is 0.75 or more.
 The product (yield stress(N/mm²)×elongation (%)) of yield stress and
 elongation is 12000 or more. The invention provides a high-strength
 steel sheet which has tensile strength of 400 N/mm², excellent
 processability, high elongation rate and high yield stress.

IT 2034133-38-3P
 RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or
 engineered material use); PREP (Preparation); USES (Uses)
 (high-strength carbon steel sheet with excellent
 processability and its manuf. for automobile parts)

RN 2034133-38-3 CAPLUS
 CN Iron alloy, base, Fe 80-100,Mn 0.3-4,Cr 0-3,Cu 0-3,Ni 0-3,Al 0-2,Si 0-2,Mo
 0-1,V 0-0.5,C 0-0.4,Nb 0-0.3,Ti 0-0.3,B 0-0.1,P 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	80 - 100	7439-89-6
Mn	0.3 - 4	7439-96-5
Cr	0 - 3	7440-47-3
Cu	0 - 3	7440-50-8
Ni	0 - 3	7440-02-0
Al	0 - 2	7429-90-5
Si	0 - 2	7440-21-3
Mo	0 - 1	7439-98-7
V	0 - 0.5	7440-62-2
C	0 - 0.4	7440-44-0
Nb	0 - 0.3	7440-03-1
Ti	0 - 0.3	7440-32-6
B	0 - 0.1	7440-42-8
P	0 - 0.1	7723-14-0

IPCI C22C0038-00 [I]; C22C0038-60 [I]; C21D0009-46 [I]; C22C0038-00 [I];
 C22C0038-60 [I]; C21D0009-46 [I]

IPCR C22C0038-00 [I]; C21D0009-46 [I]; C22C0038-60 [I]
 CC 55-3 (Ferrous Metals and Alloys)
 ST high strength ~~steel~~ sheet processability manuf automobile part
 IT Metalworking
 (capability; high-strength carbon ~~steel~~ sheet with excellent
 processability and its manuf. for automobile parts)
 IT Alloying
 Annealing
 Automobile parts
 Casting of metals
 Cold rolling
 Cooling
 Elongation, mechanical
 Hot rolling
 Hot-dip galvanizing
 Microstructure
 Phase composition
 Pickling
 Sheet materials
 Tensile strength
 Yield strength
 (high-strength carbon ~~steel~~ sheet with excellent
 processability and its manuf. for automobile parts)
 IT 2034133-38-3P
 RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or
 engineered material use); PREP (Preparation); USES (Uses)
 (high-strength carbon ~~steel~~ sheet with excellent
 processability and its manuf. for automobile parts)

L12 ANSWER 76 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2016:2049760 CAPLUS Full-text
 DOCUMENT NUMBER: 167:333389
 TITLE: Method for hot forming a coated metal part and formed
 part
 INVENTOR(S): Verloop, Willem Cornelis; Van Genderen, Marc Jacco;
 Van Tol, Ronald Theodoor; Hensen, Guido Cornelis;
 Loiseaux, Jenny
 PATENT ASSIGNEE(S): Tata Steel IJmuiden B.V., Neth.
 SOURCE: U.S., No pp. given
 CODEN: USXXAM
 DOCUMENT TYPE: Patent
 LANGUAGE: English
 FAMILY ACC. NUM. COUNT: 2
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 9127329	B2	20150908	US 2013-13818041	20130220
US 20130153094	A1	20130620		
WO 2012028224	A1	20120308	WO 2011-EP3601	20110719
PRIORITY APPLN. INFO.:			EP 2010-9041	A 20100831
			WO 2011-EP3601	W 20110719

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB A method for manufg. a coated part having very high mech. properties using
 hot forming techniques. The method includes: -providing an annealed
~~steel~~ strip or blank or pre-shaped part that was coated with a metal or
 metal alloy before the annealing -if a strip is provided, cutting a blank
 from the strip before or after the annealing -optionally forming a
 pre-shaped part from the blank -heating the blank or preshaped part to a
 temp. of 500° C. at an av. heating rate of 16° C./s or more
 -further heating the blank or pre-shaped part to a temp. between 700 and
 1000° C. -hot forming the blank or preshaped part into a hot formed
 part -hardening the hot formed part. A method for manufg. a coated
~~steel~~ strip, blank or pre-shaped part, and a coated ~~steel~~ strip, blank
 or part and a hot formed part.

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
Anon	2009			DE 102008022400 A1	CAPLUS
Anon	2009			WO 2009021743 A1	CAPLUS
Anon	2009			WO 2009096351 A1	CAPLUS

Anon	2010			WO 2010005121 A1	CAPLUS
Anon	2010			WO 2010069588 A1	CAPLUS
Anon	2010			WO 2010085983 A1	CAPLUS
Anon	2010			EP 2177641 A1	CAPLUS
Anon	2002			"Glossary of Metallu	
Anon	2011			International Search	
Brandstatter	2011			US 20110045316 A1	CAPLUS
Hensen	2011			US 20110236719 A1	CAPLUS
Maki	2011			US 20110174418 A1	CAPLUS
Mehler	1962			US 3056694 A	CAPLUS
Oh	2008			US 20080286603 A1	CAPLUS
Thirion	2012			US 20120085467 A1	CAPLUS
Toki	2011			US 20110048585 A1	CAPLUS
Vlot	2010			US 20100026048 A1	CAPLUS

IT 1360605-36-2
 RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (method for manuf. coated ~~steel~~ parts by hot forming)

RN 1360605-36-2 CAPLUS

CN Iron alloy, base, Fe 94-99, Mn 0.5-3, Cr 0-1, C 0.1-0.5, Si 0.1-0.5, Ti 0-0.2, Al 0-0.1, B 0-0.1, Nb 0-0.1, P 0-0.1, V 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	94 - 99	7439-89-6
Mn	0.5 - 3	7439-96-5
Cr	0 - 1	7440-47-3
C	0.1 - 0.5	7440-44-0
Si	0.1 - 0.5	7440-21-3
Ti	0 - 0.2	7440-32-6
Al	0 - 0.1	7429-90-5
B	0 - 0.1	7440-42-8
Nb	0 - 0.1	7440-03-1
P	0 - 0.1	7723-14-0
V	0 - 0.1	7440-62-2

IPCI C21D0008-02 [I]; C21D0009-46 [I]; C23C0002-06 [I]; C23C0002-40 [I]; B32B0015-01 [I]; C21D0001-673 [I]; C21D0008-04 [I]; C21D0009-48 [I]; C22C0038-02 [I]; C22C0038-04 [I]; C23C0010-28 [I]; C23C0010-60 [I]; C21D0008-02 [I]; B32B0015-01 [I]

IPCR C21D0008-02 [I]; B32B0015-01 [I]; C21D0001-673 [I]; C21D0008-04 [I]; C21D0009-46 [I]; C21D0009-48 [I]; C22C0038-02 [I]; C22C0038-04 [I]; C23C0002-06 [I]; C23C0002-40 [I]; C23C0010-28 [I]; C23C0010-60 [I]

NCL 001/001.000; 148/533.000; 148/330.000

CC 55-3 (Ferrous Metals and Alloys)

ST ~~steel~~ strip coating hot deformation

IT Plastic deformation

(hot; method for manuf. coated ~~steel~~ parts by hot forming)

IT 1360605-37-3

RL: TEM (Technical or engineered material use); USES (Uses)

(coating; method for manuf. coated ~~steel~~ parts by hot forming)

IT 1360605-36-2

RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)

(method for manuf. coated ~~steel~~ parts by hot forming)

L12 ANSWER 77 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2016:1997298 CAPLUS Full-text

DOCUMENT NUMBER: 167:180612

TITLE: Coated ~~steel~~ strips, methods of making the same, methods of using the same, stamping blanks prepared from the same, stamped products prepared from the same, and articles of manufacture which contain such a stamped product

INVENTOR(S): Drillet, Pascal; Spehner, Dominique; Kefferstein, Ronald

PATENT ASSIGNEE(S): Arcelormittal France, Fr.

SOURCE: U.S. Pat. Appl. Publ., No pp. given

CODEN: USXXCO

DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 2

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 20110165436	A1	20110707	US 2011-447777	20110318
WO 2008053273	A1	20080508	WO 2006-IB4019	20061030
EP 3290199	A1	20180307	EP 2017-192410	20061030
EP 3290199	B1	20190821		
EP 3290200	A1	20180307	EP 2017-192418	20061030
EP 3587104	A1	20200101	EP 2019-185736	20061030
EP 3587105	A1	20200101	EP 2019-185743	20061030
US 20130029172	A1	20130131	US 2012-13621015	20120915
US 9708683	B2	20170718		
US 20170260603	A1	20170914	US 2017-15606770	20170526
US 10550447	B2	20200204		
US 20190271055	A1	20190905	US 2019-16413774	20190516
US 10590507	B2	20200317		
US 20190271056	A1	20190905	US 2019-16413799	20190516
US 20190271057	A1	20190905	US 2019-16413825	20190516
US 20190271058	A1	20190905	US 2019-16414022	20190516
US 10597747	B2	20200324		
US 20190276912	A1	20190912	US 2019-16413729	20190516
US 10577674	B2	20200303		

PRIORITY APPLN. INFO.:

WO 2006-IB4019	W	20061030
EP 2006-842403	A3	20061030
EP 2017-192410	A3	20061030
US 2011-447777	A3	20110318
US 2012-13621015	A1	20120915
US 2017-15606770	A1	20170526

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB Coated ~~steel~~ having a well defined and uniform thickness is useful and advantageous for prep. products by hot stamping. Products prep. by hot stamping such a ~~steel~~ are particularly advantageous when subjected to a subsequent spot welding step.

IT 1022915-01-0
RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(aluminum coated ~~steel~~ strips stamping blanks and articles of manuf. which contain such a stamped product)

RN 1022915-01-0 CAPLUS

CN Iron alloy, base, Fe 94-99, Mn 0.5-3, Cr 0-1, C 0.2-0.5, Si 0.1-0.5, Ti 0-0.2, Al 0-0.1, B 0-0.1, P 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	94 - 99	7439-89-6
Mn	0.5 - 3	7439-96-5
Cr	0 - 1	7440-47-3
C	0.2 - 0.5	7440-44-0
Si	0.1 - 0.5	7440-21-3
Ti	0 - 0.2	7440-32-6
Al	0 - 0.1	7429-90-5
B	0 - 0.1	7440-42-8
P	0 - 0.1	7723-14-0

INCL 428653000; 072342100; 072047000

IPCI B32B0015-01 [I]; B21D0022-00 [I]; C21D0009-46 [I]

IPCR B32B0015-01 [I]; B21D0022-00 [I]; C21D0009-46 [I]

NCL 428/653.000; 072/047.000; 072/342.100

CC 55-11 (Ferrous Metals and Alloys)

ST aluminum coated ~~steel~~ strip stamping article spot welding

IT Metalworking

(stamping; aluminum coated ~~steel~~ strips stamping blanks and articles of manuf. which contain such a stamped product)

IT 7429-90-5, Aluminum, uses 952598-91-3, Aluminum 87-90, iron 2-4, silicon 8-11

RL: NUU (Other use, unclassified); USES (Uses)

(aluminum coated ~~steel~~ strips stamping blanks and articles of manuf. which contain such a stamped product)

IT 10232915-01-0
RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM
(Technical or engineered material use); PROC (Process); USES (Uses)
(aluminum coated ~~steel~~ strips stamping blanks and articles of
manuf. which contain such a stamped product)

L12 ANSWER 78 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2016:1976821 CAPLUS Full-text
DOCUMENT NUMBER: 167:35538
TITLE: Low temperature hardenable ~~steels~~ with excellent
machinability
INVENTOR(S): Valls, Isaac
PATENT ASSIGNEE(S): Valls Besitz GmbH, Germany
SOURCE: U.S. Pat. Appl. Publ., No pp. given
CODEN: USXXCO
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 3
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 20150118098	A1	20150430	US 2014-14399289	20141106
US 10077490	B2	20180918		
EP 2662462	A1	20131113	EP 2012-166948	20120507
WO 2013167580	A1	20131114	WO 2013-EP59471	20130507
US 20180363110	A1	20181220	US 2018-16052826	20180802
PRIORITY APPLN. INFO.:			EP 2012-166948	A 20120507
			WO 2013-EP59471	W 20130507
			US 2014-14399289	A1 20141106

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB The present invention relates to the application of at least partially
bainitic or interstitial martensitic heat treatments on ~~steels~~, often
tool ~~steels~~ or ~~steels~~ that can be used for tools. The first tranche
of the heat treatment implying austenitization is applied so that the
~~steel~~ presents a low enough hardness to allow for advantageous shape
modification, often through machining. Thus a ~~steel~~ product is obtained
which can be shaped with ease and whose hardness can be raised to a higher
working hardness with a simple heat treatment at low temp. (below
austenitization temp.).

IT 1478046-17-1 1478046-18-2 1478046-23-9
RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM
(Technical or engineered material use); PROC (Process); USES (Uses)
(low temp. hardenable tool ~~steels~~ with excellent
machinability)

RN 1478046-17-1 CAPLUS

CN Iron alloy, base, Fe 37-100, Mo 0-10, W 0-10, Co 0-6, Ni 0-6, V 0-4, Cr 0-3, Hf
0-3, Mn 0-3, Ta 0-3, Ti 0-3, Zr 0-3, Al 0-2.5, Cu 0-2, Nb 0-1.5, Si 0-1.4, N 0-1, B
0-0.6, C 0.2 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	37 - 100	7439-89-6
Mo	0 - 10	7439-98-7
W	0 - 10	7440-33-7
Co	0 - 6	7440-48-4
Ni	0 - 6	7440-02-0
V	0 - 4	7440-62-2
Cr	0 - 3	7440-47-3
Hf	0 - 3	7440-58-6
Mn	0 - 3	7439-96-5
Ta	0 - 3	7440-25-7
Ti	0 - 3	7440-32-6
Zr	0 - 3	7440-67-7
Al	0 - 2.5	7429-90-5
Cu	0 - 2	7440-50-8
Nb	0 - 1.5	7440-03-1
Si	0 - 1.4	7440-21-3
N	0 - 1	17778-88-0
B	0 - 0.6	7440-42-8
C	0.2	7440-44-0

RN 1478046-18-2 CAPLUS
 CN Iron alloy, base, Fe 13-100,Mo 0-15,W 0-15,Cr 0-14,V 0-12,Zr 0-12,Co
 0-6,Ni 0-6,Hf 0-4,Nb 0-4,Ta 0-4,Ti 0-4,C 0.5-3,Mn 0-3,Al 0-2.5,N 0-2.2,B
 0-2,Cu 0-2,Si 0-2 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
=====+=====+=====		
Fe	13 - 100	7439-89-6
Mo	0 - 15	7439-98-7
W	0 - 15	7440-33-7
Cr	0 - 14	7440-47-3
V	0 - 12	7440-62-2
Zr	0 - 12	7440-67-7
Co	0 - 6	7440-48-4
Ni	0 - 6	7440-02-0
Hf	0 - 4	7440-58-6
Nb	0 - 4	7440-03-1
Ta	0 - 4	7440-25-7
Ti	0 - 4	7440-32-6
C	0.5 - 3	7440-44-0
Mn	0 - 3	7439-96-5
Al	0 - 2.5	7429-90-5
N	0 - 2.2	17778-88-0
B	0 - 2	7440-42-8
Cu	0 - 2	7440-50-8
Si	0 - 2	7440-21-3

RN 1478046-23-9 CAPLUS
 CN Iron alloy, base, Fe 44-99,W 0-8,Co 0-6,Mo 0-6,Ni 0-6,Cr 0-4,V 0-4,Mn
 0.2-3,Si 0.2-2.8,Al 0-2.5,Cu 0-2,Hf 0-2,Nb 0-2,Ta 0-2,Ti 0-2,Zr 0-2,C
 0.2-0.9,B 0-0.6,N 0-0.6 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
=====+=====+=====		
Fe	44 - 99	7439-89-6
W	0 - 8	7440-33-7
Co	0 - 6	7440-48-4
Mo	0 - 6	7439-98-7
Ni	0 - 6	7440-02-0
Cr	0 - 4	7440-47-3
V	0 - 4	7440-62-2
Mn	0.2 - 3	7439-96-5
Si	0.2 - 2.8	7440-21-3
Al	0 - 2.5	7429-90-5
Cu	0 - 2	7440-50-8
Hf	0 - 2	7440-58-6
Nb	0 - 2	7440-03-1
Ta	0 - 2	7440-25-7
Ti	0 - 2	7440-32-6
Zr	0 - 2	7440-67-7
C	0.2 - 0.9	7440-44-0
B	0 - 0.6	7440-42-8
N	0 - 0.6	17778-88-0

INCL 420102000; 420111000; 420110000; 420109000; 420107000; 420106000;
 420101000

IPCI C22C0038-58 [I]; C22C0038-50 [I]; C22C0038-52 [I]; C22C0038-38 [I];
 C22C0038-32 [I]; C22C0038-02 [I]; C22C0038-28 [I]; C22C0038-26 [I];
 C22C0038-24 [I]; C22C0038-22 [I]; C22C0038-04 [I]; C22C0038-44 [I];
 C22C0038-30 [I]; C22C0038-12 [I]; C22C0038-22 [I]; C22C0038-44 [I];
 C22C0038-58 [I]; C21D0009-00 [I]; C22C0038-18 [I]; C21D0006-00 [I];
 C21D0001-30 [I]; C22C0038-02 [I]; C22C0038-04 [I]; C22C0038-24 [I];
 C22C0038-26 [I]; C22C0038-28 [I]; C22C0038-30 [I]; C22C0038-32 [I];
 C22C0038-38 [I]; C22C0038-50 [I]; C22C0038-52 [I]; C22C0038-00 [I];
 C22C0038-08 [I]; C22C0038-14 [I]
 IPCR C22C0038-58 [I]; C22C0038-02 [I]; C22C0038-04 [I]; C22C0038-22 [I];
 C22C0038-24 [I]; C22C0038-26 [I]; C22C0038-28 [I]; C22C0038-30 [I];
 C22C0038-32 [I]; C22C0038-38 [I]; C22C0038-44 [I]; C22C0038-50 [I];
 C22C0038-52 [I]; C22C0038-12 [I]; C21D0001-30 [I]; C21D0006-00 [I];

C21D0009-00 [I]; C22C0038-00 [I]; C22C0038-08 [I]; C22C0038-14 [I];
C22C0038-18 [I]
NCL 420/102.000; 420/101.000; 420/106.000; 420/107.000; 420/109.000;
420/110.000; 420/111.000
CC 55-3 (Ferrous Metals and Alloys)
ST tool steel heat treatment hardness
IT Dies
Heat treatment
Injection molding apparatus
Tools
(low temp. hardenable tool steels with excellent
machinability)
IT 12173-93-2, Martensite, formation (nonpreparative) 12427-23-5, Bainite
RL: FMU (Formation, unclassified); FORM (Formation, nonpreparative)
(low temp. hardenable tool steels with excellent
machinability)
IT 1478046-17-1 1478046-18-2 1478046-23-9
RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM
(Technical or engineered material use); PROC (Process); USES (Uses)
(low temp. hardenable tool steels with excellent
machinability)

L12 ANSWER 79 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN
ACCESSION NUMBER: 2016:1976461 CAPLUS Full-text
DOCUMENT NUMBER: 167:35564
TITLE: Tough bainitic heat treatments on steels for tooling
INVENTOR(S): Valls Angles, Isaac
PATENT ASSIGNEE(S): Vallsbesitz GmbH, Germany
SOURCE: U.S. Pat. Appl. Publ., No pp. given
CODEN: USXXCO
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 3
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 20150114525	A1	20150430	US 2014-14399239	20141106
EP 2662460	A1	20131113	EP 2012-166949	20120507
WO 2013167628	A1	20131114	WO 2013-EP59542	20130507
PRIORITY APPLN. INFO.:			EP 2012-166949	A 20120507
			WO 2013-EP59542	W 20130507

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB The invention relates to a method that has been developed to obtain good
toughness and homogeneous properties through heavy sections in tool
steels or likely highly alloyed steels. The microstructure attained
is mostly bainitic. The method is esp. good for hot work tool steels in
applications demanding heavy sections and very high toughness. The method
consists on the application of a low temp. bainitic transformation to tool
steels presenting a low enough martensite transformation temp. (Ms).
Addnl. or alternatively cementite is replaced from the bainite by other
finer carbides, mainly mixed carbides contg. elements with stronger
affinity for carbon than iron. The method is esp. simple if applied to
steels with high contents of Si or Al (>1.3% and >0.4% resp.) where
cementite growth is impaired. The method works also well for low cost
plastic injection molding and structural steels. Even some higher
alloyed tool steels can benefit from, the present method.

IT 1480228-53-2
RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM
(Technical or engineered material use); PROC (Process); USES (Uses)
(tough bainitic heat treatment for tool steels)

RN 1480228-53-2 CAPLUS

CN Iron alloy, base, Fe 0-100, Mo 0-15, W 0-15, Cr 0-14, V 0-12, Zr 0-12, Co 0-6, Ni
0-6, Hf 0-4, Nb 0-4, Ta 0-4, Ti 0-4, C 0.5-3, Mn 0-3, Al 0-2.5, N 0-2.2, B 0-2, Cu
0-2, Si 0-2 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	0 - 100	7439-89-6
Mo	0 - 15	7439-98-7
W	0 - 15	7440-33-7

Cr	0	-	14	7440-47-3
V	0	-	12	7440-62-2
Zr	0	-	12	7440-67-7
Co	0	-	6	7440-48-4
Ni	0	-	6	7440-02-0
Hf	0	-	4	7440-58-6
Nb	0	-	4	7440-03-1
Ta	0	-	4	7440-25-7
Ti	0	-	4	7440-32-6
C	0.5	-	3	7440-44-0
Mn	0	-	3	7439-96-5
Al	0	-	2.5	7429-90-5
N	0	-	2.2	17778-88-0
B	0	-	2	7440-42-8
Cu	0	-	2	7440-50-8
Si	0	-	2	7440-21-3

INCL 148612000; 148660000; 148663000; 148621000
 IPCI C22C0038-58 [I]; C21D0001-00 [I]; C22C0038-54 [I]; C22C0038-50 [I];
 C22C0038-48 [I]; C22C0038-46 [I]; C22C0038-44 [I]; C22C0038-38 [I];
 C22C0038-28 [I]; C22C0038-26 [I]; C22C0038-24 [I]; C22C0038-22 [I];
 C22C0038-04 [I]; C22C0038-02 [I]; C21D0006-00 [I]
 IPCR C22C0038-58 [I]; C21D0001-00 [I]; C21D0006-00 [I]; C22C0038-02 [I];
 C22C0038-04 [I]; C22C0038-22 [I]; C22C0038-24 [I]; C22C0038-26 [I];
 C22C0038-28 [I]; C22C0038-38 [I]; C22C0038-44 [I]; C22C0038-46 [I];
 C22C0038-48 [I]; C22C0038-50 [I]; C22C0038-54 [I]
 NCL 148/612.000; 148/621.000; 148/660.000; 148/663.000
 CC 55-5 (Ferrous Metals and Alloys)
 ST tool steel bainite heat treatment hardness
 IT Heat treatment
 Mechanical hardness
 Tools
 (tough bainitic heat treatment for tool steel*)
 IT 12427-23-5, Bainite
 RL: FMU (Formation, unclassified); FORM (Formation, nonpreparative)
 (tough bainitic heat treatment for tool steel*)
 IT 1480228-53-2
 RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM
 (Technical or engineered material use); PROC (Process); USES (Uses)
 (tough bainitic heat treatment for tool steel*)

L12 ANSWER 80 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN
 ACCESSION NUMBER: 2016:1976375 CAPLUS Full-text
 DOCUMENT NUMBER: 167:35563
 TITLE: High thermal diffusivity, high toughness and low crack
 risk during heat treatment tool steel
 INVENTOR(S): Angles, Isaac Valls
 PATENT ASSIGNEE(S): Rovalma, S.A., Spain
 SOURCE: U.S. Pat. Appl. Publ., No pp. given
 CODEN: USXXCO
 DOCUMENT TYPE: Patent
 LANGUAGE: English
 FAMILY ACC. NUM. COUNT: 2

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 20160010168	A1	20160114	US 2015-14771976	20150901
WO 2014131907	A1	20140904	WO 2014-EP54010	20140228
PRIORITY APPLN. INFO.:			EP 2013-382069	A 20130301
			WO 2014-EP54010	W 20140228

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB The present invention relates to a tool steel as described in
 WO2012095532A1 or WO2010112319A1 and its heat treatment where high levels
 of thermal diffusivity, mech. resistance, wear resistance and/or toughness
 are attained while having a low cracking risk during the heat treatment.
 It is achieved by austenitizing at a temp., normally above AC3, cooling to
 an intermediate temp. below AC1 and above the temp. where bainitic (and
 alike) transformation occurs and finally quenching with a severe cooling
 media to a temp. below the bainitic transformation nose. Final
 microstructure is mainly composed of martensite and/or lower bainite,
 which will generally be afterwards tempered.

IT 1625647-86-0
 RL: PRP (Properties); TEM (Technical or engineered material use); USES
 (Uses)
 (tool ~~steel~~; high thermal diffusivity, high toughness and low
 crack risk during heat treatment tool ~~steel~~)

RN 1625647-86-0 CAPLUS

CN Iron alloy, base, Fe 36-100, Mo 0-10, W 0-10, Co 0-6, Ni 0-6, V 0-4, Cr 0-3, Hf
 0-3, Mn 0-3, Ta 0-3, Zr 0-3, Al 0-2.5, Cu 0-2, Ti 0-2, C 0.2-1.9, Nb 0-1.5, Si
 0-1.4, N 0-1, B 0-0.6 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
=====+=====+=====		
Fe	36 - 100	7439-89-6
Mo	0 - 10	7439-98-7
W	0 - 10	7440-33-7
Co	0 - 6	7440-48-4
Ni	0 - 6	7440-02-0
V	0 - 4	7440-62-2
Cr	0 - 3	7440-47-3
Hf	0 - 3	7440-58-6
Mn	0 - 3	7439-96-5
Ta	0 - 3	7440-25-7
Zr	0 - 3	7440-67-7
Al	0 - 2.5	7429-90-5
Cu	0 - 2	7440-50-8
Ti	0 - 2	7440-32-6
C	0.2 - 1.9	7440-44-0
Nb	0 - 1.5	7440-03-1
Si	0 - 1.4	7440-21-3
N	0 - 1	17778-88-0
B	0 - 0.6	7440-42-8

IPCI C21D0001-84 [I]; C22C0038-46 [I]; C22C0038-44 [I]; C22C0038-00 [I];
 C22C0038-06 [I]; C22C0038-04 [I]; C22C0038-02 [I]; C21D0006-00 [I];
 C22C0038-42 [I]

IPCR C21D0001-84 [I]; C21D0006-00 [I]; C22C0038-00 [I]; C22C0038-02 [I];
 C22C0038-04 [I]; C22C0038-06 [I]; C22C0038-42 [I]; C22C0038-44 [I];
 C22C0038-46 [I]

CC 55-5 (Ferrous Metals and Alloys)

ST tool ~~steel~~ thermal diffusivity toughness crack heat treatment

IT Structural phase transition
 (ferrite-perlite; high thermal diffusivity, high toughness and low
 crack risk during heat treatment tool ~~steel~~)

IT Fracture toughness
 Heat treatment
 Mechanical hardness
 Microstructure
 Quenching (cooling)
 Tempering
 Thermal conductivity
 Wear resistance
 (high thermal diffusivity, high toughness and low crack risk during
 heat treatment tool ~~steel~~)

IT 12173-93-2, Martensite, uses
 RL: TEM (Technical or engineered material use); USES (Uses)
 (high thermal diffusivity, high toughness and low crack risk during
 heat treatment tool ~~steel~~)

IT 1625647-86-0
 RL: PRP (Properties); TEM (Technical or engineered material use); USES
 (Uses)
 (tool ~~steel~~; high thermal diffusivity, high toughness and low
 crack risk during heat treatment tool ~~steel~~)

L12 ANSWER 81 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2016:1809235 CAPLUS Full-text

DOCUMENT NUMBER: 165:597854

TITLE: High-strength ~~steel~~ plate and its manufacturing method

INVENTOR(S): Okamoto, Riki; Ishida, Yoshinari; Suwa, Yoshihiro;
 Yokoyama, Takafumi

PATENT ASSIGNEE(S): Nippon Steel & Sumitomo Metal Corporation, Japan

SOURCE: PCT Int. Appl., 67pp.
 CODEN: PIXXD2
 DOCUMENT TYPE: Patent
 LANGUAGE: Japanese
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2016178430	A1	20161110	WO 2016-JP63660	20160506
TW I606123	B	20171121	TW 2016-114295	20160506
KR 2017138545	A	20171215	KR 2017-7033656	20160506
KR 1987573	B1	20190610		
CN 107614722	A	20180119	CN 2016-80026467	20160506
CN 107614722	B	20190827		
EP 3293279	A1	20180314	EP 2016-789566	20160506
EP 3293279	B1	20200325		
MX 2017014094	A	20180316	MX 2017-14094	20160506
BR 112017023881	A2	20180717	BR 2017-112017023881	20160506
JP 6471800	B2	20190220	JP 2017-516621	20160506
ES 2784699	T3	20200930	ES 2016-789566	20160506
US 20180148809	A1	20180531	US 2017-15571619	20171103
IN 201717039616	A	20171222	IN 2017-17039616	20171107
PRIORITY APPLN. INFO.:			JP 2015-95157	A 20150507
			JP 2015-95158	A 20150507
			WO 2016-JP63660	W 20160506

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB The present invention relates to a high-strength ~~steel~~ plate that has a predetd. chem. compn. and has a microstructure represented by, in terms of area%, at least 5% martensite, at least 20% ferrite and, 5% or less pearlite. The av. grain diam. of the martensite is an equiv. circle diam. of 4 μ m or less. Among multiple martensite grains on grain boundary triple points of a matrix phase, at least one of the grain boundaries that connect adjacent two grain boundary triple points that are structured by the martensite grains and the matrix crystal grains has convex curvature toward the outside with respect to a line segment that connects the two grain boundary triple points. Furthermore, if the martensite grain is referred to as a bulging martensite grain when the martensite grain is on one grain boundary triple point of the matrix phase, the ratio of the no. of bulging martensite grains to the no. of multiple martensite grains on the grain boundary triple points of the matrix phase is at least 70%. The area ratio represented by VM/A0 is at least 1.0, where VM represents the total area of the multiple martensite grains on the grain boundary triple points of the matrix phase, and A0 represents the total area of the polygons structured by line segments connecting any two adjacent grain boundary triple points of multiple martensite grains.

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
AKAMIZU HIROSHI	2004			JP 2004308002 A	CAPLUS
IBANO AKIRA	2010			JP 2010285636 A	CAPLUS
MINAMI HIDEKAZU	2015			WO 2015015738 A1	CAPLUS
OKAMOTO TSUTOMU	2014			JP 2014173151 A	CAPLUS
ONO YOSHIHIKO	2010			WO 2010087529 A1	CAPLUS
TAKASHIMA KATSUTOSHI	2015			WO 2015019558 A1	CAPLUS

IT 2034133-38-3

RL: TEM (Technical or engineered material use); USES (Uses)
 (high-strength ~~steel~~ plate and its manufg. method)

RN 2034133-38-3 CAPLUS

CN Iron alloy, base, Fe 80-100, Mn 0.3-4, Cr 0-3, Cu 0-3, Ni 0-3, Al 0-2, Si 0-2, Mo 0-1, V 0-0.5, C 0-0.4, Nb 0-0.3, Ti 0-0.3, B 0-0.1, P 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	80 - 100	7439-89-6
Mn	0.3 - 4	7439-96-5
Cr	0 - 3	7440-47-3
Cu	0 - 3	7440-50-8
Ni	0 - 3	7440-02-0
Al	0 - 2	7429-90-5
Si	0 - 2	7440-21-3

Mo	0	-	1	7439-98-7
V	0	-	0.5	7440-62-2
C	0	-	0.4	7440-44-0
Nb	0	-	0.3	7440-03-1
Ti	0	-	0.3	7440-32-6
B	0	-	0.1	7440-42-8
P	0	-	0.1	7723-14-0

IPCI C22C0038-00 [I]; C21D0009-46 [I]; C22C0018-00 [I]; C22C0038-60 [I]
 IPCR C22C0038-00 [I]; C21D0009-46 [I]; C22C0018-00 [I]; C22C0038-60 [I]
 CC 55-3 (Ferrous Metals and Alloys)
 ST ~~steel~~ plate martensite ferrite pearlite microstructure manufg method
 IT Annealing
 Automobile parts
 Cooling
 Elongation at break
 Grain boundaries
 Heating
 Microstructure
 Particle size
 Rolling (metals)
 Tensile strength
 (high-strength ~~steel~~ plate and its manufg. method)
 IT 15099-26-0, Argon (3+), uses
 RL: NUU (Other use, unclassified); USES (Uses)
 (high-strength ~~steel~~ plate and its manufg. method)
 IT 12173-93-2, Martensite, uses 12427-24-6, Ferrite (ferrous metal
 component) 12427-27-9, Pearlite 2034133-38-3
 RL: TEM (Technical or engineered material use); USES (Uses)
 (high-strength ~~steel~~ plate and its manufg. method)

L12 ANSWER 82 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2016:1777903 CAPLUS Full-text

DOCUMENT NUMBER: 165:562899

TITLE: Composition and manufacture of high-strength cold rolled ~~steel~~ plate with excellent workability and weldability

INVENTOR(S): Okamoto, Isamu; Yokoyama, Takashi

PATENT ASSIGNEE(S): Nippon Steel & Sumitomo Metal Corporation, Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 20pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2016188395	A	20161104	JP 2015-68084	20150330
JP 6492869	B2	20190403		

PRIORITY APPLN. INFO.: JP 2015-68084 20150330

AB The present invention provides a high strength cold rolled ~~steel~~ plate with excellent weldability and workability, and a strength of 400 N/mm2 or more with high processability and yield stress, and its manufg. method. The high strength cold rolled ~~steel~~ plate contains C: 0.03%-0.35%, Si: 0.01%-2.00%, Mn: 0.3%-4.0%, P: 0.001%-0.100%, S: 0.0005%-0.05%, N: 0.0005%-0.010%, Al: 0.01%-2.00%, and the balance being Fe and inevitable impurities. The metal structure contains an unrecrystd. ferrite phase at an area ratio of more than 2% and less than 20%, and martensite phase and tempered martensite phase in an amt. of more than 5% and less than 60% in total. The yield ratio YR that is the ratio of the yield stress to the tensile strength is 0.7 or more, and the product of the yield stress and the elongation is 13000 or more.

IT 2034133-38-3P

RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(compn. and manuf. of high-strength cold rolled ~~steel~~ plate with excellent workability and weldability)

RN 2034133-38-3 CAPLUS

CN Iron alloy, base, Fe 80-100, Mn 0.3-4, Cr 0-3, Cu 0-3, Ni 0-3, Al 0-2, Si 0-2, Mo 0-1, V 0-0.5, C 0-0.4, Nb 0-0.3, Ti 0-0.3, B 0-0.1, P 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	80 - 100	7439-89-6
Mn	0.3 - 4	7439-96-5
Cr	0 - 3	7440-47-3
Cu	0 - 3	7440-50-8
Ni	0 - 3	7440-02-0
Al	0 - 2	7429-90-5
Si	0 - 2	7440-21-3
Mo	0 - 1	7439-98-7
V	0 - 0.5	7440-62-2
C	0 - 0.4	7440-44-0
Nb	0 - 0.3	7440-03-1
Ti	0 - 0.3	7440-32-6
B	0 - 0.1	7440-42-8
P	0 - 0.1	7723-14-0

IPCI C22C0038-00 [I]; C22C0038-60 [I]; C21D0009-46 [I]; C22C0038-00 [I];
C22C0038-60 [I]; C21D0009-46 [I]

IPCR C22C0038-00 [I]; C21D0009-46 [I]; C22C0038-60 [I]

CC 55-3 (Ferrous Metals and Alloys)

ST cold rolled ~~steel~~ plate manuf strength workability weldability

IT Metalworking
(capability; compn. and manuf. of high-strength cold rolled
~~steel~~ plate with excellent workability and weldability)

IT Alloying
Annealing
Casting of metals
Cooling
Elongation at break
Hot rolling
Hot-dip galvanizing
Microstructure
Pickling
Recrystallization
Tensile strength
Weldability
Yield strength
(compn. and manuf. of high-strength cold rolled ~~steel~~ plate
with excellent workability and weldability)

IT 2034133-38-3P
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or
engineered material use); PREP (Preparation); USES (Uses)
(compn. and manuf. of high-strength cold rolled ~~steel~~ plate
with excellent workability and weldability)

L12 ANSWER 83 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2016:1770673 CAPLUS Full-text

DOCUMENT NUMBER: 165:549448

TITLE: Production of hot or cold strips from ~~steel~~ having
high copper content

INVENTOR(S): Redenius, Alexander; Evertz, Thomas; Palzer, Peter

PATENT ASSIGNEE(S): Salzgitter Flachstahl GmbH, Germany

SOURCE: PCT Int. Appl., 23pp.; Chemical Indexing Equivalent to
165:549447 (DE)
CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: German

FAMILY ACC. NUM. COUNT: 2

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2016174020	A1	20161103	WO 2016-EP59266	20160426
DE 102015106780	A1	20161103	DE 2015-102015106780	20150430

PRIORITY APPLN. INFO.: DE 2015-102015106780 A 20150430

AB A hot or cold strip of ~~steel~~ with high copper content, is manufd. by:
melting a ~~steel~~ melt contg. (in wt.%) 0-0.4% C, 0-3% Mn, 0-2% Al, 0-2%
Si, more than 0.8% Cu, 0-0.2% P, 0-0.05% S, and 0-0.3% N, with optional
addn. of Sn, Ni, Cr, V, Nb, Ti, Mo, W, B, Co, Sb and/or Zr, the remainder
being iron and unavoidable impurities; casting the melt under an atm.

having an oxygen content <10 vol.%, by a near-net-shape casting method, in particular horizontal strip casting or vertical casting according to the two-roll method, into a pre-strip having a thickness in of 1-30 mm; cooling the cast pre-strip at a cooling rate ≥ 100 K/s at the actively cooled strip surface until forming a rigid boundary layer.

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
FANG YUAN	2014			US 20140366602 A1	
GUELTON NICOLAS PATRICE	2004			EP 1466024 A1	CAPLUS
IKI HIROSHI	2000			JP 2000045045 A	CAPLUS
IUNG THIERRY	2001			EP 1072689 A1	CAPLUS
MARUYAMA NAOKI	2005			JP 2005036271 A	CAPLUS
MIZOGUCHI TOSHIAKI NIPP	1995			EP 0641867 A1	CAPLUS
UENISHI AKIHIRO	2000			EP 0969112 A1	CAPLUS
YAMAKAWA TSUNAHIRO	1992			US 5098489 A	CAPLUS

IT 2031158-69-5P
 RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
 (strips; prodn. of hot or cold strips from ~~steel~~ having high copper content)

RN 2031158-69-5 CAPLUS

CN Iron alloy, base, Fe 68-99, Cu 0.8-5, Cr 0-4, Co 0-3, Mn 0-3, Mo 0-3, W 0-3, Al 0-2, Ni 0-2, Si 0-2, Nb 0-0.9, Ti 0-0.9, V 0-0.9, Sn 0-0.5, Zr 0-0.5, C 0-0.4, B 0-0.3, N 0-0.3, P 0-0.2 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	68 - 99	7439-89-6
Cu	0.8 - 5	7440-50-8
Cr	0 - 4	7440-47-3
Co	0 - 3	7440-48-4
Mn	0 - 3	7439-96-5
Mo	0 - 3	7439-98-7
W	0 - 3	7440-33-7
Al	0 - 2	7429-90-5
Ni	0 - 2	7440-02-0
Si	0 - 2	7440-21-3
Nb	0 - 0.9	7440-03-1
Ti	0 - 0.9	7440-32-6
V	0 - 0.9	7440-62-2
Sn	0 - 0.5	7440-31-5
Zr	0 - 0.5	7440-67-7
C	0 - 0.4	7440-44-0
B	0 - 0.3	7440-42-8
N	0 - 0.3	17778-88-0
P	0 - 0.2	7723-14-0

IPCI C22C0038-00 [I]; B22D0011-00 [I]; B22D0011-06 [I]; B22D0011-106 [I]; B22D0011-124 [I]; B22D0011-14 [I]; B22D0011-22 [I]; B22D0015-00 [I]; B22D0037-00 [I]; C21D0006-00 [I]; C21D0008-02 [I]; C21D0001-26 [I]; C22C0038-02 [I]; C22C0038-04 [I]; C22C0038-06 [I]; C22C0038-16 [I]; B22D0011-112 [I]; C21D0006-02 [I]

IPCR C22C0038-00 [I]; B22D0011-00 [I]; B22D0011-06 [I]; B22D0011-106 [I]; B22D0011-112 [I]; B22D0011-124 [I]; B22D0011-14 [I]; B22D0011-22 [I]; B22D0015-00 [I]; B22D0037-00 [I]; C21D0001-26 [I]; C21D0006-00 [I]; C21D0006-02 [I]; C21D0008-02 [I]; C22C0038-02 [I]; C22C0038-04 [I]; C22C0038-06 [I]; C22C0038-16 [I]

CC 55-3 (Ferrous Metals and Alloys)

ST hot cold strip ~~steel~~ copper casting cooling

IT Annealing
 Casting of metals
 Cooling
 Hot rolling
 (prodn. of hot or cold strips from ~~steel~~ having high copper content)

IT 124-38-9, Carbon dioxide, uses 630-08-0, Carbon monoxide, uses 7440-37-1, Argon, uses 7727-37-9, Nitrogen, uses 7782-44-7, Oxygen, uses
 RL: NUU (Other use, unclassified); USES (Uses)

(casting atm.; prodn. of hot or cold strips from steel having high copper content)

IT 2031158-68-4P 2031158-69-5P

RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(strips; prodn. of hot or cold strips from steel having high copper content)

L12 ANSWER 84 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2016:1770568 CAPLUS Full-text

DOCUMENT NUMBER: 165:549447

TITLE: Production of hot or cold strips from steel having high copper content

INVENTOR(S): Redenius, Alexander; Evertz, Thomas; Palzer, Peter

PATENT ASSIGNEE(S): Salzgitter Flachstahl GmbH, Germany

SOURCE: Ger. Offen., 9pp.; Chemical Indexing Equivalent to 165:549448 (WO)

CODEN: GWXXBX

DOCUMENT TYPE: Patent

LANGUAGE: German

FAMILY ACC. NUM. COUNT: 2

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
DE 102015106780	A1	20161103	DE 2015-102015106780	20150430
WO 2016174020	A1	20161103	WO 2016-EP59266	20160426
PRIORITY APPLN. INFO.:			DE 2015-102015106780 A	20150430

AB A hot or cold strip of steel with high copper content, is manufd. by: melting a steel melt contg. (in wt.%) 0-0.4% C, 0-3% Mn, 0-2% Al, 0-2% Si, more than 0.8% Cu, 0-0.2% P, 0-0.05% S, and 0-0.3% N, with optional addn. of Sn, Ni, Cr, V, Nb, Ti, Mo, W, B, Co, Sb and/or Zr, the remainder being iron and unavoidable impurities; casting the melt under an atm. having an oxygen content <10 vol.%, by a near-net-shape casting method, in particular horizontal strip casting or vertical casting according to the two-roll method, into a pre-strip having a thickness in of 1-30 mm; cooling the cast pre-strip at a cooling rate ≥100 K/s at the actively cooled strip surface until forming a rigid boundary layer.

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
Anon				DE 112013001434 T5	CAPLUS
Anon				WO 2015003755 A1	CAPLUS
Anon				EP 2546368 A1	CAPLUS
Anon				DE 60306365 T2	
Anon	2013			M Bausch et al:Ultra	

IT 2031158-69-5P

RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(strips; prodn. of hot or cold strips from steel having high copper content)

RN 2031158-69-5 CAPLUS

CN Iron alloy, base, Fe 68-99, Cu 0.8-5, Cr 0-4, Co 0-3, Mn 0-3, Mo 0-3, W 0-3, Al 0-2, Ni 0-2, Si 0-2, Nb 0-0.9, Ti 0-0.9, V 0-0.9, Sn 0-0.5, Zr 0-0.5, C 0-0.4, B 0-0.3, N 0-0.3, P 0-0.2 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	68 - 99	7439-89-6
Cu	0.8 - 5	7440-50-8
Cr	0 - 4	7440-47-3
Co	0 - 3	7440-48-4
Mn	0 - 3	7439-96-5
Mo	0 - 3	7439-98-7
W	0 - 3	7440-33-7
Al	0 - 2	7429-90-5
Ni	0 - 2	7440-02-0
Si	0 - 2	7440-21-3
Nb	0 - 0.9	7440-03-1
Ti	0 - 0.9	7440-32-6

V	0	-	0.9	7440-62-2
Sn	0	-	0.5	7440-31-5
Zr	0	-	0.5	7440-67-7
C	0	-	0.4	7440-44-0
B	0	-	0.3	7440-42-8
N	0	-	0.3	17778-88-0
P	0	-	0.2	7723-14-0

IPCI C22C0038-04 [I]; C22C0038-16 [I]; C21D0008-00 [I]; B22D0011-06 [I];
 B22D0011-116 [I]; B22D0011-12 [I]; C22C0111-00 [I]
 IPCR C22C0038-04 [I]; B22D0011-06 [I]; B22D0011-116 [I]; B22D0011-12 [I];
 C21D0008-00 [I]; C22C0038-16 [I]; C22C0111-00 [N]
 CC 55-3 (Ferrous Metals and Alloys)
 ST hot cold strip ~~steel~~ copper casting cooling
 IT Annealing
 Casting of metals
 Cooling
 Hot rolling
 (prodn. of hot or cold strips from ~~steel~~ having high copper content)
 IT 124-38-9, Carbon dioxide, uses 630-08-0, Carbon monoxide, uses
 7440-37-1, Argon, uses 7727-37-9, Nitrogen, uses 7782-44-7, Oxygen,
 uses
 RL: NUU (Other use, unclassified); USES (Uses)
 (casting atm.; prodn. of hot or cold strips from ~~steel~~ having high copper content)
 IT 2031158-68-4P ~~2031158-69-5P~~
 RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
 (strips; prodn. of hot or cold strips from ~~steel~~ having high copper content)

L12 ANSWER 85 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2016:1617614 CAPLUS Full-text

DOCUMENT NUMBER: 165:466273

TITLE: Composition and manufacture of carbon ~~steel~~ sheet suitable for hot stamping, and hot stamping molded parts

INVENTOR(S): Azuma, Masafumi; Suwa, Yoshihiro; Kondo, Yusuke; Sato, Koichi

PATENT ASSIGNEE(S): Nippon Steel & Sumitomo Metal Corporation, Japan

SOURCE: PCT Int. Appl., 49pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2016158961	A1	20161006	WO 2016-JP60145	20160329
CA 2979978	A1	20161006	CA 2016-2979978	20160329
KR 2017122823	A	20171106	KR 2017-7027982	20160329
KR 2000863	B1	20190716		
CN 107427889	A	20171201	CN 2016-80017529	20160329
CN 107427889	B	20191025		
MX 2017012377	A	20171214	MX 2017-12377	20160329
EP 3278895	A1	20180207	EP 2016-772842	20160329
EP 3278895	B1	20200311		
BR 112017020165	A2	20180605	BR 2017-112017020165	20160329
RU 2683397	C1	20190328	RU 2017-135379	20160329
JP 6515356	B2	20190522	JP 2017-510030	20160329
ES 2781465	T3	20200902	ES 2016-772842	20160329
TW I597370	B	20170901	TW 2016-110064	20160330
US 20180044754	A1	20180215	US 2017-15559731	20170919
IN 201717033300	A	20171201	IN 2017-17033300	20170920

PRIORITY APPLN. INFO.: JP 2015-72280 A 20150331
 WO 2016-JP60145 W 20160329

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB A ~~steel~~ sheet for hot stamping contains, in percentage by wt., C:
 0.100%-0.600%, Si: 0.50%-3.00%, Mn: 1.20%-4.00%, Ti: 0.005%-0.100%, B:
 0.0005%-0.100%, P: 0.100% or less, S: 0.0001%-0.0100%, Al: 0.005%-1.000%,

and N: 0.100% or less, with the remainder comprising Fe and impurities.
The ~~steel~~ sheet surface roughness is such that Rz > 2.5 µm, and the
surface is coated with 50 mg/m2-1,500 mg/m2 of oil coated thereon.

RETABLER

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
=====	=====	=====	=====	=====	=====
Anon	1997			JP 976004 A	
HAYASHI KUNIO	2012			WO 2012053636 A1	CAPLUS
KAWASAKI KAORU	2011			WO 2011158818 A1	CAPLUS
KOJIMA TAKESHI	2014			JP 2014159624 A	CAPLUS
KUSUMI KAZUHISA	2008			JP 2008240046 A	CAPLUS
SETO KAZUHIRO	2010			JP 2010174302 A	CAPLUS

IT 2015959-64-3P

RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or
engineered material use); PREP (Preparation); USES (Uses)
(compn. and manuf. of carbon ~~steel~~ sheet suitable for hot
stamping, and hot stamping molded parts)

RN 2015959-64-3 CAPLUS

CN Iron alloy, base, Fe 83-98,Mn 1.2-4,Si 0.5-3,Cr 0-2,Cu 0-2,Mo 0-2,Ni
0-2,Al 0-1,C 0.1-0.6,B 0-0.1,Nb 0-0.1,P 0-0.1,Ti 0-0.1,V 0-0.1,W 0-0.1
(CA INDEX NAME)

Component	Component Percent	Component Registry Number
=====	=====	=====
Fe	83 - 98	7439-89-6
Mn	1.2 - 4	7439-96-5
Si	0.5 - 3	7440-21-3
Cr	0 - 2	7440-47-3
Cu	0 - 2	7440-50-8
Mo	0 - 2	7439-98-7
Ni	0 - 2	7440-02-0
Al	0 - 1	7429-90-5
C	0.1 - 0.6	7440-44-0
B	0 - 0.1	7440-42-8
Nb	0 - 0.1	7440-03-1
P	0 - 0.1	7723-14-0
Ti	0 - 0.1	7440-32-6
V	0 - 0.1	7440-62-2
W	0 - 0.1	7440-33-7

IPCI B21D0022-20 [I]; B21D0024-00 [I]; C21D0009-46 [I]; C22C0038-00 [I];
C22C0038-14 [I]; C22C0038-58 [I]; C23F0011-00 [I]; C23G0001-08 [I];
IPCR B21D0022-20 [I]; B21D0024-00 [I]; C21D0009-46 [I]; C22C0038-00 [I];
C22C0038-14 [I]; C22C0038-58 [I]; C23F0011-00 [I]; C23G0001-08 [I];

CC 55-3 (Ferrous Metals and Alloys)

ST carbon ~~steel~~ sheet manuf hot stamping molded part

IT Adhesion, physical

Annealing

Casting of metals

Cold rolling

Hot rolling

Lubrication

Pickling

Scale (deposits)

Sheet materials

Surface roughness

Tensile strength

(compn. and manuf. of carbon ~~steel~~ sheet suitable for hot
stamping, and hot stamping molded parts)

IT Metalworking

(stamping, hot; compn. and manuf. of carbon ~~steel~~ sheet
suitable for hot stamping, and hot stamping molded parts)

IT 2015959-64-3P

RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or
engineered material use); PREP (Preparation); USES (Uses)
(compn. and manuf. of carbon ~~steel~~ sheet suitable for hot
stamping, and hot stamping molded parts)

OS.CITING REF COUNT: 1 THERE ARE 1 CAPLUS RECORDS THAT CITE THIS RECORD
(1 CITINGS)

ACCESSION NUMBER: 2016:1459241 CAPLUS Full-text
 DOCUMENT NUMBER: 165:355921
 TITLE: High-strength high-ductility steel sheet for automobile body
 INVENTOR(S): Otani, Shigeo; Murakami, Toshio
 PATENT ASSIGNEE(S): Kobe Steel, Ltd., Japan
 SOURCE: Jpn. Kokai Tokkyo Koho, 16pp.; Chemical Indexing Equivalent to 165:355914 (WO)
 CODEN: JKXXAF

DOCUMENT TYPE: Patent
 LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 2

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2016160467	A	20160905	JP 2015-38856	20150227
JP 6348435	B2	20180627		
WO 2016136625	A1	20160901	WO 2016-JP54887	20160219

PRIORITY APPLN. INFO.: JP 2015-38856 A 20150227

AB The steel comprises C: 0.40 - 0.60%, Si+Al: 0.5 - 2.0%, Mn: 1.0 - 4.0%, P: 0 - 0.05%, S: As with 0 - 0.01%, the remainder consists of the iron and the inevitable impurity, steel organization, in the area ratio for all organization, retained austenite 20 - 40%, ferrite with 2 - 20%, the remainder consists of above 1 or 2 kinds of the bainite, the martensite, the tempering bainite, and the tempering martensite, in regard to the carbon concn. in the aforementioned retained austenite, that av. carbon concn. 0.9 - 1.2 mass %, std. deviation of the carbon concn. distribution 0.29 mass % above, that carbon concn. 1.5 mass % the high strength high ductility which in the area ratio the territory above for all organization is 3.0% or more.

IT 1995867-40-7
 RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
 (high-strength high-ductility steel sheet for automobile body)

RN 1995867-40-7 CAPLUS

CN Iron alloy, base, Fe 92-98, Mn 1-4, Al 0-2, Si 0-2, B 0-1, Cr 0-1, Cu 0-1, Mo 0-1, Ni 0-1, C 0.4-0.6, Hf 0-0.2, Nb 0-0.2, Ti 0-0.2, V 0-0.2, Zr 0-0.2 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	92 - 98	7439-89-6
Mn	1 - 4	7439-96-5
Al	0 - 2	7429-90-5
Si	0 - 2	7440-21-3
B	0 - 1	7440-42-8
Cr	0 - 1	7440-47-3
Cu	0 - 1	7440-50-8
Mo	0 - 1	7439-98-7
Ni	0 - 1	7440-02-0
C	0.4 - 0.6	7440-44-0
Hf	0 - 0.2	7440-58-6
Nb	0 - 0.2	7440-03-1
Ti	0 - 0.2	7440-32-6
V	0 - 0.2	7440-62-2
Zr	0 - 0.2	7440-67-7

IPCI C22C0038-00 [I]; C22C0038-06 [I]; C22C0038-58 [I]; C21D0009-46 [N];
 C22C0038-00 [I]; C22C0038-06 [I]; C22C0038-58 [I]; C21D0009-46 [N]

IPCR C22C0038-00 [I]; C22C0038-06 [I]; C22C0038-58 [I]

CC 55-3 (Ferrous Metals and Alloys)

ST steel sheet strength ductility automobile body

IT Automobile bodies
 Elongation at break
 Microstructure
 Phase composition
 Sheet materials
 Tensile strength

Yield strength
 (high-strength high-ductility ~~steel~~ sheet for automobile
 body)
 IT 1995867-40-7
 RL: PRP (Properties); TEM (Technical or engineered material use); USES
 (Uses)
 (high-strength high-ductility ~~steel~~ sheet for automobile
 body)
 OS.CITING REF COUNT: 1 THERE ARE 1 CAPLUS RECORDS THAT CITE THIS RECORD
 (1 CITINGS)

L12 ANSWER 87 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN
 ACCESSION NUMBER: 2016:1459216 CAPLUS Full-text
 DOCUMENT NUMBER: 165:355920
 TITLE: High-strength high-ductility ~~steel~~ sheet for
 automobile body
 INVENTOR(S): Otani, Shigeo; Murakami, Toshio
 PATENT ASSIGNEE(S): Kobe Steel, Ltd., Japan
 SOURCE: Jpn. Kokai Tokkyo Koho, 16pp.; Chemical Indexing
 Equivalent to 165:355916 (WO)
 CODEN: JKXXAF
 DOCUMENT TYPE: Patent
 LANGUAGE: Japanese
 FAMILY ACC. NUM. COUNT: 2
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2016160468	A	20160905	JP 2015-38857	20150227
JP 6348436	B2	20180627		
WO 2016136627	A1	20160901	WO 2016-JP54890	20160219
PRIORITY APPLN. INFO.:			JP 2015-38857	A 20150227

AB The present invention relates to a high-strength and highly-ductile
~~steel~~ sheet comprises: a compn. contg. C, (Si+Al), Mn, P, and S in
 specific amts., with the remainder comprising iron and unavoidable
 impurities; and a structure contg. residual austenite in a specific area
 ratio, with the remainder comprising at least one of bainite, martensite,
 tempered bainite, and tempered martensite. The carbon is present in the
 residual austenite at a specific concn. and concn. distribution, and
 regions having a carbon concn. of at least 1.5 mass% constitute at least
 2.0% of the total structure.

IT 1995867-40-7
 RL: PRP (Properties); TEM (Technical or engineered material use); USES
 (Uses)
 (high-strength high-ductility ~~steel~~ sheet for automobile
 body)
 RN 1995867-40-7 CAPLUS
 CN Iron alloy, base, Fe 92-98, Mn 1-4, Al 0-2, Si 0-2, B 0-1, Cr 0-1, Cu 0-1, Mo
 0-1, Ni 0-1, C 0.4-0.6, Hf 0-0.2, Nb 0-0.2, Ti 0-0.2, V 0-0.2, Zr 0-0.2 (CA
 INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	92 - 98	7439-89-6
Mn	1 - 4	7439-96-5
Al	0 - 2	7429-90-5
Si	0 - 2	7440-21-3
B	0 - 1	7440-42-8
Cr	0 - 1	7440-47-3
Cu	0 - 1	7440-50-8
Mo	0 - 1	7439-98-7
Ni	0 - 1	7440-02-0
C	0.4 - 0.6	7440-44-0
Hf	0 - 0.2	7440-58-6
Nb	0 - 0.2	7440-03-1
Ti	0 - 0.2	7440-32-6
V	0 - 0.2	7440-62-2
Zr	0 - 0.2	7440-67-7

IPCI C22C0038-00 [I]; C22C0038-06 [I]; C22C0038-58 [I]; C21D0009-46 [N];
 C22C0038-00 [I]; C22C0038-06 [I]; C22C0038-58 [I]; C21D0009-46 [N]

IPCR C22C0038-00 [I]; C22C0038-06 [I]; C22C0038-58 [I]

CC 55-3 (Ferrous Metals and Alloys)

ST ~~steel~~ sheet strength ductility automobile body

IT Automobile bodies

Elongation at break

Microstructure

Sheet materials

Tensile strength

(high-strength high-ductility ~~steel~~ sheet for automobile body)

IT 1995867-40-7

RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)

(high-strength high-ductility ~~steel~~ sheet for automobile body)

L12 ANSWER 88 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2016:1441448 CAPLUS Full-text

DOCUMENT NUMBER: 165:355916

TITLE: High-strength high-ductility ~~steel~~ sheet for automobile body

INVENTOR(S): Otani, Shigeo; Murakami, Toshio

PATENT ASSIGNEE(S): Kabushiki Kaisha Kobe Seiko Sho (Kobe Steel, Ltd.), Japan

SOURCE: PCT Int. Appl., 28pp.; Chemical Indexing Equivalent to 165:355920 (JP)
CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 2

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2016136627	A1	20160901	WO 2016-JP54890	20160219
JP 2016160468	A	20160905	JP 2015-38857	20150227
JP 6348436	B2	20180627		

PRIORITY APPLN. INFO.: JP 2015-38857 A 20150227

AB The present invention relates to a high-strength and highly-ductile ~~steel~~ sheet comprises: a compn. contg. C, (Si+Al), Mn, P, and S in specific amts., with the remainder comprising iron and unavoidable impurities; and a structure contg. residual austenite in a specific area ratio, with the remainder comprising at least one of bainite, martensite, tempered bainite, and tempered martensite. The carbon is present in the residual austenite at a specific concn. and concn. distribution, and regions having a carbon concn. of at least 1.5 mass% constitute at least 2.0% of the total structure.

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
AKAMIZU HIROSHI	2005			JP 2005336526 A	CAPLUS
Anon	1996			JP 83720 A	
HAYASHI KOTARO	2014			JP 2014025091 A	CAPLUS
KINO NOBUO	2001			JP 2001330101 A	CAPLUS
KUROKAWA SHINPEI	2013			JP 2013159802 A	CAPLUS
SHIBAIRI KOSUKE	2013			JP 2013204093 A	CAPLUS
SUZUKI TAKESHI	2010			JP 2010222671 A	CAPLUS
SUZUKI TAKESHI	2013			JP 2013036087 A	CAPLUS

IT 1995867-40-7

RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)

(high-strength high-ductility ~~steel~~ sheet for automobile body)

RN 1995867-40-7 CAPLUS

CN Iron alloy, base, Fe 92-98, Mn 1-4, Al 0-2, Si 0-2, B 0-1, Cr 0-1, Cu 0-1, Mo 0-1, Ni 0-1, C 0.4-0.6, Hf 0-0.2, Nb 0-0.2, Ti 0-0.2, V 0-0.2, Zr 0-0.2 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
=====	=====	=====

Fe	92	-	98	7439-89-6
Mn	1	-	4	7439-96-5
Al	0	-	2	7429-90-5
Si	0	-	2	7440-21-3
B	0	-	1	7440-42-8
Cr	0	-	1	7440-47-3
Cu	0	-	1	7440-50-8
Mo	0	-	1	7439-98-7
Ni	0	-	1	7440-02-0
C	0.4	-	0.6	7440-44-0
Hf	0	-	0.2	7440-58-6
Nb	0	-	0.2	7440-03-1
Ti	0	-	0.2	7440-32-6
V	0	-	0.2	7440-62-2
Zr	0	-	0.2	7440-67-7

IPCI C22C0038-00 [I]; C22C0038-06 [I]; C22C0038-58 [I]; C21D0009-46 [N]
 IPCR C22C0038-00 [I]; C21D0009-46 [N]; C22C0038-06 [I]; C22C0038-58 [I]

CC 55-3 (Ferrous Metals and Alloys)

ST ~~steel~~ sheet strength ductility automobile body

IT Automobile bodies

Elongation at break

Microstructure

Sheet materials

Tensile strength

(high-strength high-ductility ~~steel~~ sheet for automobile body)

IT 1995867-40-7

RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)

(high-strength high-ductility ~~steel~~ sheet for automobile body)

L12 ANSWER 89 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2016:1441302 CAPLUS Full-text

DOCUMENT NUMBER: 165:355914

TITLE: High-strength high-ductility ~~steel~~ sheet for automobile body

INVENTOR(S): Otani, Shigeo; Murakami, Toshio

PATENT ASSIGNEE(S): Kabushiki Kaisha Kobe Seiko Sho (Kobe Steel, Ltd.), Japan

SOURCE: PCT Int. Appl., 27pp.; Chemical Indexing Equivalent to 165:355921 (JP)
 CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 2

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2016136625	A1	20160901	WO 2016-JP54887	20160219
JP 2016160467	A	20160905	JP 2015-38856	20150227
JP 6348435	B2	20180627		

PRIORITY APPLN. INFO.: JP 2015-38856 A 20150227

AB The ~~steel~~ sheet comprising a compn. contg. C, (Si+Al), Mn, P, and S in specific amts., with the remainder comprising iron and unavoidable impurities; and a structure contg. residual austenite and ferrite in a specific area ratio. Carbon is present in the residual austenite at a specific concn. and concn. distribution, and regions having a carbon concn. of at least 1.5 mass% constitute at least 3.0% of the total structure.

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
HATAKE HIDEO	2011			JP 2011219859 A	CAPLUS
HATAKE HIDEO	2012			JP 2012240095 A	CAPLUS
KAKIUCHI ELIJAH	2013			JP 2013181184 A	CAPLUS
MURAKAMI TOSHIO	2012			JP 2012122130 A	CAPLUS
SATO KOICHI	2013			WO 2013047808 A1	CAPLUS
WAKITA MASAYUKI	2007			JP 2007023339 A	CAPLUS

YOSHIDA MITSURU | 2012 | | | JP 2012251201 A | CAPLUS
 IT 1995867-40-7
 RL: PRP (Properties); TEM (Technical or engineered material use); USES
 (Uses)
 (high-strength high-ductility ~~steel~~ sheet for automobile
 body)
 RN 1995867-40-7 CAPLUS
 CN Iron alloy, base, Fe 92-98, Mn 1-4, Al 0-2, Si 0-2, B 0-1, Cr 0-1, Cu 0-1, Mo
 0-1, Ni 0-1, C 0.4-0.6, Hf 0-0.2, Nb 0-0.2, Ti 0-0.2, V 0-0.2, Zr 0-0.2 (CA
 INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	92 - 98	7439-89-6
Mn	1 - 4	7439-96-5
Al	0 - 2	7429-90-5
Si	0 - 2	7440-21-3
B	0 - 1	7440-42-8
Cr	0 - 1	7440-47-3
Cu	0 - 1	7440-50-8
Mo	0 - 1	7439-98-7
Ni	0 - 1	7440-02-0
C	0.4 - 0.6	7440-44-0
Hf	0 - 0.2	7440-58-6
Nb	0 - 0.2	7440-03-1
Ti	0 - 0.2	7440-32-6
V	0 - 0.2	7440-62-2
Zr	0 - 0.2	7440-67-7

IPCI C22C0038-00 [I]; C22C0038-06 [I]; C22C0038-58 [I]; C21D0009-46 [N]
 IPCR C22C0038-00 [I]; C21D0009-46 [N]; C22C0038-06 [I]; C22C0038-58 [I]
 CC 55-3 (Ferrous Metals and Alloys)

ST ~~steel~~ sheet strength ductility automobile body

IT Automobile bodies
 Elongation at break
 Microstructure
 Phase composition
 Sheet materials
 Tensile strength
 Yield strength
 (high-strength high-ductility ~~steel~~ sheet for automobile
 body)

IT 1995867-40-7
 RL: PRP (Properties); TEM (Technical or engineered material use); USES
 (Uses)
 (high-strength high-ductility ~~steel~~ sheet for automobile
 body)

L12 ANSWER 90 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2016:1420548 CAPLUS Full-text

DOCUMENT NUMBER: 165:369451

TITLE: Anti-bacterial stainless ~~steel~~

INVENTOR(S): Zhu, Hongyan

PATENT ASSIGNEE(S): Peop. Rep. China

SOURCE: Faming Zhuanli Shenqing, 5pp.

CODEN: CNXXEV

DOCUMENT TYPE: Patent

LANGUAGE: Chinese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
CN 105908085	A	20160831	CN 2016-10462806	20160622
PRIORITY APPLN. INFO.:			CN 2016-10462806	20160622

AB The present invention discloses an anti-bacterial stainless ~~steel~~,
 comprising the following chem. comps.: nickel 0.30-0.50wt%, manganese
 0.80-1.40wt%, silicon 0.20-0.34wt%, carbon 0.14-0.18wt%, boron
 0.02-0.06wt%, phosphorus 0.01-0.02wt%, sulfur 0.015-0.025wt%, erbium
 0.08-0.1wt%, vanadium 0.06-0.2wt% , thulium 0.2-0.3wt%, molybdenum
 0.02-0.08wt%, titanium 0.08-0.1wt%, niobium 0.02-0.04wt%, rubidium

0.06~0.2wt%, thorium 0.08-0.1wt%, chromium and copper 0.06-0.08wt%, and iron as balance, wherein, the chromium content is 5~7 times of copper content. The anti-bacteria stainless steel provided by the present invention has excellent anti-bacterial property. The anti-bacterial effect of antibacterial stainless steel is relevant with the ratio of chromium and copper content, and when chromium content is 5-7 times of copper content, the antibacterial effect reaches the best.

IT 1998722-49-8, Ni 0.3-0.5, Mn 0.8-1.4, Si 0.2-0.3, C 0.1-0.2, B 0-0.1, Er 0.1, V 0.1-0.2, Tm 0.2-0.3, Mo 0-0.1, Ti 0.1, Rb 0.1-0.2, Th 0.1, Cr 0-0.1, Cu 0-0.1, Fe bal.

RL: TEM (Technical or engineered material use); THU (Therapeutic use); BIOL (Biological study); USES (Uses)

(anti-bacterial stainless steel)

RN 1998722-49-8 CAPLUS

CN Iron alloy, base, Fe 96-98, Mn 0.8-1.4, Ni 0.3-0.5, Si 0.2-0.3, Tm 0.2-0.3, C 0.1-0.2, Rb 0.1-0.2, V 0.1-0.2, Er 0.1, Th 0.1, Ti 0.1, B 0-0.1, Cr 0-0.1, Cu 0-0.1, Mo 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	96 - 98	7439-89-6
Mn	0.8 - 1.4	7439-96-5
Ni	0.3 - 0.5	7440-02-0
Si	0.2 - 0.3	7440-21-3
Tm	0.2 - 0.3	7440-30-4
C	0.1 - 0.2	7440-44-0
Rb	0.1 - 0.2	7440-17-7
V	0.1 - 0.2	7440-62-2
Er	0.1	7440-52-0
Th	0.1	7440-29-1
Ti	0.1	7440-32-6
B	0 - 0.1	7440-42-8
Cr	0 - 0.1	7440-47-3
Cu	0 - 0.1	7440-50-8
Mo	0 - 0.1	7439-98-7

IPCI C22C0038-04; C22C0038-02; C22C0038-08; C22C0038-12; C22C0038-14; C22C0038-18; C22C0038-16

IPCR C22C0038-04 [I]; C22C0038-02 [I]; C22C0038-08 [I]; C22C0038-12 [I]; C22C0038-14 [I]; C22C0038-16 [I]; C22C0038-18 [I]

CC 55-12 (Ferrous Metals and Alloys)

ST antibacterial stainless steel

IT Antibacterial agents
Candida albicans
Clostridium tetani
Escherichia coli
Staphylococcus aureus
(anti-bacterial stainless steel)

IT 1998722-49-8, Ni 0.3-0.5, Mn 0.8-1.4, Si 0.2-0.3, C 0.1-0.2, B 0-0.1, Er 0.1, V 0.1-0.2, Tm 0.2-0.3, Mo 0-0.1, Ti 0.1, Rb 0.1-0.2, Th 0.1, Cr 0-0.1, Cu 0-0.1, Fe bal.

RL: TEM (Technical or engineered material use); THU (Therapeutic use); BIOL (Biological study); USES (Uses)

(anti-bacterial stainless steel)

L12 ANSWER 91 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2016:1363138 CAPLUS Full-text

DOCUMENT NUMBER: 165:320572

TITLE: Alloy steel with high strength and high toughness

INVENTOR(S): He, Huaqiong

PATENT ASSIGNEE(S): Peop. Rep. China

SOURCE: Faming Zhuanli Shenqing, 5pp.
CODEN: CNXXEV

DOCUMENT TYPE: Patent

LANGUAGE: Chinese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
CN 105861921	A	20160817	CN 2016-10264079	20160423

PRIORITY APPLN. INFO.:

CN 2016-10264079

20160423

AB The title alloy ~~steel~~ comprises boron 0.02-0.1 wt%, carbon 0.1-0.2 wt%, chromium 0.1 wt%, cobalt and zirconium (at a ratio of 4-6:1) 0.05-0.1 wt%, copper 0.2-0.3 wt%, manganese 0.8-1.2 wt%, molybdenum 0.04-0.1 wt%, nickel 0.3-0.5 wt%, niobium 0.02-0.04 wt%, phosphorus 0.01-0.03 wt%, rubidium 0.2 wt%, silicon 0.2-0.3 wt%, sulfur 0.015-0.025 wt%, thorium 0.1 wt%, titanium 0.1 wt%, vanadium 0.1 wt%, iron bal. The alloy ~~steel~~ of the present invention has ultra-high strength and toughness, and can be used for producing workpieces with relatively high requirements on strength and toughness. The strength and toughness of the alloy ~~steel~~ are related to the content ratio of cobalt to zirconium in the alloy, and little change of the ratio greatly affects the strength and toughness.

IT ~~1988674-60-7~~, Boron 0-0.1, carbon 0.1-0.2, chromium 0.1, cobalt 0-0.1, copper 0.2-0.3, manganese 0.8-1.2, molybdenum 0-0.1, nickel 0.3-0.5, rubidium 0.2, silicon 0.2-0.3, thorium 0.1, titanium 0.1, vanadium 0.1, zirconium 0-0.1, iron bal.
RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(alloy ~~steel~~ with high strength and high toughness)

RN 1988674-60-7 CAPLUS

CN Iron alloy, base, Fe 96-98, Mn 0.8-1.2, Ni 0.3-0.5, Cu 0.2-0.3, Si 0.2-0.3, Rb 0.2, C 0.1-0.2, Cr 0.1, Th 0.1, Ti 0.1, V 0.1, B 0-0.1, Co 0-0.1, Mo 0-0.1, Zr 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
=====+=====+=====		
Fe	96 - 98	7439-89-6
Mn	0.8 - 1.2	7439-96-5
Ni	0.3 - 0.5	7440-02-0
Cu	0.2 - 0.3	7440-50-8
Si	0.2 - 0.3	7440-21-3
Rb	0.2	7440-17-7
C	0.1 - 0.2	7440-44-0
Cr	0.1	7440-47-3
Th	0.1	7440-29-1
Ti	0.1	7440-32-6
V	0.1	7440-62-2
B	0 - 0.1	7440-42-8
Co	0 - 0.1	7440-48-4
Mo	0 - 0.1	7439-98-7
Zr	0 - 0.1	7440-67-7

IPCI C22C0038-02; C22C0038-32; C22C0038-04; C22C0038-18; C22C0038-12;
C22C0038-10; C22C0038-08; C22C0038-16; C22C0038-14

IPCR C22C0038-02 [I]; C22C0038-04 [I]; C22C0038-08 [I]; C22C0038-10 [I];
C22C0038-12 [I]; C22C0038-14 [I]; C22C0038-16 [I]; C22C0038-18 [I];
C22C0038-32 [I]

CC 55-1 (Ferrous Metals and Alloys)

ST alloy ~~steel~~ tensile yield strength toughness

IT Impact strength
Tensile strength
Yield strength
(alloy ~~steel~~ with high strength and high toughness)

IT ~~1988674-60-7~~, Boron 0-0.1, carbon 0.1-0.2, chromium 0.1, cobalt 0-0.1, copper 0.2-0.3, manganese 0.8-1.2, molybdenum 0-0.1, nickel 0.3-0.5, rubidium 0.2, silicon 0.2-0.3, thorium 0.1, titanium 0.1, vanadium 0.1, zirconium 0-0.1, iron bal.
RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(alloy ~~steel~~ with high strength and high toughness)

L12 ANSWER 92 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2016:1336365 CAPLUS Full-text

DOCUMENT NUMBER: 165:309752

TITLE: Abrasion-resistant ~~steel~~ plate with thickness of 4-8 mm for HB450-grade engineering machinery and manufacturing method thereof

INVENTOR(S): Hou, Dengyi; Feng, Yong; Sun, Genling; Wang, Nanhui; Cong, Liang; Su, Xiumei; Yang, Ruixia

PATENT ASSIGNEE(S): Shandong Iron & Steel Co., Ltd., Peop. Rep. China

SOURCE: Faming Zhuanli Shenqing, 11pp.

CODEN: CNXXEV

DOCUMENT TYPE: Patent

LANGUAGE: Chinese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
CN 105861928	A	20160817	CN 2016-10440247	20160617
PRIORITY APPLN. INFO.:			CN 2016-10440247	20160617

AB The present invention belongs to the tech. field of prodn. of steel plates for engineering machinery and particularly relates to an abrasion-resistant steel plate with thickness of 4-8 mm for HB450-grade engineering machinery and a manufg. method thereof. The abrasion-resistant steel plate with thickness of 4-8 mm for HB450-grade engineering machinery comprises the following molten chem. components in percentage by wt.: C 0.16-0.18%, Si 0.05-0.20%, Mn, 0.50-0.70%, P less than or equal to 0.010%, S less than or equal to 0.003%, Alt 0.020-0.030%, Cr 0.35-0.45%, Mo 0.10-0.15%, B 0.0008-0.0015%, Ti 0.015-0.025%, O less than or equal to 10 ppm, N less than or equal to 15 ppm, H less than or equal to 3 ppm, and the balance of Fe and inevitable impurities. The manuf. method comprises KR iron melt pre-treatment, converter smelting, deoxidn. alloying, CAS refining, LF refining, RH vacuum degassing, electromagnetic stirring and continuously casting to gain blanks, cold stacking the blanks, heating the blanks, high pressure water descaling, four-roll rough rolling, four-roll finish rolling, thermal straightening, water cooling and quenching, thermal straightening, distressing and annealing, thermal straightening, and length-fixing cutting. The steel plate belongs to thin-size high-grade high-strength abrasion-resistant steel, has excellent mech. property, high purity and good plate shape, and is easy to weld.

IT 1315482-08-6P, HB450, preparation

RL: IMF (Industrial manufacture); PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PREP (Preparation); PROC (Process); USES (Uses)

(abrasion-resistant steel plate with thickness of 4-8 mm for HB450-grade engineering machinery and manufg. method thereof)

RN 1315482-08-6 CAPLUS

CN Steel, (HB450) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	97 - 98	7439-89-6
Mn	1.2 - 1.6	7439-96-5
Si	0.4 - 0.6	7440-21-3
B	0 - 0.4	7440-42-8
Cr	0 - 0.4	7440-47-3
Ti	0 - 0.4	7440-32-6
C	0.2	7440-44-0

IPCI C22C0038-02; C22C0038-04; C22C0038-06; C22C0038-18; C22C0038-12; C22C0038-32; C22C0038-14; C22C0033-04; C21D0001-30; C21D0001-18; C21D0008-02

IPCR C22C0038-02 [I]; C21D0001-18 [I]; C21D0001-30 [I]; C21D0008-02 [I]; C22C0033-04 [I]; C22C0038-04 [I]; C22C0038-06 [I]; C22C0038-12 [I]; C22C0038-14 [I]; C22C0038-18 [I]; C22C0038-32 [I]

CC 55-1 (Ferrous Metals and Alloys)

ST steel plate thickness engineering machinery manufg rolling quenching annealing

IT Apparatus

(Engineering; abrasion-resistant steel plate with thickness of 4-8 mm for HB450-grade engineering machinery and manufg. method thereof)

IT Annealing

Finishing

Industrial manufacturing

Plates

Quenching (cooling)

Rolling (metals)

(abrasion-resistant steel plate with thickness of 4-8 mm for HB450-grade engineering machinery and manufg. method thereof)

IT 1315482-08-6P, HB450, preparation
 RL: IMF (Industrial manufacture); PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PREP (Preparation); PROC (Process); USES (Uses)
 (abrasion-resistant ~~steel~~ plate with thickness of 4-8 mm for HB450-grade engineering machinery and manufg. method thereof)

L12 ANSWER 93 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2016:1336280 CAPLUS Full-text
 DOCUMENT NUMBER: 165:320587
 TITLE: Long-service-life ~~steel~~ ball for shot blasting surface treatment, and its preparation method
 INVENTOR(S): Hu, Yinji
 PATENT ASSIGNEE(S): Peop. Rep. China
 SOURCE: Faming Zhuanli Shenqing, 16pp.
 CODEN: CNXXEV
 DOCUMENT TYPE: Patent
 LANGUAGE: Chinese
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
CN 105861922	A	20160817	CN 2016-10272692	20160428
CN 105861922	B	20170929		

PRIORITY APPLN. INFO.: CN 2016-10272692 20160428

AB The inventive long-service-life ~~steel~~ ball for shot blasting surface treatment comprises (by wt%) aluminum 0.001-0.05, carbon 0.1-0.4, chromium 0.3-1.5, copper 0.05-0.2, manganese 0.4-1.5, molybdenum 0.001-0.05, nickel 0.001-0.1, niobium 0.001-0.2, phosphorus 0-0.05, silicon 0.1-1.0, sulfur 0-0.05, titanium 0.001-0.1, tungsten 0.001-0.1, vanadium 0.001-0.2, zinc 0.001-0.1, boron, magnesium, cerium and/or lanthanum 0.0001-0.1, iron balance. The ~~steel~~ ball has metallog. structure of lath martensite-bainite duplex structure, or lath martensite-plate martensite duplex structure. The prepn. method includes smelting, deoxidizing with aluminum, performing centrifugal granulation, cooling with water to form as-cast ~~steel~~ balls, drying, sieving, heating at 860-930°C for 30-40 min, quenching in water, and tempering by heating at 150-480°C for 30-60 min. The ~~steel~~ ball has good wear resistance, long service life, high surface hardness, and breaking resistance.

IT 1988677-28-6P, Carbon 0.1-0.4, chromium 0.3-1.5, copper 0.05-0.2, manganese 0.4-1.5, nickel 0.001-0.1, niobium 0.001-0.2, silicon 0.1-1.0, titanium 0.001-0.1, tungsten 0.001-0.1, vanadium 0.001-0.2, zinc 0.001-0.1, boron 0-0.1, magnesium 0-0.1, cerium 0-0.1, lanthanum 0.0001-0.1, iron bal.
 RL: IMF (Industrial manufacture); PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PREP (Preparation); PROC (Process); USES (Uses)
 (long-service-life ~~steel~~ ball for shot blasting surface treatment, and its prepn. method)

RN 1988677-28-6 CAPLUS
 CN Iron alloy, base, Fe 94-99, Mn 0.4-1.5, Cr 0.3-1.5, Si 0.1-1, C 0.1-0.4, Cu 0-0.2, Nb 0-0.2, V 0-0.2, B 0-0.1, Ce 0-0.1, La 0-0.1, Mg 0-0.1, Ni 0-0.1, Ti 0-0.1, W 0-0.1, Zn 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	94 - 99	7439-89-6
Mn	0.4 - 1.5	7439-96-5
Cr	0.3 - 1.5	7440-47-3
Si	0.1 - 1	7440-21-3
C	0.1 - 0.4	7440-44-0
Cu	0 - 0.2	7440-50-8
Nb	0 - 0.2	7440-03-1
V	0 - 0.2	7440-62-2
B	0 - 0.1	7440-42-8
Ce	0 - 0.1	7440-45-1
La	0 - 0.1	7439-91-0
Mg	0 - 0.1	7439-95-4
Ni	0 - 0.1	7440-02-0

Ti	0	-	0.1	7440-32-6
W	0	-	0.1	7440-33-7
Zn	0	-	0.1	7440-66-6

IPCI C22C0038-02; C22C0038-04; C22C0038-60; C22C0038-18; C22C0038-12;
C22C0038-14; C22C0038-08; C22C0038-16; C22C0038-06; C22C0038-32;
C21D0006-00; C21D0009-36; C21D0001-18; B22F0009-10

IPCR C22C0038-02 [I]; B22F0009-10 [I]; C21D0001-18 [I]; C21D0006-00 [I];
C21D0009-36 [I]; C22C0038-04 [I]; C22C0038-06 [I]; C22C0038-08 [I];
C22C0038-12 [I]; C22C0038-14 [I]; C22C0038-16 [I]; C22C0038-18 [I];
C22C0038-32 [I]; C22C0038-60 [I]

CC 55-3 (Ferrous Metals and Alloys)

ST ~~steel~~ ball shot blasting surface treatment long service life

IT Deoxidation
Granulation
Quenching (cooling)
Shotblasting
Sieving
Smelting
Spheres
Tempering
Wear-resistant materials
(long-service-life ~~steel~~ ball for shot blasting surface treatment, and its prepn. method)

IT 1988677-28-6P, Carbon 0.1-0.4, chromium 0.3-1.5, copper 0.05-0.2, manganese 0.4-1.5, nickel 0.001-0.1, niobium 0.001-0.2, silicon 0.1-1.0, titanium 0.001-0.1, tungsten 0.001-0.1, vanadium 0.001-0.2, zinc 0.001-0.1, boron 0-0.1, magnesium 0-0.1, cerium 0-0.1, lanthanum 0.0001-0.1, iron bal.
RL: IMF (Industrial manufacture); PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PREP (Preparation); PROC (Process); USES (Uses)
(long-service-life ~~steel~~ ball for shot blasting surface treatment, and its prepn. method)

IT 7429-90-5, Aluminum, processes
RL: NUU (Other use, unclassified); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(long-service-life ~~steel~~ ball for shot blasting surface treatment, and its prepn. method)

L12 ANSWER 94 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2016:1287935 CAPLUS Full-text

DOCUMENT NUMBER: 165:278246

TITLE: ~~Steel~~ sheet blank having laser cut end surfaces,
~~steel~~ sheet for laser cutting, and manufacture thereof

INVENTOR(S): Fujinaka, Shingo

PATENT ASSIGNEE(S): Nippon Steel & Sumitomo Metal Corporation, Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 17pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2016141816	A	20160808	JP 2015-15695	20150129
JP 6417977	B2	20181107		

PRIORITY APPLN. INFO.: JP 2015-15695 20150129

AB The title ~~steel~~ sheet blank is characterized by a compn. contg. C 0.02-0.16, Si 0.04-2, Mn 0.4-3, P ≤0.05, S ≤0.02, sol.Al 0.01-2, and balance Fe, a microstructure having martensite and bainite for total area ratio ≥70% at cut end surfaces with 40 μm width to inside, and having ferrite area ratio 10-90%, retained austenite area ratio ≥1%, and balance martensite and bainite at mother material parts except the cut end surfaces, and tensile strength ≥440 MPa and <780 MPa. Optionally, the compn. contains (1) Ti ≤0.2, Nb ≤0.2, and/or V ≤0.2, (2) Cu ≤1, Ni ≤1, Cr ≤1, Mo ≤1, and/or B ≤0.1, and/or (3) REM ≤0.1, Mg ≤0.01, Ca ≤0.01, and/or Bi ≤0.1 mass%. The title ~~steel~~ sheet is manufd. by the steps comprising: hot rolling a ~~steel~~ slab at 1100-1300°, finishing the hot rolling at 850-950°,

and then coiling at $\leq 650^\circ$; (B) pickling and cold rolling the hot rolled sheet; and then (C) continuous annealing by heating at $\geq [(Ac1 + Ac3)/2]$ and $\leq (Ac3 + 50^\circ)$, retaining at the temp. region for 240 s, and then cooling at av. cooling rate $2-50^\circ/\text{s}$ to $250-500^\circ$. The manuf. process provides the high-strength steel sheet having excellent elongation and stretch flangeability to give the steel sheet blank.

IT 1980840-39-8D, Mg,Ca microalloy
 RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (manuf. of steel sheet for laser cutting and microstructure of steel sheet blank)

RN 1980840-39-8 CAPLUS

CN Iron alloy, base, Fe 88-100, Mn 0.4-3, Al 0-2, Si 0-2, Cr 0-1, Cu 0-1, Mo 0-1, Ni 0-1, C 0-0.2, Nb 0-0.2, Ti 0-0.2, V 0-0.2, B 0-0.1, Bi 0-0.1, misch metal 0-0.1
 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
=====+	=====+	=====+
Fe	88 - 100	7439-89-6
Mn	0.4 - 3	7439-96-5
Al	0 - 2	7429-90-5
Si	0 - 2	7440-21-3
Cr	0 - 1	7440-47-3
Cu	0 - 1	7440-50-8
Mo	0 - 1	7439-98-7
Ni	0 - 1	7440-02-0
C	0 - 0.2	7440-44-0
Nb	0 - 0.2	7440-03-1
Ti	0 - 0.2	7440-32-6
V	0 - 0.2	7440-62-2
B	0 - 0.1	7440-42-8
Bi	0 - 0.1	7440-69-9
Misch metal	0 - 0.1	8049-20-5

IPCI C22C0038-00 [I]; C22C0038-06 [I]; C22C0038-58 [I]; C21D0009-46 [I];
 C22C0038-00 [I]; C22C0038-06 [I]; C22C0038-58 [I]; C21D0009-46 [N]

IPCR C22C0038-00 [I]; C21D0009-46 [I]; C22C0038-06 [I]; C22C0038-58 [I]

CC 55-5 (Ferrous Metals and Alloys)

ST laser cutting steel sheet blank microstructure; annealing steel sheet laser cutting

IT Annealing
 Hot rolling
 Laser cutting
 Microstructure
 (manuf. of steel sheet for laser cutting and microstructure of steel sheet blank)

IT 1980840-37-6 1980840-39-8D, Mg,Ca microalloy
 RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (manuf. of steel sheet for laser cutting and microstructure of steel sheet blank)

IT 12173-93-2, Martensite, uses 12427-23-5, Bainite 12427-24-6, Ferrite (ferrous metal component)
 RL: TEM (Technical or engineered material use); USES (Uses)
 (manuf. of steel sheet for laser cutting and microstructure of steel sheet blank)

IT 7439-95-4D, Magnesium, trace in steel 7440-70-2D, Calcium, trace in steel
 RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (microalloy; manuf. of steel sheet for laser cutting and microstructure of steel sheet blank)

IT 12244-31-4, Austenite, uses
 RL: TEM (Technical or engineered material use); USES (Uses)
 (retained; manuf. of steel sheet for laser cutting and microstructure of steel sheet blank)

DOCUMENT NUMBER: 165:167420
 TITLE: An alloy ~~steel~~ new material with resistance to high temperature oxidation
 INVENTOR(S): Guo, Jiachuan
 PATENT ASSIGNEE(S): Wenling Chuangjia Information Technology Co., Ltd., Peop. Rep. China
 SOURCE: Faming Zhuanli Shenqing, 5pp.
 CODEN: CNXXEV
 DOCUMENT TYPE: Patent
 LANGUAGE: Chinese
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
CN 105734420	A	20160706	CN 2016-10154150	20160317
PRIORITY APPLN. INFO.:			CN 2016-10154150	20160317

AB The present invention discloses an alloy ~~steel~~ new material with resistance to high temp. oxidn., comprising 0.30~0.50wt% of nickel, 0.80~1.40wt% of manganese, 0.20~0.34wt% of silicon, 0.14~0.18wt% of carbon, 0.02~0.06wt% of boron, 0.01~0.02wt% of phosphorus, 0.015~0.025wt% of sulfur, 0.08~0.1wt% of chromium, 0.06~0.2wt% of vanadium, 0.2~0.3wt% of copper, 0.02~0.08wt% of molybdenum, 0.08~0.1wt% of titanium, 0.02~0.04wt% of niobium, 0.06~0.2wt% of rubidium, 0.08~0.1wt% of thorium, 0.06~0.1wt% of lanthanum and germanium, and balance iron; wherein the germanium content is 2~4 times of the lanthanum content. The alloy ~~steel~~ new material provided by the present invention has excellent high temp. oxidn. resistance, and could be used for manufg. the workpiece with high temp. oxidn. resistance. The high temp. oxidn. resistance of the alloy ~~steel~~ new material is related with the content proportion of the lanthanum and germanium in the alloy ~~steel~~.

IT 1960401-15-3, Ni 0.3-0.5, Mn 0.8-1.4, Si 0.2-0.3, C 0.1-0.2, B 0-0.1, Cr 0.1, V 0.1-0.2, Cu 0.2-0.3, Mo 0-0.1, Ti 0.1, Rb 0.1-0.2, Th 0.1, La 0-0.1, Ge 0-0.1, Fe bal.

RL: TEM (Technical or engineered material use); USES (Uses)
 (alloy ~~steel~~ new material with resistance to high temp. oxidn.)

RN 1960401-15-3 CAPLUS

CN Iron alloy, base, Fe 96-98, Mn 0.8-1.4, Ni 0.3-0.5, Cu 0.2-0.3, Si 0.2-0.3, C 0.1-0.2, Rb 0.1-0.2, V 0.1-0.2, Cr 0.1, Th 0.1, Ti 0.1, B 0-0.1, Ge 0-0.1, La 0-0.1, Mo 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	96 - 98	7439-89-6
Mn	0.8 - 1.4	7439-96-5
Ni	0.3 - 0.5	7440-02-0
Cu	0.2 - 0.3	7440-50-8
Si	0.2 - 0.3	7440-21-3
C	0.1 - 0.2	7440-44-0
Rb	0.1 - 0.2	7440-17-7
V	0.1 - 0.2	7440-62-2
Cr	0.1	7440-47-3
Th	0.1	7440-29-1
Ti	0.1	7440-32-6
B	0 - 0.1	7440-42-8
Ge	0 - 0.1	7440-56-4
La	0 - 0.1	7439-91-0
Mo	0 - 0.1	7439-98-7

IPCI C22C0038-04; C22C0038-08; C22C0038-02; C22C0038-18; C22C0038-12; C22C0038-16; C22C0038-14

IPCR C22C0038-04 [I]; C22C0038-02 [I]; C22C0038-08 [I]; C22C0038-12 [I]; C22C0038-14 [I]; C22C0038-16 [I]; C22C0038-18 [I]

CC 55-12 (Ferrous Metals and Alloys)

ST alloy ~~steel~~ material high temp oxidn resistance

IT Furnaces
 (alloy ~~steel~~ new material with resistance to high temp. oxidn.)

IT 1960401-15-3, Ni 0.3-0.5, Mn 0.8-1.4, Si 0.2-0.3, C 0.1-0.2, B

0-0.1, Cr 0.1, V 0.1-0.2, Cu 0.2-0.3, Mo 0-0.1, Ti 0.1, Rb 0.1-0.2, Th 0.1, La 0-0.1, Ge 0-0.1, Fe bal.

RL: TEM (Technical or engineered material use); USES (Uses)
(alloy ~~steel~~ new material with resistance to high temp.
oxidn.)

L12 ANSWER 96 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2016:1011326 CAPLUS Full-text
DOCUMENT NUMBER: 165:117791
TITLE: High temperature resistant alloy ~~steel~~ and
preparation method thereof
INVENTOR(S): Xu, Ting
PATENT ASSIGNEE(S): Peop. Rep. China
SOURCE: Faming Zhuanli Shenqing, 5pp.
CODEN: CNXXEV
DOCUMENT TYPE: Patent
LANGUAGE: Chinese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
CN 105695866	A	20160622	CN 2016-10264926	20160423
PRIORITY APPLN. INFO.:			CN 2016-10264926	20160423

AB The present invention discloses a high temp. resistant alloy ~~steel~~ and prepn. method thereof, comprising 0.30-0.50wt% of nickel, 0.80%-1.40wt% of manganese, 0.20-0.34wt% of silicon, 0.14-0.18wt% of carbon, 0.02-0.06wt% of boron, 0.01-0.02wt% of phosphorus, 0.015-0.025wt% of sulfur, 0.08-0.1wt% of chromium, 0.06-0.2wt% of vanadium, 0.2-0.3wt% of copper, 0.02-0.08wt% of molybdenum, 0.08-0.1wt% of titanium, 0.02-0.04wt% of niobium, 0.06-0.2wt% of rubidium, 0.08-0.1wt% of thorium, 0.06-0.1wt% of erbium and thulium, the residue is iron; wherein, the content of described thulium is 2-4 times of the content of erbium. The alloy ~~steel~~ novel material provided by the present invention has excellent high temp. oxidn. resistance, it is possible to prep. the workpiece that the high temp. oxidn. resistance is high. The high temp. oxidn. resistance of this alloy ~~steel~~ novel material is relevant with the content ratio of thulium and erbium in this ~~steel~~ alloy.

IT 1949764-15-1, Ni 0.3-0.5, Mn 0.8-1.4, Si 0.2-0.3, C 0.1-0.2, B 0-0.1, Cr 0.1, V 0.1-0.2, Cu 0.2-0.3, Mo 0-0.1, Ti 0.1, Rb 0.1-0.2, Th 0.1, Er 0-0.1, Tm 0-0.1, Fe bal.

RL: TEM (Technical or engineered material use); USES (Uses)
(high temp. resistant alloy ~~steel~~ and prepn. method thereof)

RN 1949764-15-1 CAPLUS

CN Iron alloy, base, Fe 96-98, Mn 0.8-1.4, Ni 0.3-0.5, Cu 0.2-0.3, Si 0.2-0.3, C 0.1-0.2, Rb 0.1-0.2, V 0.1-0.2, Cr 0.1, Th 0.1, Ti 0.1, B 0-0.1, Er 0-0.1, Mo 0-0.1, Tm 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	96 - 98	7439-89-6
Mn	0.8 - 1.4	7439-96-5
Ni	0.3 - 0.5	7440-02-0
Cu	0.2 - 0.3	7440-50-8
Si	0.2 - 0.3	7440-21-3
C	0.1 - 0.2	7440-44-0
Rb	0.1 - 0.2	7440-17-7
V	0.1 - 0.2	7440-62-2
Cr	0.1	7440-47-3
Th	0.1	7440-29-1
Ti	0.1	7440-32-6
B	0 - 0.1	7440-42-8
Er	0 - 0.1	7440-52-0
Mo	0 - 0.1	7439-98-7
Tm	0 - 0.1	7440-30-4

IPCI C22C0038-08; C22C0038-04; C22C0038-02; C22C0038-32; C22C0038-18;
C22C0038-12; C22C0038-16; C22C0038-14

IPCR C22C0038-08 [I]; C22C0038-02 [I]; C22C0038-04 [I]; C22C0038-12 [I];
C22C0038-14 [I]; C22C0038-16 [I]; C22C0038-18 [I]; C22C0038-32 [I]

CC 55-12 (Ferrous Metals and Alloys)

ST high temp resistant alloy steel
 IT Heat-resistant materials
 (high temp. resistant alloy steel and prepn. method thereof)
 IT 1949764-15-1, Ni 0.3-0.5, Mn 0.8-1.4, Si 0.2-0.3, C 0.1-0.2, B
 0-0.1, Cr 0.1, V 0.1-0.2, Cu 0.2-0.3, Mo 0-0.1, Ti 0.1, Rb 0.1-0.2, Th
 0.1, Er 0-0.1, Tm 0-0.1, Fe bal.
 RL: TEM (Technical or engineered material use); USES (Uses)
 (high temp. resistant alloy steel and prepn. method thereof)

L12 ANSWER 97 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2016:894459 CAPLUS Full-text
 DOCUMENT NUMBER: 165:46380
 TITLE: A high-strength high-toughness alloy steel
 INVENTOR(S): Song, Xiaoling
 PATENT ASSIGNEE(S): Peop. Rep. China
 SOURCE: Faming Zhuanli Shenqing, 5pp.
 CODEN: CNXXEV
 DOCUMENT TYPE: Patent
 LANGUAGE: Chinese
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
CN 105624555	A	20160601	CN 2016-10038427	20160120
PRIORITY APPLN. INFO.:			CN 2016-10038427	20160120

AB The present invention discloses a high-strength high-toughness alloy steel. The alloy steel includes carbon 0.14-0.18, Si 0.20-0.34, boron 0.02-0.06, Mn 0.80-1.40, phosphorus 0.01-0.02, sulfur 0.015-0.025, chromium 0.08-0.1, vanadium 0.06-0.2, nickel 0.30-0.50, Cu 0.2-0.3, molybdenum 0.02-0.08, titanium 0.08-0.1, niobium 0.02-0.04, rubidium 0.06-0.2, indium 0.01-0.02, europium 0.02-0.08, thorium 0.08-0.1, the balance iron; wherein the content of europium is 2 to 4 times of indium content. Alloy steel of the present invention has ultra-high strength and toughness, can be used in manuf. of workpiece with high requirement to strength and toughness. The strength and toughness of the steel alloy is relative to content ratio of europium and indium in alloy steel, and small changes of the content ratio has large influence on the strength and toughness.

IT 1935673-46-3, Boron 0.02-0.06, carbon 0.14-0.18, copper 0.2-0.3, chromium 0.1, europium 0.02-0.08, iron 71.28-97.88, manganese 0.80-1.40, molybdenum 0.02-0.08, nickel 0.30-0.50, rubidium 0.06-0.2, silicon 0.20-0.34, titanium 0.1, thorium 0.1, vanadium 0.06-0.2
 RL: TEM (Technical or engineered material use); USES (Uses)
 (high-strength high-toughness alloy steel)
 RN 1935673-46-3 CAPLUS
 CN Iron alloy, base, Fe 71-98, Mn 0.8-1.4, Ni 0.3-0.5, Cu 0.2-0.3, Si 0.2-0.3, C 0.1-0.2, Rb 0.1-0.2, V 0.1-0.2, Cr 0.1, Th 0.1, Ti 0.1, B 0-0.1, Eu 0-0.1, Mo 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	71 - 98	7439-89-6
Mn	0.8 - 1.4	7439-96-5
Ni	0.3 - 0.5	7440-02-0
Cu	0.2 - 0.3	7440-50-8
Si	0.2 - 0.3	7440-21-3
C	0.1 - 0.2	7440-44-0
Rb	0.1 - 0.2	7440-17-7
V	0.1 - 0.2	7440-62-2
Cr	0.1	7440-47-3
Th	0.1	7440-29-1
Ti	0.1	7440-32-6
B	0 - 0.1	7440-42-8
Eu	0 - 0.1	7440-53-1
Mo	0 - 0.1	7439-98-7

IPCI C22C0038-04; C22C0038-02; C22C0038-18; C22C0038-12; C22C0038-08;
 C22C0038-16; C22C0038-14

IPCR C22C0038-04 [I]; C22C0038-02 [I]; C22C0038-08 [I]; C22C0038-12 [I];
 C22C0038-14 [I]; C22C0038-16 [I]; C22C0038-18 [I]

CC 55-12 (Ferrous Metals and Alloys)
 ST high strength toughness alloy ~~steel~~
 IT 1935673-46-3, Boron 0.02-0.06, carbon 0.14-0.18, copper 0.2-0.3,
 chromium 0.1, europium 0.02-0.08, iron 71.28-97.88, manganese 0.80-1.40,
 molybdenum 0.02-0.08, nickel 0.30-0.50, rubidium 0.06-0.2, silicon
 0.20-0.34, titanium 0.1, thorium 0.1, vanadium 0.06-0.2
 RL: TEM (Technical or engineered material use); USES (Uses)
 (high-strength high-toughness alloy ~~steel~~)

L12 ANSWER 98 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2016:892009 CAPLUS Full-text
 DOCUMENT NUMBER: 165:46330
 TITLE: High-strength high-ductility ~~steel~~ plate for
 automobile body
 INVENTOR(S): Murakami, Toshio; Otani, Shigeo
 PATENT ASSIGNEE(S): Kabushiki Kaisha Kobe Seiko Sho (Kobe Steel, Ltd.),
 Japan
 SOURCE: PCT Int. Appl., 27pp.; Chemical Indexing Equivalent to
 165:46317 (JP)
 CODEN: PIXXD2
 DOCUMENT TYPE: Patent
 LANGUAGE: Japanese
 FAMILY ACC. NUM. COUNT: 2
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2016084847	A1	20160602	WO 2015-JP83078	20151125
JP 2016098427	A	20160530	JP 2014-238710	20141126
JP 6282577	B2	20180221		
KR 2017070230	A	20170621	KR 2017-7013590	20151125
KR 2111921	B1	20200518		
CN 107002192	A	20170801	CN 2015-80061877	20151125
CN 107002192	B	20190308		
EP 3225708	A1	20171004	EP 2015-862199	20151125
US 20170268077	A1	20170921	US 2017-15528675	20170522
PRIORITY APPLN. INFO.:			JP 2014-238710	A 20141126
			WO 2015-JP83078	W 20151125

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB The invention provides a high-strength high-ductility ~~steel~~ plate
 excellent in strength-ductility balance which can secure tensile strength
 (TS) × elongation (EL) × elongation flange ability (λ)
 of more than 1000000MPa·%, and yield ratio (YR) of 0.7 or
 more. The high-strength high-ductility ~~steel~~ plate contains (by wt.%) C
 0.10-0.35, Si+Al 0.5-2.0, Mn 1.0-4.0, P 0-0.05, S 0-0.01, and iron and
 inevitable impurities as balance. As for ~~steel~~ texture, retained
 austenite is 8% or more at the area rate with respect to all the texture,
 and the remainder consists of one or two of bainite, martensite, tempered
 bainite, and tempered martensite. As for the carbon concn. in the
 retained austenite, the mean carbon concn. is 0.9-1.2 mass%, and the std.
 deviation of the carbon concn. distribution is more than 0.35 mass%. The
 region with carbon concn. of more than 1.5 mass% is 1.0% or more at the
 area rate to all the texture.

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
AKAMIZU HIROSHI	2005			JP 2005336526 A	CAPLUS
FUTAMURA YUICHI	2011			JP 2011157583 A	CAPLUS
MATSUDA HIROSHI	2010			JP 2010065273 A	CAPLUS
NOMURA MASAHIRO	2005			JP 2005179703 A	CAPLUS
OKAMOTO RIKI	2011			WO 2011093490 A1	CAPLUS
SPEER JOHN G	2006			US 20060011274 A1	CAPLUS

IT 1935673-79-2
 RL: PRP (Properties); TEM (Technical or engineered material use); USES
 (Uses)
 (high-strength high-ductility ~~steel~~ plate for automobile
 body)

RN 1935673-79-2 CAPLUS

CN Iron alloy, base, Fe 92-98, Mn 1-4, Al 0-2, Si 0-2, B 0-1, Cr 0-1, Cu 0-1, Mo
 0-1, Ni 0-1, C 0.1-0.4, Hf 0-0.2, Nb 0-0.2, Ti 0-0.2, V 0-0.2, Zr 0-0.2 (CA
 INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	92 - 98	7439-89-6
Mn	1 - 4	7439-96-5
Al	0 - 2	7429-90-5
Si	0 - 2	7440-21-3
B	0 - 1	7440-42-8
Cr	0 - 1	7440-47-3
Cu	0 - 1	7440-50-8
Mo	0 - 1	7439-98-7
Ni	0 - 1	7440-02-0
C	0.1 - 0.4	7440-44-0
Hf	0 - 0.2	7440-58-6
Nb	0 - 0.2	7440-03-1
Ti	0 - 0.2	7440-32-6
V	0 - 0.2	7440-62-2
Zr	0 - 0.2	7440-67-7

IPCI C22C0038-00 [I]; C22C0038-06 [I]; C22C0038-58 [I]; C21D0009-46 [N]
 IPCR C22C0038-00 [I]; C21D0009-46 [N]; C22C0038-06 [I]; C22C0038-58 [I]

CC 55-3 (Ferrous Metals and Alloys)

ST ~~steel~~ plate strength ductility microstructure automobile body

IT Automobile bodies

Elongation, mechanical

Phase composition

Tensile strength

Yield strength

(high-strength high-ductility ~~steel~~ plate)

IT Microstructure

(high-strength high-ductility ~~steel~~ plate for automobile body)

IT 7440-44-0, Carbon, properties

RL: MOA (Modifier or additive use); PRP (Properties); USES (Uses)

(alloy element, high-strength high-ductility ~~steel~~ plate)

IT ~~1935673-79-2~~

RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)

(high-strength high-ductility ~~steel~~ plate for automobile body)

OS.CITING REF COUNT: 1 THERE ARE 1 CAPLUS RECORDS THAT CITE THIS RECORD
 (1 CITINGS)

L12 ANSWER 99 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2016:871152 CAPLUS Full-text

DOCUMENT NUMBER: 165:46317

TITLE: High-strength high-ductility ~~steel~~ plate for automobile body

INVENTOR(S): Murakami, Toshio; Otani, Shigeo

PATENT ASSIGNEE(S): Kobe Steel, Ltd., Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 16pp.; Chemical Indexing Equivalent to 165:46330 (WO)

CODEN: JKXXAF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 2

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2016098427	A	20160530	JP 2014-238710	20141126
JP 6282577	B2	20180221		
WO 2016084847	A1	20160602	WO 2015-JP83078	20151125
KR 2017070230	A	20170621	KR 2017-7013590	20151125
KR 2111921	B1	20200518		
CN 107002192	A	20170801	CN 2015-80061877	20151125
CN 107002192	B	20190308		
EP 3225708	A1	20171004	EP 2015-862199	20151125
US 20170268077	A1	20170921	US 2017-15528675	20170522
PRIORITY APPLN. INFO.:			JP 2014-238710	A 20141126
			WO 2015-JP83078	W 20151125

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB The invention provides a high-strength high-ductility ~~steel~~ plate excellent in strength-ductility balance which can secure tensile strength (TS) × elongation (EL) × elongation flange ability (λ) of more than 1000000MPa·%·%, and yield ratio (YR) of 0.7 or more. The high-strength high-ductility ~~steel~~ plate contains (by wt.%) C 0.10-0.35, Si+Al 0.5-2.0, Mn 1.0-4.0, P 0-0.05, S 0-0.01, and iron and inevitable impurities as balance. As for ~~steel~~ texture, retained austenite is 8% or more at the area rate with respect to all the texture, and the remainder consists of one or two of bainite, martensite, tempered bainite, and tempered martensite. As for the carbon concn. in the retained austenite, the mean carbon concn. is 0.9-1.2 mass%, and the std. deviation of the carbon concn. distribution is more than 0.35 mass%. The region with carbon concn. of more than 1.5 mass% is 1.0% or more at the area rate to all the texture.

IT 1935673-79-2
 RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
 (high-strength high-ductility ~~steel~~ plate for automobile body)

RN 1935673-79-2 CAPLUS

CN Iron alloy, base, Fe 92-98, Mn 1-4, Al 0-2, Si 0-2, B 0-1, Cr 0-1, Cu 0-1, Mo 0-1, Ni 0-1, C 0.1-0.4, Hf 0-0.2, Nb 0-0.2, Ti 0-0.2, V 0-0.2, Zr 0-0.2 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
=====+=====+=====		
Fe	92 - 98	7439-89-6
Mn	1 - 4	7439-96-5
Al	0 - 2	7429-90-5
Si	0 - 2	7440-21-3
B	0 - 1	7440-42-8
Cr	0 - 1	7440-47-3
Cu	0 - 1	7440-50-8
Mo	0 - 1	7439-98-7
Ni	0 - 1	7440-02-0
C	0.1 - 0.4	7440-44-0
Hf	0 - 0.2	7440-58-6
Nb	0 - 0.2	7440-03-1
Ti	0 - 0.2	7440-32-6
V	0 - 0.2	7440-62-2
Zr	0 - 0.2	7440-67-7

IPCI C22C0038-00 [I]; C22C0038-06 [I]; C22C0038-58 [I]; C21D0009-46 [N];
 C22C0038-00 [I]; C22C0038-06 [I]; C22C0038-58 [I]; C21D0009-46 [N]

IPCR C22C0038-00 [I]; C22C0038-06 [I]; C22C0038-58 [I]

CC 55-3 (Ferrous Metals and Alloys)

ST ~~steel~~ plate strength ductility microstructure automobile body

IT Automobile bodies
 Elongation, mechanical
 Phase composition
 Tensile strength
 Yield strength
 (high-strength high-ductility ~~steel~~ plate)

IT Microstructure
 (high-strength high-ductility ~~steel~~ plate for automobile body)

IT 7440-44-0, Carbon, properties
 RL: MOA (Modifier or additive use); PRP (Properties); USES (Uses)
 (alloy element, high-strength high-ductility ~~steel~~ plate)

IT 1935673-79-2
 RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
 (high-strength high-ductility ~~steel~~ plate for automobile body)

OS.CITING REF COUNT: 1 THERE ARE 1 CAPLUS RECORDS THAT CITE THIS RECORD
 (1 CITINGS)

DOCUMENT NUMBER: 165:35141
 TITLE: High strength high ductility ~~steel~~ plate for automobile body
 INVENTOR(S): Murakami, Toshio; Otani, Shigeo
 PATENT ASSIGNEE(S): Kobe Steel, Ltd., Japan
 SOURCE: Jpn. Kokai Tokkyo Koho, 16pp.; Chemical Indexing Equivalent to 165:35129 (WO)
 CODEN: JKXXAF

DOCUMENT TYPE: Patent
 LANGUAGE: Japanese
 FAMILY ACC. NUM. COUNT: 2

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2016098413	A	20160530	JP 2014-236928	20141121
JP 6282576	B2	20180221		
WO 2016080534	A1	20160526	WO 2015-JP82758	20151120
KR 2017070168	A	20170621	KR 2017-7013013	20151120
KR 2111923	B1	20200518		
CN 107109557	A	20170829	CN 2015-80061931	20151120
EP 3222741	A1	20170927	EP 2015-860677	20151120
US 20170335423	A1	20171123	US 2017-15527814	20170518
PRIORITY APPLN. INFO.:			JP 2014-236928	A 20141121
			WO 2015-JP82758	W 20151120

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB To provide a superior high strength and high ductility ~~steel~~ sheet strength over ductility balance, a tensile strength (TS) is above 980MPa, tensile strength (TS) × elongation (EL) can be kept more than 25000MPa·%. High strength and high ductility ~~steel~~ sheet component compn., in mass%, C: 0.10-0.30%, Si + Al: 0.5-2.0%, Mn: 1.0-4.0%, P: 0-0.05%, S: at 0-0.01 %, balance of iron and unavoidable impurities, ~~steel~~ organizations has the area ratio for the entire organization, residual austenite is 8% or more, ferrite is less than or equal to 5% greater than 50%, balance bainite, martensite, tempered bainite, and together consist of one or more tempered martensite it relates carbon concn. of the residual austenite, the av. carbon concn. is 0.8-1.1% by mass, the std. deviation of the carbon concn. distribution is 0.25 mass% or more, the carbon concn. for the entire organization is 1.3 mass% or more of the area, it is 1.0% or more in the area ratio.

IT 1933489-48-5
 RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
 (high strength high ductility ~~steel~~ plate for automobile body)

RN 1933489-48-5 CAPLUS

CN Iron alloy, base, Fe 92-98, Mn 1-4, Al 0-2, Si 0-2, B 0-1, Cr 0-1, Cu 0-1, Mo 0-1, Ni 0-1, C 0.1-0.3, Hf 0-0.2, Nb 0-0.2, Ti 0-0.2, V 0-0.2, Zr 0-0.2 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	92 - 98	7439-89-6
Mn	1 - 4	7439-96-5
Al	0 - 2	7429-90-5
Si	0 - 2	7440-21-3
B	0 - 1	7440-42-8
Cr	0 - 1	7440-47-3
Cu	0 - 1	7440-50-8
Mo	0 - 1	7439-98-7
Ni	0 - 1	7440-02-0
C	0.1 - 0.3	7440-44-0
Hf	0 - 0.2	7440-58-6
Nb	0 - 0.2	7440-03-1
Ti	0 - 0.2	7440-32-6
V	0 - 0.2	7440-62-2
Zr	0 - 0.2	7440-67-7

IPCI C22C0038-00 [I]; C22C0038-06 [I]; C22C0038-58 [I]; C21D0009-46 [I]; C21D0001-19 [N]; C22C0038-00 [I]; C22C0038-06 [I]; C22C0038-58 [I]; C21D0009-46 [N]
 IPCR C22C0038-00 [I]; C21D0009-46 [I]; C22C0038-06 [I]; C22C0038-58 [I]

CC 55-3 (Ferrous Metals and Alloys)
ST steel plate strength ductility microstructure automobile body
IT Automobile bodies
Elongation at break
Microstructure
Tensile strength
Yield strength
(high strength high ductility steel plate for automobile body)
IT 7440-44-0, Carbon, properties
RL: PRP (Properties)
(concn. distribution in steel; high strength high ductility steel plate for automobile body)
IT 1933489-48-5
RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(high strength high ductility steel plate for automobile body)
IT 12173-93-2, Martensite, processes 12244-31-4, Austenite, processes
12427-23-5, Bainite
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)
(phase; high strength high ductility steel plate for automobile body)

L12 ANSWER 101 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN
ACCESSION NUMBER: 2016:848429 CAPLUS Full-text
DOCUMENT NUMBER: 165:35129
TITLE: High strength high ductility steel plate for automobile body
INVENTOR(S): Murakami, Toshio; Otani, Shigeo
PATENT ASSIGNEE(S): Kabushiki Kaisha Kobe Seiko Sho (Kobe Steel, Ltd.), Japan
SOURCE: PCT Int. Appl., 27pp.; Chemical Indexing Equivalent to 165:35141 (JP)
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 2
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2016080534	A1	20160526	WO 2015-JP82758	20151120
JP 2016098413	A	20160530	JP 2014-236928	20141121
JP 6282576	B2	20180221		
KR 2017070168	A	20170621	KR 2017-7013013	20151120
KR 2111923	B1	20200518		
CN 107109557	A	20170829	CN 2015-80061931	20151120
EP 3222741	A1	20170927	EP 2015-860677	20151120
US 20170335423	A1	20171123	US 2017-15527814	20170518
PRIORITY APPLN. INFO.:			JP 2014-236928	A 20141121
			WO 2015-JP82758	W 20151120

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB In the present invention, a steel plate contains specific alloy components, has a steel structure that contains specific proportions of retained austenite and ferrite, with the remainder comprising one or more types selected from among bainite, martensite, tempered bainite and tempered martensite, and has a specific av. carbon concn. and carbon concn. distribution in the retained austenite. The steel plate is composed of a mass percentage of carbon 0.10 to 0.30, silicon and aluminum 0.5 to 2.0, manganese 1.0-4.0, phosphorus 0.0 to 0.5, sulfur 0.0 to 0.1, and the balance iron and unavoidable impurities.

RETABLE

Referenced Author (RAU)	Year (RYP)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
ENNIS BERNARD LEO	2014			WO 2014139625 A1	CAPLUS
KOBE STEEL LTD	2012			JP 2012180570 A	CAPLUS
KOBE STEEL LTD	2012			JP 2012214869 A	CAPLUS
NIPPON STEEL CORP	2012			JP 2012041573 A	CAPLUS
NIPPON STEEL & SUMITOMO	2013			JP 2013032581 A	CAPLUS

OKAMOTO TSUTOMU | 2011 | | | JP 2011195956 A | CAPLUS
IT 1933489-48-5
RL: PRP (Properties); TEM (Technical or engineered material use); USES
(Uses)
(high strength high ductility ~~steel~~ plate for automobile
body)
RN 1933489-48-5 CAPLUS
CN Iron alloy, base, Fe 92-98, Mn 1-4, Al 0-2, Si 0-2, B 0-1, Cr 0-1, Cu 0-1, Mo
0-1, Ni 0-1, C 0.1-0.3, Hf 0-0.2, Nb 0-0.2, Ti 0-0.2, V 0-0.2, Zr 0-0.2 (CA
INDEX NAME)

Component	Component Percent	Component Registry Number
=====+=====+=====		
Fe	92 - 98	7439-89-6
Mn	1 - 4	7439-96-5
Al	0 - 2	7429-90-5
Si	0 - 2	7440-21-3
B	0 - 1	7440-42-8
Cr	0 - 1	7440-47-3
Cu	0 - 1	7440-50-8
Mo	0 - 1	7439-98-7
Ni	0 - 1	7440-02-0
C	0.1 - 0.3	7440-44-0
Hf	0 - 0.2	7440-58-6
Nb	0 - 0.2	7440-03-1
Ti	0 - 0.2	7440-32-6
V	0 - 0.2	7440-62-2
Zr	0 - 0.2	7440-67-7

IPCI C22C0038-00 [I]; C21D0009-46 [I]; C22C0038-06 [I]; C22C0038-58 [I]
IPCR C22C0038-00 [I]; C21D0009-46 [I]; C22C0038-06 [I]; C22C0038-58 [I]
CC 55-3 (Ferrous Metals and Alloys)
ST ~~steel~~ plate strength ductility microstructure automobile body
IT Automobile bodies
Elongation at break
Microstructure
Tensile strength
Yield strength
(high strength high ductility ~~steel~~ plate for automobile
body)
IT 7440-44-0, Carbon, properties
RL: PRP (Properties)
(concn. distribution in ~~steel~~; high strength high ductility
~~steel~~ plate for automobile body)
IT 1933489-48-5
RL: PRP (Properties); TEM (Technical or engineered material use); USES
(Uses)
(high strength high ductility ~~steel~~ plate for automobile
body)
IT 12173-93-2, Martensite, processes 12244-31-4, Austenite, processes
12427-23-5, Bainite
RL: PEP (Physical, engineering or chemical process); PRP (Properties);
PROC (Process)
(phase; high strength high ductility ~~steel~~ plate for
automobile body)

L12 ANSWER 102 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN
ACCESSION NUMBER: 2016:387717 CAPLUS Full-text
DOCUMENT NUMBER: 164:385854
TITLE: Manufacture method of high-strength high-toughness
alloy ~~steel~~
INVENTOR(S): Tao, Jun; Dong, Banglin; Sheng, Xiang
PATENT ASSIGNEE(S): Anhui Chujiang Special Steel Co., Ltd., Peop. Rep.
China
SOURCE: Faming Zhuanli Shenqing, 8pp.
CODEN: CNXXEV
DOCUMENT TYPE: Patent
LANGUAGE: Chinese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
CN 105385939	A	20160309	CN 2015-10928577	20151215
PRIORITY APPLN. INFO.:			CN 2015-10928577	20151215
<p>AB The chem. compn. of the alloy steel contains carbon 0.3-0.58, silicon 0.25-1.38, manganese 0.55-1.55, phosphorus ≤0.025%, sulfur 0.02-0.025, chromium 0.09-1.32, nickel 0.28-0.62, molybdenum 0.02-0.035, titanium 0.18-0.20, vanadium 0.2-0.5, tungsten 0.4-0.9, niobium 0.3-0.6, cobalt 0.11-0.15, copper 0.2-0.8, aluminum ≤0.2, boron ≤0.15%, nitrogen ≤0.3% and inevitable impurities bal. The manuf. method comprises the steps of (1) smelting raw materials in smelting furnace to obtain alloy steel billet, (2) annealing the alloy steel billet, then forging to obtain alloy steel crude product, (3) carrying out heat treatment on the alloy steel crude product, then carrying out primary hot-rolling and fine hot-rolling operations in sequence to obtain alloy steel finished product, and (4) carrying out annealing heat treatment on the alloy steel finished product, cooling to room temp., inspecting and packaging. The alloy steel has low cost, high tensile strength, yield strength and hardness, good uniformity of structure and uniformity of mech. properties, and broad application prospects.</p> <p>IT 1884454-35-6P, Aluminum 0-0.2, boron 0-0.2, carbon 0.3-0.6, chromium 0.1-1.32, cobalt 0.1-0.2, copper 0.2-0.8, manganese 0.55-1.55, nickel 0.28-0.62, niobium 0.3-0.6, nitrogen 0-0.3, silicon 0.25-1.38, titanium 0.2, tungsten 0.4-0.9, vanadium 0.2-0.5, iron bal. RL: IMF (Industrial manufacture); PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PREP (Preparation); PROC (Process); USES (Uses) (manuf. method of alloy steel having high strength and toughness)</p> <p>RN 1884454-35-6 CAPLUS</p> <p>CN Iron alloy, base, Fe 91-97, Mn 0.6-1.6, Si 0.2-1.4, Cr 0.1-1.3, W 0.4-0.9, Cu 0.2-0.8, C 0.3-0.6, Nb 0.3-0.6, Ni 0.3-0.6, V 0.2-0.5, N 0-0.3, Ti 0.2, Co 0.1-0.2, Al 0-0.2, B 0-0.2 (CA INDEX NAME)</p>				

Component	Component Percent	Component Registry Number
Fe	91 - 97	7439-89-6
Mn	0.6 - 1.6	7439-96-5
Si	0.2 - 1.4	7440-21-3
Cr	0.1 - 1.3	7440-47-3
W	0.4 - 0.9	7440-33-7
Cu	0.2 - 0.8	7440-50-8
C	0.3 - 0.6	7440-44-0
Nb	0.3 - 0.6	7440-03-1
Ni	0.3 - 0.6	7440-02-0
V	0.2 - 0.5	7440-62-2
N	0 - 0.3	17778-88-0
Ti	0.2	7440-32-6
Co	0.1 - 0.2	7440-48-4
Al	0 - 0.2	7429-90-5
B	0 - 0.2	7440-42-8

IPCI C22C0038-02; C22C0038-04; C22C0038-12; C22C0038-14; C22C0038-16; C22C0038-18; C22C0038-08; C22C0033-04; C21D0008-02; C21D0001-26

IPCR C22C0038-02 [I]; C21D0001-26 [I]; C21D0008-02 [I]; C22C0033-04 [I]; C22C0038-04 [I]; C22C0038-08 [I]; C22C0038-12 [I]; C22C0038-14 [I]; C22C0038-16 [I]; C22C0038-18 [I]

CC 55-1 (Ferrous Metals and Alloys)

ST alloy ~~steel~~ smelting forging rolling heat treatment strength toughness

IT Annealing
 Forging
 Hot rolling
 Industrial manufacturing
 Smelting
 (manuf. method of alloy ~~steel~~ having high strength and toughness)

IT ~~1884454-35-6P~~, Aluminum 0-0.2, boron 0-0.2, carbon 0.3-0.6, chromium 0.1-1.32, cobalt 0.1-0.2, copper 0.2-0.8, manganese 0.55-1.55, nickel 0.28-0.62, niobium 0.3-0.6, nitrogen 0-0.3, silicon 0.25-1.38, titanium 0.2, tungsten 0.4-0.9, vanadium 0.2-0.5, iron bal.

RL: IMF (Industrial manufacture); PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PREP (Preparation); PROC (Process); USES (Uses)
(manuf. method of alloy ~~steel~~ having high strength and toughness)

L12 ANSWER 103 OF 398 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2015:1942164 CAPLUS Full-text

DOCUMENT NUMBER: 164:40753

TITLE: ~~Steel~~ sheet provided with a sacrificial cathodically protected coating comprising lanthanum

INVENTOR(S): Allely, Christian; Petitjean, Jacques

PATENT ASSIGNEE(S): ArcelorMittal Investigacion y Desarrollo, S.L., Spain

SOURCE: PCT Int. Appl., 20pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: French

FAMILY ACC. NUM. COUNT: 2

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2015181581	A1	20151203	WO 2014-IB61788	20140528
CA 2950476	A1	20151203	CA 2015-2950476	20150528
WO 2015181318	A1	20151203	WO 2015-EP61891	20150528
KR 2017010773	A	20170201	KR 2016-7032934	20150528
CN 106460138	A	20170222	CN 2015-80027730	20150528
EP 3149217	A1	20170405	EP 2015-724718	20150528
EP 3149217	B1	20180711		
JP 2017524806	T	20170831	JP 2016-569819	20150528
JP 6762879	B2	20200930		
ES 2689039	T3	20181108	ES 2015-724718	20150528
RU 2689979	C2	20190530	RU 2016-146657	20150528
ZA 2016007435	A	20171220	ZA 2016-7435	20161027
IN 201617039713	A	20170310	IN 2016-17039713	20161121
IN 343260	B	20200804		
MX 2016015550	A	20170425	MX 2016-15550	20161125
US 20170198374	A1	20170713	US 2016-15314457	20161128
US 10676804	B2	20200609		

PRIORITY APPLN. INFO.:

WO 2014-IB61788	A	20140528
WO 2015-EP61891	W	20150528

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB The invention relates to a ~~steel~~ sheet provided with a sacrificial cathodically protected coating comprising between 1 and 40 % by wt. zinc, between 0.01 and 0.4 % by wt. lanthanum, and optionally up to 10 % by wt. magnesium, optionally up to 15 % by wt. silicon, and optionally up to 0.3 % by wt., in cumulative amts., of addnl. components, the remainder consisting of aluminum and unavoidable impurities or residual elements. The invention also relates to a method of producing parts by hot or cold swaging and the parts which can be obtained in this way.

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
LIXIN FENG	2010			CN 101736217 A	CAPLUS
MORIMOTO YASUhide	2009			JP 2009120942 A	CAPLUS
NOSE KOICHI	2008			EP 1997927 A1	CAPLUS
ZHAO YUNJIE	2013			CN 103045980 A	CAPLUS

IT 1173986-65-6

RL: NUU (Other use, unclassified); USES (Uses)

(~~steel~~ sheet provided with sacrificial cathodically protected coating comprising lanthanum)

RN 1173986-65-6 CAPLUS

CN Iron alloy, base, Fe 94-99, Mn 0.5-3, Cr 0-1, C 0.2-0.5, Si 0.1-0.5, Ti 0-0.2, Al 0-0.1, B 0-0.1, Cu 0-0.1, Ni 0-0.1, P 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	94 - 99	7439-89-6
Mn	0.5 - 3	7439-96-5
Cr	0 - 1	7440-47-3

C	0.2	-	0.5	7440-44-0
Si	0.1	-	0.5	7440-21-3
Ti	0	-	0.2	7440-32-6
Al	0	-	0.1	7429-90-5
B	0	-	0.1	7440-42-8
Cu	0	-	0.1	7440-50-8
Ni	0	-	0.1	7440-02-0
P	0	-	0.1	7723-14-0

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IPCI C23C0002-12 [I]; C22C0021-10 [I]
IPCR C23C0002-12 [I]; C22C0021-10 [I]
CC 56-3 (Nonferrous Metals and Alloys)
ST steel sheet sacrificial cathodically protected coating lanthanum swaging
IT Anticorrosive coating materials
   Coating process
   Swaging
   (steel sheet provided with sacrificial cathodically protected
   coating comprising lanthanum)
IT 7439-91-0, Lanthanum, uses
   RL: MOA (Modifier or additive use); USES (Uses)
   (steel sheet provided with sacrificial cathodically protected
   coating comprising lanthanum)
IT 12597-69-2, Steel, uses 1173986-65-6
   RL: NUU (Other use, unclassified); USES (Uses)
   (steel sheet provided with sacrificial cathodically protected
   coating comprising lanthanum)
IT 1832643-11-4
   RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM
   (Technical or engineered material use); PROC (Process); USES (Uses)
   (steel sheet provided with sacrificial cathodically protected
   coating comprising lanthanum)

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=> display ibib abs retable hitstr hitind l13 1-398

L13 ANSWER 1 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2020:2713368 CAPLUS Full-text

DOCUMENT NUMBER: 174:278826

TITLE: ~~Steel~~ sheet comprising carbon, silicon and titanium
with high strength and excellent collision resistance

INVENTOR(S): Nakano, Katsuya; Takeda, Kengo; Kawata, Hiroyuki;
Uenishi, Akihiro; Suzuki, Yuya

PATENT ASSIGNEE(S): Nippon Steel Corporation, Japan

SOURCE: PCT Int. Appl., 58pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2020262651	A1	20201230	WO 2020-JP25352	20200626
PRIORITY APPLN. INFO.:			JP 2019-121092	A 20190628
			JP 2019-121093	A 20190628

AB A ~~steel~~ sheet which has a metal structure that contains, in terms of
vol. fraction, 95% or more of tempered martensite and a total of 5% or
less of one or more structures selected from among ferrite, pearlite,
bainite, as-quenched martensite and residual austenite. This ~~steel~~
sheet has a tensile strength of 1,100 MPa or more; the std. deviation of
the Vickers hardness is 30 or less as measured under a load of 9.8 N at 30
points in a 300µm square area that is centered at the position of t/2,
where t is the sheet thickness, in a cross-section of the ~~steel~~ sheet
10, said cross-section being parallel to the sheet thickness direction;
and if nanohardness is measured under a max. load of 1 mN at 100 points in
a 100µm square area that is centered at the position of t/2, the ratio
of the measurement points that have a nanohardness difference of 3 GPa or
more from 8 adjacent measurement points is 10% or less.

IT 2572991-88-7

RL: PRP (Properties); TEM (Technical or engineered material use); USES

(Uses)
 (steel sheet comprising carbon, silicon and titanium with
 high strength and excellent collision resistance)
 RN 2572991-88-7 CAPLUS
 CN Iron alloy, base, Fe 85-99,Mn 0.6-5,Si 0-2.5,Cr 0-2,Al 0-1,Co 0-1,Ni
 0-1,Cu 0-0.5,Mo 0-0.5,V 0-0.5,C 0.2-0.4,B 0-0.1,Nb 0-0.1,Ta 0-0.1,Ti
 0-0.1,W 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	85 - 99	7439-89-6
Mn	0.6 - 5	7439-96-5
Si	0 - 2.5	7440-21-3
Cr	0 - 2	7440-47-3
Al	0 - 1	7429-90-5
Co	0 - 1	7440-48-4
Ni	0 - 1	7440-02-0
Cu	0 - 0.5	7440-50-8
Mo	0 - 0.5	7439-98-7
V	0 - 0.5	7440-62-2
C	0.2 - 0.4	7440-44-0
B	0 - 0.1	7440-42-8
Nb	0 - 0.1	7440-03-1
Ta	0 - 0.1	7440-25-7
Ti	0 - 0.1	7440-32-6
W	0 - 0.1	7440-33-7

IPCI C21D0009-46 [I]; C22C0038-00 [I]; C22C0038-60 [I]
 IPCR C21D0009-46 [I]; C22C0038-00 [I]; C22C0038-60 [I]
 CC 55-3 (Ferrous Metals and Alloys)
 ST carbon silicon titanium steel sheet
 IT Galvanizing
 (electrogalvanizing, layer; steel sheet comprising
 carbon, silicon and titanium with high strength and excellent collision
 resistance)
 IT Hot-dip galvanizing
 (layer; steel sheet comprising carbon, silicon and
 titanium with high strength and excellent collision resistance)
 IT Collisions
 (resistance; steel sheet comprising carbon, silicon and
 titanium with high strength and excellent collision resistance)
 IT Microhardness
 Tensile strength
 Vickers hardness
 (steel sheet comprising carbon, silicon and titanium with
 high strength and excellent collision resistance)
 IT 12597-69-2, Steel, properties
 RL: PRP (Properties); TEM (Technical or engineered material use); USES
 (Uses)
 (sheet; steel sheet comprising carbon, silicon and titanium
 with high strength and excellent collision resistance)
 IT 2572991-88-7
 RL: PRP (Properties); TEM (Technical or engineered material use); USES
 (Uses)
 (steel sheet comprising carbon, silicon and titanium with
 high strength and excellent collision resistance)

L13 ANSWER 2 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN
 ACCESSION NUMBER: 2020:2054532 CAPLUS Full-text
 DOCUMENT NUMBER: 173:899795
 TITLE: Strong resistance to hydrogen embrittlement via
 surface shielding in multi-layered
 austenite/martensite steel sheets
 AUTHOR(S): Jo, Min Cheol; Jo, Min Chul; Yoo, Jisung; Song,
 Taejin; Kim, Sang-Heon; Sohn, Seok Su; Lee, Sunghak
 CORPORATE SOURCE: Center for Advanced Aerospace Materials, Pohang
 University of Science and Technology, Pohang, 37673,
 S. Korea
 SOURCE: Materials Science & Engineering, A: Structural
 Materials: Properties, Microstructure and Processing

(2021), 800, 140319
 CODEN: MSAPE3; ISSN: 0921-5093
 DIGITAL OBJECT ID: 10.1016/j.msea.2020.140319
 PUBLISHER: Elsevier B.V.
 DOCUMENT TYPE: Journal; (online computer file)
 LANGUAGE: English

AB Layered architectures have been applied to twinning-induced plasticity (TWIP) ~~steel~~ in terms of configuring multi-layered TWIP and martensitic ~~steel~~ (MLS) sheets to overcome the limitation of low yield strength. However, hydrogen embrittlement (HE) inevitably appears in materials used for high-strength purposes, with the interfacial layers presenting localization sites of hydrogen, thereby limiting the materials' broad structural applications. Here, we present a novel design for MLS sheets that exhibit both strong resistance to HE and a good strength-ductility balance via surface shielding. Our hydrogen penetration data demonstrates that the proposed austenitic shielding structure effectively acts as a barrier to hydrogen due to the reduced hydrogen diffusivity, compared with existing MLS sheets. We propose the optimal surface thickness required to play the role of shielding layer based on the quantified diffusivity and the rule of mixts. of the layer fractions, which presents a plausible novel design for layered architectures that exhibit strong resistance to HE and possess tunable mech. properties.

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
=====	=====	=====	=====	=====	=====
Anon	1991		261	Electron Probe Quant	
Anon	2004			ISO 17081 Method of	
Ashby, M	2003	51	5801	Acta Mater	CAPLUS
Ashby, M	2013	68	4	Scripta Mater	CAPLUS
Barabash, R	2014	45	98	Metall Mater Trans	CAPLUS
Beachem, C	1972	3	441	Metall Mater Trans B	
Bouaziz, O	2008	10	24	Adv Eng Mater	CAPLUS
Bouaziz, O	2016	18	56	Adv Eng Mater	CAPLUS
Cetin, A	2012	60	2265	Acta Mater	CAPLUS
Chin, K	2018	24	489	Met Mater Int	CAPLUS
Cho, L	2018	734	416	Mater Sci Eng, A	CAPLUS
Cho, L	2018	735	448	Mater Sci Eng, A	CAPLUS
De Cooman, B	2011			New Trends and Devel	
Devanathan, M	1962	270	90	Proc R Soc A	CAPLUS
Dunne, D	2012	706	1568	Mater Sci Forum	
Dwivedi, S	2018	43	21603	Int J Hydrogen Energ	CAPLUS
Enomoto, M	2012	43	572	Metall Mater Trans	CAPLUS
Fang, T	2011	331	1587	Science	CAPLUS
Grassel, O	2000	16	1391	Int J Plast	CAPLUS
Gutierrez-Urrutia, I	2010	527	3552	Mater Sci Eng, A	
Gwon, H	2017	696	416	Mater Sci Eng, A	CAPLUS
Han, D	2015	99	45	Scripta Mater	CAPLUS
He, J	2018	726	288	Mater Sci Eng, A	CAPLUS
Huang, M	2018	153	235	Acta Mater	CAPLUS
Ichimura, M	1991	32	1109	Mater Trans, JIM	CAPLUS
Inoue, J	2008	59	1055	Scripta Mater	CAPLUS
Jin, J	2012	60	1680	Acta Mater	CAPLUS
Jo, M	2019	50	4085	Metall Mater Trans	CAPLUS
Jo, S	2015	627	374	J Alloys Compd	CAPLUS
Kim, J	2018	147	304	Acta Mater	CAPLUS
Kim, J	2009	505	105	Mater Sci Eng, A	
Kim, J	2017	682	164	Mater Sci Eng, A	CAPLUS
Kim, J	2019	25	912	Met Mater Int	CAPLUS
Kim, J	2019	9	6829	Sci Rep	
Koseki, T	2014	55	227	Mater Trans	CAPLUS
Koyama, M	2013	61	4607	Acta Mater	CAPLUS
Koyama, M	2017	355	1055	Science	CAPLUS
Kubin, L	2003	48	119	Scripta Mater	CAPLUS
Kwon, Y	2018	43	10129	Int J Hydrogen Energ	CAPLUS
Lee, J	2019	9	5219	Sci Rep	
Li, Y	2013	61	2588	J Mech Phys Solid	CAPLUS
Mohtadi-Bonab, M	2019	25	1109	Met Mater Int	CAPLUS
Oh, S	2020	188	366	Acta Mater	CAPLUS
Park, C	2019	25	584	Met Mater Int	CAPLUS
Park, I	2015	93	63	Corrosion Sci	CAPLUS
Park, J	2017	686	160	Mater Sci Eng, A	CAPLUS

Park, J	2019	759	320	Mater Sci Eng, A	CAPLUS
Ritchie, R	2011	10	817	Nat Mater	CAPLUS
Seok, M	2016	121	164	Acta Mater	CAPLUS
Song, E	2014	87	9	Scripta Mater	CAPLUS
Takai, K	2003	43	520	ISIJ Int	CAPLUS
Wang, M	2005	398	37	Mater Sci Eng, A	
Wang, Y	2002	419	912	Nature	CAPLUS
Wang, Y	2018	150	22	Scripta Mater	CAPLUS
Wei, Y	2014	5	3580	Nat Commun	
Wu, X	2014	2	185	Mater Res Lett	CAPLUS
Yanagimoto, J	2010	59	287	CIRP Ann - Manuf Tec	
Yokota, T	2003	43	534	ISIJ Int	CAPLUS
Yu, W	2018	727	70	Mater Sci Eng, A	CAPLUS
Zhang, Y	2019	165	15	Scripta Mater	CAPLUS

IT 2522569-69-1, C 0.35, Mn 1.3, Si 0.15, Mo 0.1, Cr 0.2, Ti 0-0.06, B 0-0.06, Fe bal., processes
 RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (strong resistance to hydrogen embrittlement via surface shielding in multi-layered austenite/martensite steel sheets)

RN 2522569-69-1 CAPLUS

CN Steel, Fe 98,Mn 1.3,C 0.4,Cr 0.2,Si 0.2,Mo 0.1,B 0-0.1,Ti 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	98	7439-89-6
Mn	1.3	7439-96-5
C	0.4	7440-44-0
Cr	0.2	7440-47-3
Si	0.2	7440-21-3
Mo	0.1	7439-98-7
B	0 - 0.1	7440-42-8
Ti	0 - 0.1	7440-32-6

CC 55-8 (Ferrous Metals and Alloys)

ST TWIP steel multilayer austenite martensite shielding hydrogen embrittlement resistance

IT Diffusion
 Elongation, mechanical
 Fracture surface morphology
 Hydrogen embrittlement
 Interface
 Microstructure
 Multilayers
 Sheet materials
 Shields
 Stress-strain relationship
 Tensile strength
 Yield strength
 (strong resistance to hydrogen embrittlement via surface shielding in multi-layered austenite/martensite steel sheets)

IT 1333-74-0, Hydrogen, processes
 RL: OCU (Occurrence, unclassified); PEP (Physical, engineering or chemical process); OCCU (Occurrence); PROC (Process)
 (strong resistance to hydrogen embrittlement via surface shielding in multi-layered austenite/martensite steel sheets)

IT 12173-93-2, Martensite, processes 12244-31-4, Austenite, processes
 RL: PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)
 (strong resistance to hydrogen embrittlement via surface shielding in multi-layered austenite/martensite steel sheets)

IT 2362540-95-0, C 1.2, Mn 13, Si 0.2, Fe bal. 2522569-69-1, C 0.35, Mn 1.3, Si 0.15, Mo 0.1, Cr 0.2, Ti 0-0.06, B 0-0.06, Fe bal., processes 2522569-74-8, C 0.7, Mn 17, Si 0.6, V 0.3, Al 1.3, Fe bal.
 RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (strong resistance to hydrogen embrittlement via surface shielding in multi-layered austenite/martensite steel sheets)

L13 ANSWER 3 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2020:1569923 CAPLUS Full-text
DOCUMENT NUMBER: 173:359646
TITLE: Al-Fe-based plated steel sheet for hot press, and
method for manufacturing hot press member
INVENTOR(S): Sato, Rinta; Nakajima, Seiji; Ando, Satoru
PATENT ASSIGNEE(S): JFE Steel Corp., Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 15pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2020122202	A	20200813	JP 2019-16283	20190131
PRIORITY APPLN. INFO.:			JP 2019-16283	20190131

AB The title Al-Fe-based plated steel sheet can obtain a hot press member having excellent corrosion resistance after coating and excellent corrosion resistance at the joint portion while realizing a high temp. rising rate when subjected to heating by a furnace heating method performed before hot pressing. The Al-Fe-based plated steel sheet for hot press comprises a base steel sheet, an Al-Fe alloy plated layer formed on at least one surface of the base steel sheet with an adhesion amt. per one surface of 30-100 g/m², having a compn. including Fe 25-90% by mass, Si 0-1% by mass and Al and unavoidable impurities as balance, and unalloyed Al attached to the surface of the Al-Fe alloy plated layer with an adhesion amt. per one surface of 0-90 mg/m².

IT 1356847-15-8
RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(Al-Fe-based plated steel sheet for hot press, and method for manufg. hot press member)

RN 1356847-15-8 CAPLUS

CN Iron alloy, base, Fe 93-99, Mn 0.5-3, Si 0-2, Cr 0-1, C 0.2-0.5, Ti 0-0.2, Al 0-0.1, B 0-0.1, P 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	93 - 99	7439-89-6
Mn	0.5 - 3	7439-96-5
Si	0 - 2	7440-21-3
Cr	0 - 1	7440-47-3
C	0.2 - 0.5	7440-44-0
Ti	0 - 0.2	7440-32-6
Al	0 - 0.1	7429-90-5
B	0 - 0.1	7440-42-8
P	0 - 0.1	7723-14-0

IPCI C23C0002-12 [I]; C23C0002-28 [I]; C22C0021-00 [I]; C22C0038-00 [I]; C22C0021-02 [I]; C22C0038-60 [I]; C21D0009-00 [I]; C21D0001-18 [I]
IPCR C23C0002-12 [I]; C21D0001-18 [I]; C21D0009-00 [I]; C22C0021-00 [I]; C22C0021-02 [I]; C22C0038-00 [I]; C22C0038-60 [I]; C23C0002-28 [I]

CC 56-11 (Nonferrous Metals and Alloys)

ST aluminum iron plating steel sheet hot press

IT Heating

Hot-press molding

(Al-Fe-based plated steel sheet for hot press, and method for manufg. hot press member)

IT 7429-90-5, Aluminum, processes 1356847-15-8 2460706-65-2

RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)

(Al-Fe-based plated steel sheet for hot press, and method for manufg. hot press member)

L13 ANSWER 4 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2020:1063971 CAPLUS Full-text
DOCUMENT NUMBER: 173:85787
TITLE: Zinc-coated hot-stamped steel plate or strip with excellent cold bending performance and its

INVENTOR(S): manufacturing method
Bi, Wenzhen; Hong, Jiyao; Wang, Li
PATENT ASSIGNEE(S): Baoshan Iron & Steel Co., Ltd., Peop. Rep. China
SOURCE: PCT Int. Appl., 23pp.
CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: Chinese

FAMILY ACC. NUM. COUNT: 2

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2020108594	A1	20200604	WO 2019-CN121860	20191129
CN 109371325	A	20190222	CN 2018-11454798	20181130
PRIORITY APPLN. INFO.:			CN 2018-11454798	A 20181130

AB Provided are a zinc-based plated hot-formed steel plate or steel strip having excellent cold bending performance, and a manufg. method thereof; said zinc-based plated hot-formed steel plate or steel strip comprises a substrate having a surface decarburized layer thickness of less than 20 um and a zinc-based plated layer having an adhesion amt. of 10 to 100 g/m.cxa. 2; the component wt. percentages of the substrate are: C: 0.1-0.8%, Si: 0.05-2.0%, Mn: 0.5-3.0%, P≤0.1%, S≤0.05%, Al≤0.1%, N≤0.01%; the remainder is Fe and unavoidable impurities; the av. size of original austenite grains of the substrate is less than 15 um. After hot forming of the substrate, the hot-formed steel plate or steel strip has a tensile strength of 1500 MPa and elongation after fracture of 5%, and the coating is continuous and complete, there are no cracks extending to the substrate, and the steel plate has excellent cold bending performance.

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
AZUMA MASASHI	2011			JP 2011111675 A	CAPLUS
BI WENZHEN	2017			CN 107127238 A	CAPLUS
BI WENZHEN	2019			CN 109371325 A	CAPLUS
JIN KWANG-KEUN	1996			KR 960005237 B1	
KAWATA HIROYUKI	2014			CN 103874776 A	CAPLUS
TAKEDA GENTARO	2018			WO 2018207560 A1	CAPLUS
TANAKA YUKIMOTO	2012			JP 2012251229 A	CAPLUS
YUANQIANG TU	2010			CN 101880832 A	CAPLUS
ZHOU SHU	2016			CN 106244923 A	CAPLUS
ZHOU SHU	2016			CN 106244923 A	CAPLUS

IT 2293976-55-1D, Aluminum 0-0.1, carbon 0.1-0.8, manganese 0.5-3, phosphorus 0-0.1, silicon 0.05-2, Cr 0-1, Mo 0-1, Ti 0-0.2, Nb 0-0.08, V 0-1, B 0-0.08, iron bal., nitrogen 0-0.01
RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(Zinc-coated hot-stamped steel plate or strip with excellent cold bending performance and its manufg. method)

RN 2293976-55-1 CAPLUS

CN Iron alloy, base, Fe 91-99, Mn 0.5-3, Si 0-2, Cr 0-1, Mo 0-1, V 0-1, C 0.1-0.8, Ti 0-0.2, Al 0-0.1, B 0-0.1, Nb 0-0.1, P 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	91 - 99	7439-89-6
Mn	0.5 - 3	7439-96-5
Si	0 - 2	7440-21-3
Cr	0 - 1	7440-47-3
Mo	0 - 1	7439-98-7
V	0 - 1	7440-62-2
C	0.1 - 0.8	7440-44-0
Ti	0 - 0.2	7440-32-6
Al	0 - 0.1	7429-90-5
B	0 - 0.1	7440-42-8
Nb	0 - 0.1	7440-03-1
P	0 - 0.1	7723-14-0

IPCI C22C0038-02 [I]; C22C0038-04 [I]; C22C0038-60 [I]; C22C0038-06 [I];
C23C0002-40 [I]; C21D0008-02 [I]

IPCR C22C0038-02 [I]; C21D0008-02 [I]; C22C0038-04 [I]; C22C0038-06 [I];

CC C22C0038-60 [I]; C23C0002-40 [I]
ST 55-3 (Ferrous Metals and Alloys)
IT cold bending performance zinc coating steel manuf hot stamping
IT Coating materials
(Zinc-coated hot-stamped steel plate or strip with
excellent cold bending performance and its manufg. method)
IT Galvanized steel
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or
engineered material use); PREP (Preparation); USES (Uses)
(Zinc-coated hot-stamped steel plate or strip with
excellent cold bending performance and its manufg. method)
IT Metalworking
(stamping, hot; Zinc-coated hot-stamped steel plate
or strip with excellent cold bending performance and its manufg.
method)
IT 2293976-55-1D, Aluminum 0-0.1, carbon 0.1-0.8, manganese 0.5-3,
phosphorus 0-0.1, silicon 0.05-2, Cr 0-1, Mo 0-1, Ti 0-0.2, Nb 0-0.08, V
0-1, B 0-0.08, iron bal., nitrogen 0-0.01
RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM
(Technical or engineered material use); PROC (Process); USES (Uses)
(Zinc-coated hot-stamped steel plate or strip with
excellent cold bending performance and its manufg. method)
IT 7440-66-6, Zinc, processes 98357-26-7
RL: PEP (Physical, engineering or chemical process); TEM (Technical or
engineered material use); PROC (Process); USES (Uses)
(Zinc-coated hot-stamped steel plate or strip with
excellent cold bending performance and its manufg. method)

L13 ANSWER 5 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2020:1063958 CAPLUS Full-text

DOCUMENT NUMBER: 173:85818

TITLE: Hot stamping method of zinc-based coated steel
plate or steel strip with excellent corrosion
resistance

INVENTOR(S): Bi, Wenzhen; Hong, Jiyao; Wang, Li

PATENT ASSIGNEE(S): Baoshan Iron & Steel Co., Ltd., Peop. Rep. China

SOURCE: PCT Int. Appl., 17pp.; Chemical Indexing Equivalent to
170:379972 (CN)
CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: Chinese

FAMILY ACC. NUM. COUNT: 2

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2020108593	A1	20200604	WO 2019-CN121859	20191129
CN 109365606	A	20190222	CN 2018-11453322	20181130
			CN 2018-11453322	A 20181130

PRIORITY APPLN. INFO.:

AB A method for forming a zinc-plated steel plate or steel belt having
good corrosion resistance, comprising the following steps: 1) conveying
the steel plate or steel belt into a heating furnace higher than Ac3,
austenitizing the steel plate or steel belt, and keeping the temp. for
1-7 min; 2) before the steel plate or steel belt leaves the heating
furnace and enters a forming mold, applying different cooling manners
according to different plated thicknesses, wherein when the single-sided
wt. of the plating is less than or equal to 50g/m2, only air cooling is
required before transferring to the forming mold, when the single-sided
wt. of the plating is greater than 50g/m2, aerial fog or water mist
precooling is performed before transferring to the forming mold, and the
steel plate is cooled to be below 700°C at a cooling sped greater
than 30°C/s; and 3) rapidly transferring the steel plate or
steel belt to the mold for hot stamping forming, wherein a transferring
duration does not exceed 1 min, and the temp. of the hot stamping forming
is controlled between 400-800°C. The tensile strength of the
steel plate or steel belt after hot stamping is greater than 1,450
MPa, and substrate cracks caused by local press and LME in an element are
avoided.

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
=====	=====	=====	=====	=====	=====

AKIRA OBAYASHI	2005			CN 1600877 A	CAPLUS
BI WENZHEN	2017			CN 107127238 A	CAPLUS
BI WENZHEN	2017			CN 107127238 A	CAPLUS
BI WENZHEN	2019			CN 109365606 A	CAPLUS
KOJIMA TAKESHI	2017			CN 106756697 A	CAPLUS
SEKIDO YOSHITO	2013			JP 2013227614 A	CAPLUS
TAKEBAYASHI SHIGETO	2009			JP 2009228134 A	CAPLUS
WILHELM WARNECKE	2010			CN 101849029 A	CAPLUS
YI HONGLIANG	2015			CN 104846274 A	CAPLUS

IT 2293976-55-1
 RL: MSC (Miscellaneous); PEP (Physical, engineering or chemical process);
 TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (Hot stamping method of zinc-based coated steel
 plate or steel strip with excellent corrosion resistance)

RN 2293976-55-1 CAPLUS

CN Iron alloy, base, Fe 91-99, Mn 0.5-3, Si 0-2, Cr 0-1, Mo 0-1, V 0-1, C
 0.1-0.8, Ti 0-0.2, Al 0-0.1, B 0-0.1, Nb 0-0.1, P 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	91 - 99	7439-89-6
Mn	0.5 - 3	7439-96-5
Si	0 - 2	7440-21-3
Cr	0 - 1	7440-47-3
Mo	0 - 1	7439-98-7
V	0 - 1	7440-62-2
C	0.1 - 0.8	7440-44-0
Ti	0 - 0.2	7440-32-6
Al	0 - 0.1	7429-90-5
B	0 - 0.1	7440-42-8
Nb	0 - 0.1	7440-03-1
P	0 - 0.1	7723-14-0

IPCI B21D0022-02 [I]; C23C0002-06 [I]; C23C0002-40 [I]; C22C0018-00 [I];
 C21D0008-02 [I]

IPCR B21D0022-02 [I]; C21D0008-02 [I]; C22C0018-00 [I]; C23C0002-06 [I];
 C23C0002-40 [I]

CC 55-6 (Ferrous Metals and Alloys)

ST corrosion resistance zinc alloy coating steel hot stamping

IT Anticorrosive coating materials
 Coating materials
 (Hot stamping method of zinc-based coated steel
 plate or steel strip with excellent corrosion resistance)

IT Metalworking
 (stamping, hot; Hot stamping method of zinc-based coated
 steel plate or steel strip with excellent corrosion
 resistance)

IT 2293976-55-1
 RL: MSC (Miscellaneous); PEP (Physical, engineering or chemical process);
 TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (Hot stamping method of zinc-based coated steel
 plate or steel strip with excellent corrosion resistance)

IT 2226545-76-0
 RL: PEP (Physical, engineering or chemical process); TEM (Technical or
 engineered material use); PROC (Process); USES (Uses)
 (Hot stamping method of zinc-based coated steel
 plate or steel strip with excellent corrosion resistance)

L13 ANSWER 6 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2020:1041904 CAPLUS Full-text

DOCUMENT NUMBER: 173:612711

TITLE: Aluminum or aluminum alloy plated steel differential
 strength welded part and its manufacture

INVENTOR(S): Pan, Hua; Liu, Chengjie; Lei, Ming; Wu, Yue; Sun,
 Zhongqu; Jiang, Haomin

PATENT ASSIGNEE(S): Baoshan Iron & Steel Co., Ltd., Peop. Rep. China

SOURCE: Faming Zhuanli Shenqing, 12pp.
 CODEN: CNXXEV

DOCUMENT TYPE: Patent

LANGUAGE: Chinese

FAMILY ACC. NUM. COUNT: 2

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
CN 111215751	A	20200602	CN 2019-10249188	20190329
WO 2020200110	A1	20201008	WO 2020-CN81743	20200327
			CN 2019-10249188	A 20190329

PRIORITY APPLN. INFO.:

AB The invention discloses a steel differential strength welding part with an aluminum or aluminum alloy coating and a manufg. method thereof, wherein the steel differential strength welding part is formed by butt welding a high-strength steel plate and a low-strength steel plate, and the high-strength steel plate and the low-strength steel plate comprise a substrate and at least one of the surfaces of the substrate and the substrate is a pure aluminum or aluminum alloy coating; the high-strength steel plate matrix comprises the following components in percentage by wt.: C 0.08-0.8%, Si 0.05-1.0%, Mn 0.1-5%, P <0.3%, S <0.1%, Al <0.3%, Ti <0.5%, B 0.0005-0.1%, Cr 0.01-3%, residual Fe and inevitable impurities; the low-strength steel plate matrix comprises the following components in percentage by wt.: C 0.03-0.1%, Si 0-0.1%, Mn 1.0-2.0%, P <0.1%, S <0.05%, Al <0.1%, Cr 0-0.1%, Ti 0-0.05%, balance of Fe and inevitable impurities. The tensile strength of the welded part after hot stamping is greater than that of a low-strength steel base metal, the elongation is greater than 4%, and the application requirements of the welded part in the field of automobile hot stamping are met.

IT 2067242-22-0, C 0.08-0.8, Si 0.05-1, Mn 0.1-5, P 0-0.3, S 0-0.1, Al 0-0.3, Ti 0-0.5, B 0.0005-0.1, Cr 0.01-3, Fe bal.
RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(aluminum or aluminum alloy plated steel differential strength welded part and its manuf.)

RN 2067242-22-0 CAPLUS

CN Iron alloy, base, Fe 89-100, Mn 0.1-5, Cr 0-3, Si 0-1, C 0.1-0.8, Ti 0-0.5, Al 0-0.3, P 0-0.3, B 0-0.1, S 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	89 - 100	7439-89-6
Mn	0.1 - 5	7439-96-5
Cr	0 - 3	7440-47-3
Si	0 - 1	7440-21-3
C	0.1 - 0.8	7440-44-0
Ti	0 - 0.5	7440-32-6
Al	0 - 0.3	7429-90-5
P	0 - 0.3	7723-14-0
B	0 - 0.1	7440-42-8
S	0 - 0.1	7704-34-9

IPCI B23K0026-26; B23K0026-322; B23K0026-12; C22C0038-38; C22C0038-32; C22C0038-28; C22C0038-06; C22C0038-04; C22C0038-02

IPCR B23K0026-26 [I]; B23K0026-12 [I]; B23K0026-322 [I]; C22C0038-02 [I]; C22C0038-04 [I]; C22C0038-06 [I]; C22C0038-28 [I]; C22C0038-32 [I]; C22C0038-38 [I]

CC 55-9 (Ferrous Metals and Alloys)

ST r aluminum alloy plated steel differential strength welded part

IT Laser welding
Plating process
Tensile strength
Welds
(aluminum or aluminum alloy plated steel differential strength welded part and its manuf.)

IT Welding of metals
(gas metal-arc welding; aluminum or aluminum alloy plated steel differential strength welded part and its manuf.)

IT 2067242-22-0, C 0.08-0.8, Si 0.05-1, Mn 0.1-5, P 0-0.3, S 0-0.1, Al 0-0.3, Ti 0-0.5, B 0.0005-0.1, Cr 0.01-3, Fe bal. 2490151-15-8, C 0.03-0.1, Si 0-0.1, Mn 0.5-2, Al 0-0.1, Cr 0-0.1, Fe bal., processes
RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(aluminum or aluminum alloy plated steel differential strength welded part and its manuf.)

IT 2490151-16-9, C 0.1-0.25, Si 0.2-0.4, Mn 1.2-2, Al 0-0.06, Ti 0.02-0.08,

Cr 0.05-0.2, Fe bal., processes
 RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (aluminum or aluminum alloy plated ~~steel~~ differential strength welded part and its manuf.)

IT 7429-90-5, Aluminum, uses 1273096-81-3, Aluminum alloy
 RL: TEM (Technical or engineered material use); USES (Uses)
 (aluminum or aluminum alloy plated ~~steel~~ differential strength welded part and its manuf.)

L13 ANSWER 7 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN
 ACCESSION NUMBER: 2020:185423 CAPLUS Full-text
 DOCUMENT NUMBER: 172:169762
 TITLE: Manufacture of hardened ~~steel~~ products with aluminum-based ~~coatings~~
 INVENTOR(S): Pohl, Stefan; Danger, Elisabeth; Labudde, Thorsten; Butzkamm, Juergen
 PATENT ASSIGNEE(S): Muhr und Bender KG, Germany
 SOURCE: PCT Int. Appl., 29pp.; Chemical Indexing Equivalent to 172:169761 (DE)
 CODEN: PIXXD2
 DOCUMENT TYPE: Patent
 LANGUAGE: German
 FAMILY ACC. NUM. COUNT: 2
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2020020644	A1	20200130	WO 2019-EP68581	20190710
DE 102018118015	A1	20200130	DE 2018-102018118015	20180725
			DE 2018-102018118015 A	20180725

PRIORITY APPLN. INFO.:
 AB A method for producing a hardened ~~steel~~ product, comprises: providing a ~~steel~~ substrate made of a hardenable ~~steel~~; coating the ~~steel~~ substrate with an aluminum pre-coating, the pre-coating being applied to the ~~steel~~ substrate with a thickness of at least 34µm; flexibly rolling the pre-coated ~~steel~~ substrate in order to produce a variable thickness over the length of the pre-coated ~~steel~~ substrate, the pre-coating being rolled out to a reduced first thickness of less than 33µm in thinner first portions and to a reduced second thickness, which is thicker than the reduced first thickness, in thicker second portions; creating a blank from the flexibly rolled ~~steel~~ substrate; heating the blank to the austenitization temp., diffusion processes between the base material and the pre-coating occurring; and hot-forming the heated blank, the heated blank being formed and being quickly cooled in such a way that a hardened ~~steel~~ product having a coating is produced.

RETABE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
BATISTA LEONARDO MESQUI	2019			EP 3489386 A1	CAPLUS
Hauger, A	1995	23	40	Fertigung	
KIM HEUNG-YUN	2018			US 20180142337 A1	
MACHADO AMORIM	2017			WO 2017017521 A1	CAPLUS
SCHNEIDER DR CHRISTOPH	2017			EP 3181248 A1	
TANAHASHI HIROYUKI	2014			US 20140044987 A1	
WINKLHOFFER KERRY	2008			DE 102007019196 A1	CAPLUS
Windmann, M	2014	246	17	Surface And Coatings	CAPLUS

IT 2408930-78-7
 RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (substrates; manuf. of hardened ~~steel~~ products with aluminum-based ~~coatings~~)

RN 2408930-78-7 CAPLUS

CN Iron alloy, base, Fe 91-99, Mn 0.5-5, Cr 0-1, Mo 0-1, Si 0.1-0.9, C 0.2-0.5, Ti 0-0.2, V 0-0.2, Al 0-0.1, B 0-0.1, Cu 0-0.1, Nb 0-0.1, Ni 0-0.1, P 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	91 - 99	7439-89-6
Mn	0.5 - 5	7439-96-5

Cr	0	-	1	7440-47-3
Mo	0	-	1	7439-98-7
Si	0.1	-	0.9	7440-21-3
C	0.2	-	0.5	7440-44-0
Ti	0	-	0.2	7440-32-6
V	0	-	0.2	7440-62-2
Al	0	-	0.1	7429-90-5
B	0	-	0.1	7440-42-8
Cu	0	-	0.1	7440-50-8
Nb	0	-	0.1	7440-03-1
Ni	0	-	0.1	7440-02-0
P	0	-	0.1	7723-14-0

IPCI C21D0001-673 [I]; B21B0037-24 [I]; B21B0037-26 [I]; C23C0002-12 [I]
 IPCR C21D0001-673 [I]; B21B0037-24 [I]; B21B0037-26 [I]; C23C0002-12 [I]

CC 55-6 (Ferrous Metals and Alloys)

Section cross-reference(s): 56

ST hardened steel aluminum alloy coating silicon austenizing rolling

IT Diffusion

Heat treatment

Hot-dip coating process

Metal forming

Rolling (metals)

Thermomechanical metalworking

(manuf. of hardened steel products with aluminum-based coatings)

IT Oxides (inorganic)

RL: FMU (Formation, unclassified); FORM (Formation, nonpreparative)

(manuf. of hardened steel products with aluminum-based coatings)

IT 7429-90-5, Aluminum, processes 77578-10-0

RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)

(coatings; manuf. of hardened steel products with aluminum-based coatings)

IT 12597-69-2, Steel, processes 2408930-78-7

RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)

(substrates; manuf. of hardened steel products with aluminum-based coatings)

L13 ANSWER 8 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2020:178086 CAPLUS Full-text

DOCUMENT NUMBER: 172:169761

TITLE: Manufacture of hardened steel products with aluminum-based coatings

INVENTOR(S): Pohl, Stefan; Danger, Elisabeth; Labudde, Thorsten; Butzkamm, Juergen

PATENT ASSIGNEE(S): Muhr und Bender KG, Germany

SOURCE: Ger. Offen., 13pp.; Chemical Indexing Equivalent to 172:169762 (WO)

CODEN: GWXXBX

DOCUMENT TYPE: Patent

LANGUAGE: German

FAMILY ACC. NUM. COUNT: 2

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
DE 102018118015	A1	20200130	DE 2018-102018118015	20180725
WO 2020020644	A1	20200130	WO 2019-EP68581	20190710

PRIORITY APPLN. INFO.: DE 2018-102018118015 A 20180725

AB A method for producing a hardened steel product, comprises: providing a steel substrate made of a hardenable steel; coating the steel substrate with an aluminum pre-coating, the pre-coating being applied to the steel substrate with a thickness of at least 34µm; flexibly rolling the pre-coated steel substrate in order to produce a variable thickness over the length of the pre-coated steel substrate, the pre-coating being rolled out to a reduced first thickness of less than 33µm in thinner first portions and to a reduced second thickness, which is thicker than the reduced first thickness, in thicker second portions; creating a blank from the flexibly rolled steel substrate; heating the

blank to the austenitization temp., diffusion processes between the base material and the pre-coating occurring; and hot-forming the heated blank, the heated blank being formed and being quickly cooled in such a way that a hardened steel product having a coating is produced.

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
Anon				DE 102005031461 A1	CAPLUS
Anon				DE 102007013739 B3	CAPLUS
Anon				DE 102007019196 A1	CAPLUS
Anon				DE 102009007909 A1	CAPLUS
Anon	2019			Feuerverzinken In:Wi	
Anon				Salzgitter Flachstah	

IT 2408930-78-7
RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(substrates; manuf. of hardened steel products with aluminum-based coatings)

RN 2408930-78-7 CAPLUS

CN Iron alloy, base, Fe 91-99, Mn 0.5-5, Cr 0-1, Mo 0-1, Si 0.1-0.9, C 0.2-0.5, Ti 0-0.2, V 0-0.2, Al 0-0.1, B 0-0.1, Cu 0-0.1, Nb 0-0.1, Ni 0-0.1, P 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	91 - 99	7439-89-6
Mn	0.5 - 5	7439-96-5
Cr	0 - 1	7440-47-3
Mo	0 - 1	7439-98-7
Si	0.1 - 0.9	7440-21-3
C	0.2 - 0.5	7440-44-0
Ti	0 - 0.2	7440-32-6
V	0 - 0.2	7440-62-2
Al	0 - 0.1	7429-90-5
B	0 - 0.1	7440-42-8
Cu	0 - 0.1	7440-50-8
Nb	0 - 0.1	7440-03-1
Ni	0 - 0.1	7440-02-0
P	0 - 0.1	7723-14-0

IPCI C23F0017-00 [I]; C23C0002-12 [I]; C22C0038-04 [I]

IPCR C23F0017-00 [I]; C22C0038-04 [I]; C23C0002-12 [I]

CC 55-6 (Ferrous Metals and Alloys)
Section cross-reference(s): 56

ST hardened steel aluminum alloy coating silicon austenizing rolling

IT Diffusion
Heat treatment
Hot-dip coating process
Metal forming
Rolling (metals)
Thermomechanical metalworking
(manuf. of hardened steel products with aluminum-based coatings)

IT Oxides (inorganic)
RL: FMU (Formation, unclassified); FORM (Formation, nonpreparative)
(manuf. of hardened steel products with aluminum-based coatings)

IT 7429-90-5, Aluminum, processes 77578-10-0
RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(coatings; manuf. of hardened steel products with aluminum-based coatings)

IT 12597-69-2, Steel, processes 2408930-78-7
RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(substrates; manuf. of hardened steel products with aluminum-based coatings)

ACCESSION NUMBER: 2019:1450710 CAPLUS Full-text
 TITLE: The influence of the heating rate of cemented constructional steels on the growth of austenitic grain in the process of high-temperature holding
 AUTHOR(S): Kukareko, V. A.; Valko, A. L.; Chichin, A. N.
 CORPORATE SOURCE: Joint Institute of Mechanical Engineering of the National Academy of Sciences of Belarus, Minsk, Belarus
 SOURCE: Vestsi Natsyyanal'nai Akademii Navuk Belarusi, Seryya Fizika-Tekhnichnykh Navuk (2018), (4), 399-406
 CODEN: VABNFA; ISSN: 1561-8358
 DIGITAL OBJECT ID: 10.29235/1561-8358-2018-63-4-399-406
 PUBLISHER: Vydavetski Dom "Belaruskaya Navuka"
 DOCUMENT TYPE: Journal
 LANGUAGE: Russian

AB The influence of the heating mode of samples of constructional cemented steels 20KhNZA, 20KhGMR and 15KhGN2TA on the value of austenite grain after high-temp. isothermal aging at 1000 °C is studied. It is shown that the heating of steels at a rate of 1.2-3.0 °C/min in the phase-transformation interval stabilizes the grain structure of the steels and leads to a slowing down of the kinetics of the growth of austenite grains during prolonged high-temp. aging, which makes it possible to increase the temp. of the chem.-thermal treatment of steels. It is concluded that the stabilization of the grain structure of steels is assocd. with the formation of segregation of impurity atoms and particles at grain boundaries with high-angle disorientation during slow heating, which prevents migration of grain boundaries in the process of prolonged high-temp. aging. A high-temp. chem.-thermal treatment of a batch of billets from steel 20KhNZA under exptl. conditions with stepwise heating in the phase-transformation interval provided a qual. fine-grained structure of the cemented layer.

IT INDEXING IN PROGRESS

IT 37312-00-8, 20KhGMR

RL: TEM (Technical or engineered material use); USES (Uses)
 (influence of heating rate of cemented constructional steels
 on growth of austenitic grain in process of high-temp. holding)

RN 37312-00-8 CAPLUS

CN Iron alloy, base, Fe 95-97, Ni 0.80-1.10, Cr 0.70-1.10, Mn 0.70-1.00, Si 0.17-0.37, Cu 0-0.30, C 0.16-0.23, W 0-0.20, Mo 0-0.15, V 0-0.05, P 0-0.035, S 0-0.035, Ti 0-0.03, B 0.001 (20KhGMR) (CA INDEX NAME)

Component	Component Percent		Component Registry Number
=====+=====+=====			
Fe	95	- 97	7439-89-6
Ni	0.80	- 1.10	7440-02-0
Cr	0.70	- 1.10	7440-47-3
Mn	0.70	- 1.00	7439-96-5
Si	0.17	- 0.37	7440-21-3
Cu	0	- 0.30	7440-50-8
C	0.16	- 0.23	7440-44-0
W	0	- 0.20	7440-33-7
Mo	0	- 0.15	7439-98-7
V	0	- 0.05	7440-62-2
P	0	- 0.035	7723-14-0
S	0	- 0.035	7704-34-9
Ti	0	- 0.03	7440-32-6
B	0.001		7440-42-8

CC 55 (Ferrous Metals and Alloys)

ST steel austenitic grain growth heating rate holding temp

IT Grain boundaries

Grain size

Heat treatment

Microhardness

Microstructure

Quenching (cooling)

(influence of heating rate of cemented constructional steels
 on growth of austenitic grain in process of high-temp. holding)

IT 37312-00-8, 20KhGMR 61431-72-9, 15KhGN2TA

RL: TEM (Technical or engineered material use); USES (Uses)
 (influence of heating rate of cemented constructional steels

on growth of austenitic grain in process of high-temp. holding)

L13 ANSWER 10 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2019:1254928 CAPLUS Full-text

DOCUMENT NUMBER: 171:98349

TITLE: Production of cold-rolled flat steel products having metal anti-corrosion layers

INVENTOR(S): Mraczek, Klemens; Muhr, Andreas; Haneder, Bernhard

PATENT ASSIGNEE(S): Voestalpine Stahl GmbH, Austria

SOURCE: PCT Int. Appl., 38pp.; Chemical Indexing Equivalent to 171:98344 (DE)

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: German

FAMILY ACC. NUM. COUNT: 2

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2019121793	A1	20190627	WO 2018-EP85664	20181218
DE 102017223633	A1	20190627	DE 2017-102017223633	20171221
EP 3728654	A1	20201028	EP 2018-826307	20181218
US 20200325552	A1	20201015	US 2020-16956301	20200619
PRIORITY APPLN. INFO.:			DE 2017-102017223633 A	20171221
			WO 2018-EP85664 W	20181218

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB A cold-rolled flat steel contains, in addn. to iron and unavoidable impurities, (in wt.%): C: 0.01-0.35%, Mn: 1-4%, Si: 0.5-2.5%, Nb: up to 0.1%, Ti: 0.015-0.1%, P: up to 0.1%, Al: up to 0.15%, S: up to 0.01%, N: up to 0.1%, and optionally one or more elements from the group of rare earth metals, Mo, Cr, Zr, V, W, Co, Ni, B, Cu, Ca, with rare earth metals: up to 0.2%, Mo: up to 1%, Cr: up to 3%, Zr: up to 1%, V: up to 1%, W: up to 1%, Co: up to 1%, Ni: up to 2%, B: up to 0.1%, Cu: up to 3%, Ca: up to 0.015%. The flat steel products are manufd. by: melting then casting the steel melt to form a semi-finished product; hot-rolling the semi-finished product at 820-1000°C to form a hot strip; winding the hot strip at a temp. between room temp. and 750°C to form a coil; annealing the hot strip at 530-950°C for 1-50 h; cold-rolling the annealed hot strip to form a cold-rolled flat steel product in one or more stages with a total cold-rolling degree of at least 45%; final annealing of the cold-rolled flat steel product at 650-920°C for 30-1500 s; and applying a zinc-based metal anti-corrosion layer by electrolytic galvanizing or hot dip galvanizing of the cold-rolled and finally-annealed flat steel product. As a result of the final annealing of the cold-rolled flat steel product, an Si enrichment layer is created between a surface and a base material of the cold-rolled and finally-annealed flat steel product, the max. Si content of which is higher by a factor of 3-8 than the Si content of the base material and which has a depth of 10 nm to 1 µm.

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
ARLAZAROV ARTEM	2017			EP 3146083 A1	CAPLUS
HAGA JUN	2013			JP 2013032582 A	CAPLUS
NAKAGAITO TATSUYA	2007			JP 2007224416 A	CAPLUS

IT 2351042-49-2P

RL: IMF (Industrial manufacture); PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PREP (Preparation); PROC (Process); USES (Uses)
(sheets; prodn. of cold-rolled flat steel products having metal anti-corrosion layers)

RN 2351042-49-2 CAPLUS

CN Iron alloy, base, Fe 78-98, Mn 1-4, Cr 0-3, Cu 0-3, Si 0.5-2.5, Ni 0-2, Al 0-1.5, Co 0-1, Mo 0-1, V 0-1, W 0-1, Zr 0-1, C 0-0.4, misch metal 0-0.2, Nb 0-0.2, Ti 0-0.2, B 0-0.1, N 0-0.1, P 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	78 - 98	7439-89-6
Mn	1 - 4	7439-96-5

Cr	0	-	3	7440-47-3
Cu	0	-	3	7440-50-8
Si	0.5	-	2.5	7440-21-3
Ni	0	-	2	7440-02-0
Al	0	-	1.5	7429-90-5
Co	0	-	1	7440-48-4
Mo	0	-	1	7439-98-7
V	0	-	1	7440-62-2
W	0	-	1	7440-33-7
Zr	0	-	1	7440-67-7
C	0	-	0.4	7440-44-0
Misch metal	0	-	0.2	8049-20-5
Nb	0	-	0.2	7440-03-1
Ti	0	-	0.2	7440-32-6
B	0	-	0.1	7440-42-8
N	0	-	0.1	17778-88-0
P	0	-	0.1	7723-14-0

IPCI C21D0006-00 [I]; B21B0001-24 [I]; B21B0001-26 [I]; B21B0001-28 [I];
C21D0007-02 [I]; C21D0007-10 [I]; C21D0008-02 [I]; C21D0008-04 [I];
C23C0002-00 [I]; C21D0009-46 [I]; C21D0009-48 [I]; C21D0001-26 [I];
C22C0038-02 [I]; C22C0038-04 [I]; C22C0038-12 [I]; C22C0038-14 [I];
C25F0001-06 [I]; C23G0001-08 [I]; B21B0001-22 [I]
IPCR C21D0006-00 [I]; B21B0001-22 [I]; B21B0001-24 [I]; B21B0001-26 [I];
B21B0001-28 [I]; C21D0001-26 [I]; C21D0007-02 [I]; C21D0007-10 [I];
C21D0008-02 [I]; C21D0008-04 [I]; C21D0009-46 [I]; C21D0009-48 [I];
C22C0038-02 [I]; C22C0038-04 [I]; C22C0038-12 [I]; C22C0038-14 [I];
C23C0002-00 [I]; C23G0001-08 [I]; C25F0001-06 [I]
CC 55-3 (Ferrous Metals and Alloys)
Section cross-reference(s): 56
ST cold rolling annealing flat steel zinc anticorrosion coating
IT Galvanizing
(electro galvanizing; prodn. of cold-rolled flat steel
products having metal anti-corrosion layers)
IT Annealing
Anticorrosive coating materials
Casting of metals
Cold rolling
Hot rolling
Hot-dip galvanizing
(prodn. of cold-rolled flat steel products having metal
anti-corrosion layers)
IT 7440-66-6P, Zinc, preparation
RL: IMF (Industrial manufacture); TEM (Technical or engineered material
use); PREP (Preparation); USES (Uses)
(coatings; prodn. of cold-rolled flat steel
products having metal anti-corrosion layers)
IT 2351042-49-2P
RL: IMF (Industrial manufacture); PEP (Physical, engineering or chemical
process); TEM (Technical or engineered material use); PREP (Preparation);
PROC (Process); USES (Uses)
(sheets; prodn. of cold-rolled flat steel products having
metal anti-corrosion layers)

L13 ANSWER 11 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN
ACCESSION NUMBER: 2019:1241982 CAPLUS Full-text
DOCUMENT NUMBER: 171:98344
TITLE: Production of cold-rolled flat steel products having
metal anti-corrosion layers
INVENTOR(S): Mraczek, Klemens; Muhr, Andreas; Haneder, Bernhard
PATENT ASSIGNEE(S): Voestalpine Stahl GmbH, Austria
SOURCE: Ger. Offen., 17pp.; Chemical Indexing Equivalent to
171:98349 (WO)
CODEN: GWXXBX
DOCUMENT TYPE: Patent
LANGUAGE: German
FAMILY ACC. NUM. COUNT: 2
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
DE 102017223633	A1	20190627	DE 2017-102017223633	20171221

WO 2019121793	A1	20190627	WO 2018-EP85664	20181218
EP 3728654	A1	20201028	EP 2018-826307	20181218
US 20200325552	A1	20201015	US 2020-16956301	20200619
PRIORITY APPLN. INFO.:			DE 2017-102017223633 A	20171221
			WO 2018-EP85664	W 20181218

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB A cold-rolled flat ~~steel~~ contains, in addn. to iron and unavoidable impurities, (in wt.%): C: 0.01-0.35%, Mn: 1-4%, Si: 0.5-2.5%, Nb: up to 0.1%, Ti: 0.015-0.1%, P: up to 0.1%, Al: up to 0.15%, S: up to 0.01%, N: up to 0.1%, and optionally one or more elements from the group of rare earth metals, Mo, Cr, Zr, V, W, Co, Ni, B, Cu, Ca, with rare earth metals: up to 0.2%, Mo: up to 1%, Cr: up to 3%, Zr: up to 1%, V: up to 1%, W: up to 1%, Co: up to 1%, Ni: up to 2%, B: up to 0.1%, Cu: up to 3%, Ca: up to 0.015%. The flat ~~steel~~ products are manufd. by: melting then casting the ~~steel~~ melt to form a semi-finished product; hot-rolling the semi-finished product at 820-1000°C to form a hot strip; winding the hot strip at a temp. between room temp. and 750°C to form a coil; annealing the hot strip at 530-950°C for 1-50 h; cold-rolling the annealed hot strip to form a cold-rolled flat ~~steel~~ product in one or more stages with a total cold-rolling degree of at least 45%; final annealing of the cold-rolled flat ~~steel~~ product at 650-920°C for 30-1500 s; and applying a zinc-based metal anti-corrosion ~~layer~~ by electrolytic galvanizing or hot dip galvanizing of the cold-rolled and finally-annealed flat ~~steel~~ product. As a result of the final annealing of the cold-rolled flat ~~steel~~ product, an Si enrichment ~~layer~~ is created between a surface and a base material of the cold-rolled and finally-annealed flat ~~steel~~ product, the max. Si content of which is higher by a factor of 3-8 than the Si content of the base material and which has a depth of 10 nm to 1 µm.

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
=====	=====	=====	=====	=====	=====
Anon				DE 102012013113 A1	CAPLUS
Anon				DE 102015111866 A1	CAPLUS
Anon				DE 102015112886 A1	CAPLUS
Anon				DE 102015112889 A1	CAPLUS
Anon				EP 2383353 A2	CAPLUS
IT	2351042-49-2P				
	RL: IMF (Industrial manufacture); PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PREP (Preparation); PROC (Process); USES (Uses)				
	(sheets; prodn. of cold-rolled flat steel products having metal anti-corrosion layers)				
RN	2351042-49-2	CAPLUS			
CN	Iron alloy, base, Fe 78-98, Mn 1-4, Cr 0-3, Cu 0-3, Si 0.5-2.5, Ni 0-2, Al 0-1.5, Co 0-1, Mo 0-1, V 0-1, W 0-1, Zr 0-1, C 0-0.4, misch metal 0-0.2, Nb 0-0.2, Ti 0-0.2, B 0-0.1, N 0-0.1, P 0-0.1 (CA INDEX NAME)				

Component	Component Percent	Component Registry Number
=====	=====	=====
Fe	78 - 98	7439-89-6
Mn	1 - 4	7439-96-5
Cr	0 - 3	7440-47-3
Cu	0 - 3	7440-50-8
Si	0.5 - 2.5	7440-21-3
Ni	0 - 2	7440-02-0
Al	0 - 1.5	7429-90-5
Co	0 - 1	7440-48-4
Mo	0 - 1	7439-98-7
V	0 - 1	7440-62-2
W	0 - 1	7440-33-7
Zr	0 - 1	7440-67-7
C	0 - 0.4	7440-44-0
Misch metal	0 - 0.2	8049-20-5
Nb	0 - 0.2	7440-03-1
Ti	0 - 0.2	7440-32-6
B	0 - 0.1	7440-42-8
N	0 - 0.1	17778-88-0
P	0 - 0.1	7723-14-0

IPCI C22C0038-04 [I]; C22C0038-38 [I]; C22C0038-42 [I]; C22C0038-20 [I]
 IPCR C22C0038-04 [I]; C22C0038-20 [I]; C22C0038-38 [I]; C22C0038-42 [I]
 CC 55-3 (Ferrous Metals and Alloys)
 Section cross-reference(s): 56
 ST cold rolling annealing flat steel zinc anticorrosion coating
 IT Galvanizing
 (electrogalvanizing; prodn. of cold-rolled flat steel
 products having metal anti-corrosion layers)
 IT Annealing
 Anticorrosive coating materials
 Casting of metals
 Cold rolling
 Hot rolling
 Hot-dip galvanizing
 (prodn. of cold-rolled flat steel products having metal
 anti-corrosion layers)
 IT 7440-66-6P, Zinc, preparation
 RL: IMF (Industrial manufacture); TEM (Technical or engineered material
 use); PREP (Preparation); USES (Uses)
 (coatings; prodn. of cold-rolled flat steel
 products having metal anti-corrosion layers)
 IT 2351042-49-2P
 RL: IMF (Industrial manufacture); PEP (Physical, engineering or chemical
 process); TEM (Technical or engineered material use); PREP (Preparation);
 PROC (Process); USES (Uses)
 (sheets; prodn. of cold-rolled flat steel products having
 metal anti-corrosion layers)

L13 ANSWER 12 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2019:1019962 CAPLUS Full-text

DOCUMENT NUMBER: 171:30626

TITLE: Ultra-high strength and excellent ductility in
 multi-layer steel sheet of austenitic hadfield and
 martensitic hot-press-forming steels

AUTHOR(S): Park, Jaeyeong; Jo, Min Cheol; Song, Taejin; Kim,
 Hyoung Seop; Sohn, Seok Su; Lee, Sunghak

CORPORATE SOURCE: Center for Advanced Aerospace Materials, Pohang
 University of Science and Technology, Pohang, 790-784,
 S. Korea

SOURCE: Materials Science & Engineering, A: Structural
 Materials: Properties, Microstructure and Processing
 (2019), 759, 320-328

CODEN: MSAPE3; ISSN: 0921-5093

DIGITAL OBJECT ID: 10.1016/j.msea.2019.05.046

PUBLISHER: Elsevier B.V.

DOCUMENT TYPE: Journal; (online computer file)

LANGUAGE: English

AB An austenitic Hadfield steel sheet shows a relatively low yield strength
 of 0.4-0.5 GPa and serrated flows in spite of excellent tensile strength
 and ductility along with highly-sustained strain hardening. In order to
 overcome the shortcomings, a multi-layer steel (MLS) sheet was
 fabricated by a roll-bonding with an ultra-high-strength martensitic
 hot-press-forming (HPF) steel sheet. Near the Hadfield/HPF interface,
 the carburized and decarburized layers were formed by the carbon
 diffusion from the Hadfield (1.2% of C) to HPF (0.23% of C) layers, and
 could generate a kind of very thin multi-layers of 35 µm in
 thickness. All tensile properties of the Hadfield/HPF MLS sheet (yield
 strength; 946 MPa, tensile strength; 1291 MPa, elongation; 44.5%) were
 superior to those of the Hadfield sheet. Interestingly, the persistent
 elongation up to 44.5%, which is higher than that of the Hadfield steel,
 in the present MLS sheet is a quite unique and interesting characteristic.
 The simultaneous enhancement of strength and ductility of the MLS sheet
 was explained by the contributions of (1) populated twin formation, (2)
 generation of geometrically necessary dislocations (GNDs), and (3)
 increase of back stress inside thin interfacial layers.

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
Anon				K. Sato, Q. Yu, J. H.	
Barbier, D	2009	500	196	Mater Sci Eng A	

Bouaziz, O	2016	18	56	Adv Eng Mater	CAPLUS
Calcagnotto, M	2011	59	658	Acta Mater	CAPLUS
Cetin, A	2012	60	2265	Acta Mater	CAPLUS
Chateau, J	2010	240	012023	J Phys Conf Ser	
Chen, L	2007	47	1804	ISIJ Int	CAPLUS
Curtze, S	2010	58	5129	Acta Mater	CAPLUS
Dini, G	2010	64	15	Mater Lett	CAPLUS
Dinsdale, A	1991	15		Calphad	CAPLUS
Dumay, A	2008	483-4	184	Mater Sci Eng A	
Eshelby, J	1951	42	351	Lond Edinb Dublin Ph	
Fan, D	2009	80	241	Steel Res Int	CAPLUS
Frommeyer, G	2003	43	438	ISIJ Int	CAPLUS
Grassel, O	2000	16	1391	Int J Plast	CAPLUS
Gwon, H	2019	25	594	Met Mater Int	CAPLUS
Han, Y	2012	553	192	Mater Sci Eng A	CAPLUS
Hild, F	2006	42	69	Strain	
Hirth, J	1982			Theory of Dislocatio	
Inoue, J	2008	59	1055	Scripta Mater	CAPLUS
Kang, M	2017	700	387	Mater Sci Eng A	CAPLUS
Kang, S	2010	527	745	Mater Sci Eng A	
Kim, J	2019			Met Mater Int	
Koseki, T	2014	55	227	Mater Trans	CAPLUS
Kubin, L	2003	48	119	Scripta Mater	CAPLUS
Kurt, B	2009	60	1035	Mater Char	CAPLUS
Laws, N	1977	7	91	J Elast	
Lebedkina, T	2009	519	147	Mater Sci Eng A	
Lee, D	1988	23	558	J Mater Sci	CAPLUS
Lee, Y	2000	31	355	Metall Mater Trans A	
Li, Y	2018	731	377	Mater Sci Eng A	CAPLUS
Liu, B	2017	679	172	Mater Sci Eng A	CAPLUS
Ma, X	2016	116	43	Acta Mater	CAPLUS
Matlock, D	2012	15	1	JESTECH	
Morito, S	2005	45	91	ISIJ Int	CAPLUS
Nambu, S	2009	69	1936	Compos Sci Technol	CAPLUS
Nambu, S	2009	60	221	Scripta Mater	CAPLUS
Ojima, M	2009	529	16	Mater Sci Eng A	
Ojima, M	2012	66	139	Scripta Mater	CAPLUS
Pan, B	2009	20	1	Meas Sci Technol	
Park, J	2017	7	40231	Sci Rep	CAPLUS
Park, K	2001	7	95	Met Mater Int	CAPLUS
Saleh, A	2011	528	4537	Mater Sci Eng A	
Scott, C	2011	102	538	Int J Mater Res	CAPLUS
Semiatin, S	1979	10	85	Metall Trans A	
Seok, M	2016	121	164	Acta Mater	CAPLUS
Srivastava, A	2008	43	5654	J Mater Sci	CAPLUS
Ueji, R	2012	47	7946	J Mater Sci	CAPLUS
Ueji, R	2008	59	963	Scripta Mater	CAPLUS
Wu, X	2015	112	14501	Proc Natl Acad Sci U	CAPLUS
Xie, G	2011	52	1709	Mater Trans	CAPLUS
Yan, F	2014	81	487	Acta Mater	CAPLUS
Yang, M	2016	4	145	Mater Res Lett	CAPLUS
Yang, W	1990	25	1821	J Mater Sci	CAPLUS
Zuidema, B	1987	18	1629	Metall Trans A	

IT 2334123-60-1, Fe bal., C 0.23, Mn 1.2, Si 0.41, Cr 0.2, Ti

0-0.06, B 0-0.06, processes

RL: PEP (Physical, engineering or chemical process); PRP (Properties);

PROC (Process)

(ultra-high strength and excellent ductility in multi-layer

steel sheet of austenitic hadfield and martensitic

hot-press-forming steels)

RN 2334123-60-1 CAPLUS

CN Steel, Fe 98,Mn 1.2,Si 0.4,C 0.2,Cr 0.2,B 0-0.1,Ti 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
=====+=====+=====		
Fe	98	7439-89-6
Mn	1.2	7439-96-5
Si	0.4	7440-21-3
C	0.2	7440-44-0
Cr	0.2	7440-47-3
B	0 - 0.1	7440-42-8

Ti 0 - 0.1 7440-32-6

CC 55-12 (Ferrous Metals and Alloys)
ST ~~steel~~ multilayer sheet strength ductility microstructure
IT Elongation, mechanical
Hot-press molding
Microstructure
Multilayers
Sheet materials
Solid-solid interface
Strain hardening
Stress-strain relationship
Tensile strength
Yield strength
(ultra-high strength and excellent ductility in multi-layer
~~steel~~ sheet of austenitic hadfield and martensitic
hot-press-forming ~~steels~~)
IT 2334123-57-6, Fe bal., C 1.2, Mn 13.6, Si 0.2 2334123-60-1, Fe
bal., C 0.23, Mn 1.2, Si 0.41, Cr 0.2, Ti 0-0.06, B 0-0.06, processes
RL: PEP (Physical, engineering or chemical process); PRP (Properties);
PROC (Process)
(ultra-high strength and excellent ductility in multi-layer
~~steel~~ sheet of austenitic hadfield and martensitic
hot-press-forming ~~steels~~)
OS.CITING REF COUNT: 3 THERE ARE 3 CAPLUS RECORDS THAT CITE THIS RECORD
(3 CITINGS)

L13 ANSWER 13 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN
ACCESSION NUMBER: 2019:949375 CAPLUS Full-text
DOCUMENT NUMBER: 170:609630
TITLE: Al plated ~~steel~~ pipe parts by STAF method
INVENTOR(S): Maki, Jun; Fujita, Soshi; Nakamura, Toyomitsu
PATENT ASSIGNEE(S): Nippon Steel & Sumitomo Metal Corporation, Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 21pp.
CODEN: JKXXAF

DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2019073778	A	20190516	JP 2017-201702	20171018
PRIORITY APPLN. INFO.:			JP 2017-201702	20171018

AB The present invention relates to an Al plated ~~steel~~ pipe parts comprising a hollow portion having a predetd. cross-sectional shape; and a flange portion projecting from the outer surface of the hollow portion; wherein the hollow portion and the flange portion are made of the same ~~steel~~ material as a material, and the surface of the hollow portion and the flange portion is coated with a plating layer contg. at least one of an Al-Fe-based alloy and an Al-Fe-Si-based alloy. The Al plated ~~steel~~ pipe parts has thickness of the plating layer is in the range of 5-50 μ m, and the surface roughness of the plating layer at the flange portion is in the range of 0.3-1.2 μ m as a center line av. roughness Ra defined by JIS B0610. The Al-plated ~~steel~~ pipe part has excellent spot weldability manufd. by processing an Al-plated ~~steel~~ pipe by the STAF method.

IT 2320493-55-6, Aluminum 0-0.1, boron 0.0001-0.1, carbon 0.15-0.5, chromium 0-1.5, iron bal., manganese 0.6-3, nitrogen 0-0.006, phosphorus 0-0.01, silicon 0.01-2, titanium 0.01-0.1
RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(aluminum plated ~~steel~~ pipe parts by STAF method)
RN 2320493-55-6 CAPLUS
CN Iron alloy, base, Fe 93-99, Mn 0.6-3, Si 0-2, Cr 0-1.5, C 0.2-0.5, Al 0-0.1, B 0-0.1, Ti 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	93 - 99	7439-89-6
Mn	0.6 - 3	7439-96-5

Si	0	-	2	7440-21-3
Cr	0	-	1.5	7440-47-3
C	0.2	-	0.5	7440-44-0
Al	0	-	0.1	7429-90-5
B	0	-	0.1	7440-42-8
Ti	0	-	0.1	7440-32-6

IPCI C23C0002-12 [I]; C23C0002-26 [I]; C22C0038-00 [I]; C22C0038-04 [I];
C22C0038-38 [I]; B21D0026-035 [N]; B21D0026-059 [N]; C22C0021-02 [N];
C21D0009-08 [N]

IPCR C23C0002-12 [I]; C22C0038-00 [I]; C22C0038-04 [I]; C22C0038-38 [I];
C23C0002-26 [I]

CC 55-6 (Ferrous Metals and Alloys)

ST aluminum plating steel pipe parts

IT Coating materials
Pipes and Tubes
(aluminum plated steel pipe parts by STAF method)

IT 12043-58-2
RL: FMU (Formation, unclassified); FORM (Formation, nonpreparative)
(aluminum plated steel pipe parts by STAF method)

IT 2320493-55-6, Aluminum 0-0.1, boron 0.0001-0.1, carbon 0.15-0.5,
chromium 0-1.5, iron bal., manganese 0.6-3, nitrogen 0-0.006, phosphorus
0-0.01, silicon 0.01-2, titanium 0.01-0.1
RL: PEP (Physical, engineering or chemical process); TEM (Technical or
engineered material use); PROC (Process); USES (Uses)
(aluminum plated steel pipe parts by STAF method)

IT 1314-13-2, Zinc oxide, uses 7429-90-5, Aluminum, uses 11114-60-6
11116-16-8, Titanium nitride 11122-26-2 12705-37-2, Chromium nitride
RL: TEM (Technical or engineered material use); USES (Uses)
(aluminum plated steel pipe parts by STAF method)

L13 ANSWER 14 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2019:903363 CAPLUS Full-text
DOCUMENT NUMBER: 170:588989
TITLE: Piercer plug made of seamless steel, and its
manufacturing method
INVENTOR(S): Hidaka, Yasuyoshi; Shirasawa, Naoya; Miyai, Tatsuya
PATENT ASSIGNEE(S): Nippon Steel Corporation, Japan
SOURCE: PCT Int. Appl., 27pp.
CODEN: PIXXD2

DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2019087510	A1	20190509	WO 2018-JP29879	20180809
CN 111315906	A	20200619	CN 2018-80071094	20180809
BR 112020002943	A2	20200811	BR 2020-112020002943	20180809
EP 3705591	A1	20200909	EP 2018-874192	20180809
US 20200263282	A1	20200820	US 2020-16646739	20200312
PRIORITY APPLN. INFO.:			JP 2017-212753	A 20171102
			WO 2018-JP29879	W 20180809

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB The piercer plug comprises the following component in mass (%): 0.15-0.3
of carbon, 0.4-1.2 of silicon, 0.2-1.5 of manganese, 0.1-2 of nickel, 0-4
each of molybdenum and tungsten, 1-4 of chromium, 0-0.2 of boron, 0-1 of
niobium, 0-1 of vanadium, 0-1 of titanium, and iron being balance and
impurities. The piercer plug further comprises a tip section and a body
section made of the same material; wherein the body section includes a
cylindrical unit which is a hole for attaching a bar and the tip section
is harder than the cylindrical unit. The manufg. method of piercer plug
comprises a protective film forming on the surface of the piercer plug to
the heating, wherein the protective film is a thermal sprayed coating
and a buildup layer. According to the present invention, it is possible
to provide a highly recyclable piercer plug.

IT 2315454-12-5P
RL: IMF (Industrial manufacture); TEM (Technical or engineered material
use); PREP (Preparation); USES (Uses)
(piercer plug made of seamless steel, and its manufg. method)

RN 2315454-12-5 CAPLUS

CN Iron alloy, base, Fe 82-97,Cr 1-4,Mo 0-4,W 0-4,Ni 0.1-2,Mn 0.2-1.5,Si 0.4-1.2,Nb 0-1,Ti 0-1,V 0-1,C 0.2-0.3,B 0-0.2 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	82 - 97	7439-89-6
Cr	1 - 4	7440-47-3
Mo	0 - 4	7439-98-7
W	0 - 4	7440-33-7
Ni	0.1 - 2	7440-02-0
Mn	0.2 - 1.5	7439-96-5
Si	0.4 - 1.2	7440-21-3
Nb	0 - 1	7440-03-1
Ti	0 - 1	7440-32-6
V	0 - 1	7440-62-2
C	0.2 - 0.3	7440-44-0
B	0 - 0.2	7440-42-8

IPCI C22C0038-00 [I]; C21D0009-00 [I]; C22C0038-54 [I]

IPCR C22C0038-00 [I]; C21D0009-00 [I]; C22C0038-54 [I]

CC 55-3 (Ferrous Metals and Alloys)

ST carbon boron seamless steel piercer plug

IT 2315454-12-5P

RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(piercer plug made of seamless steel, and its manufg. method)

L13 ANSWER 15 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2019:807393 CAPLUS Full-text

DOCUMENT NUMBER: 170:538936

TITLE: Manufacture of steel components having a metal coating protecting it against corrosion
INVENTOR(S): Banik, Janko; Koeper, Maria; Rosenstock, Dirk; Ruthenberg, Manuela

PATENT ASSIGNEE(S): Thyssenkrupp Steel Europe AG, Germany; Thyssenkrupp AG
SOURCE: PCT Int. Appl., 26pp.; Chemical Indexing Equivalent to 170:538935 (DE)
CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: German

FAMILY ACC. NUM. COUNT: 2

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2019076720	A1	20190425	WO 2018-EP77692	20181011
DE 102017218704	A1	20190425	DE 2017-102017218704	20171019
CN 110997951	A	20200410	CN 2018-80049166	20181011
EP 3697936	A1	20200826	EP 2018-804228	20181011
US 20200216925	A1	20200709	US 2020-16647894	20200317
PRIORITY APPLN. INFO.:			DE 2017-102017218704 A	20171019
			WO 2018-EP77692 W	20181011

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB A method for producing a steel component comprising a steel substrate and an aluminum alloy-based anti-corrosion coating, is described for use in the automotive sector.

RETABE

Referenced Author (RAU)	Year	VOL	PG	Referenced Work (RWK)	Referenced File
BANIK JANKO	2016			EP 2993248 A1	CAPLUS
COBO SEBASTIAN	2017			US 20170253941 A1	
KUSUMI K	2007			EP 1767286 A1	CAPLUS
MAKI JUN	2014			EP 2695963 A1	CAPLUS
ROSENSTOCK DIRK	2018			WO 2018234102 A1	CAPLUS

IT 2307271-66-3P

RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(strips; manuf. of steel components having a metal coating protecting it against corrosion)

RN 2307271-66-3 CAPLUS

CN Iron alloy, base, Fe 94-99, Mn 0.5-3, Cr 0-1, C 0.1-0.5, Si 0.1-0.5, Ti 0-0.2, Al 0-0.1, B 0-0.1, Nb 0-0.1, P 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	94 - 99	7439-89-6
Mn	0.5 - 3	7439-96-5
Cr	0 - 1	7440-47-3
C	0.1 - 0.5	7440-44-0
Si	0.1 - 0.5	7440-21-3
Ti	0 - 0.2	7440-32-6
Al	0 - 0.1	7429-90-5
B	0 - 0.1	7440-42-8
Nb	0 - 0.1	7440-03-1
P	0 - 0.1	7723-14-0

IPCI C21D0001-76 [I]; B21D0022-02 [I]; B21D0022-20 [I]; C21D0007-13 [I]; C23C0002-12 [I]; C23C0002-26 [I]; C23C0002-28 [I]; C21D0009-46 [I]; C21D0009-48 [I]; C21D0001-673 [I]

IPCR C21D0001-76 [I]; B21D0022-02 [I]; B21D0022-20 [I]; C21D0001-673 [I]; C21D0007-13 [I]; C21D0009-46 [I]; C21D0009-48 [I]; C23C0002-12 [I]; C23C0002-26 [I]; C23C0002-28 [I]

CC 55-10 (Ferrous Metals and Alloys)
Section cross-reference(s): 56

ST steel metal prevention corrosion coating

IT Automobile bodies
(chassis; manuf. of steel components having a metal coating protecting it against corrosion)

IT Anticorrosive coating materials
Automobile bodies
Automotive bumpers
(manuf. of steel components having a metal coating protecting it against corrosion)

IT 1273096-81-3P, Aluminum alloy 2307271-67-4P
RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(anti-corrosion coatings; manuf. of steel components having a metal coating protecting it against corrosion)

IT 1333-74-0, Hydrogen, uses
RL: MOA (Modifier or additive use); USES (Uses)
(in steel; manuf. of steel components having a metal coating protecting it against corrosion)

IT 12597-69-2P, Steel, preparation 2307271-66-3P
RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(strips; manuf. of steel components having a metal coating protecting it against corrosion)

L13 ANSWER 16 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2019:805627 CAPLUS Full-text

DOCUMENT NUMBER: 170:527030

TITLE: Enamelling of high-strength steels

INVENTOR(S): Myslowicki, Stefan

PATENT ASSIGNEE(S): ThyssenKrupp Steel Europe AG, Germany; ThyssenKrupp AG

SOURCE: PCT Int. Appl., 28pp.; Chemical Indexing Equivalent to 170:527029 (DE)
CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: German

FAMILY ACC. NUM. COUNT: 2

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2019076717	A1	20190425	WO 2018-EP77686	20181011
DE 102017218434	A1	20190418	DE 2017-102017218434	20171016
EP 3697545	A1	20200826	EP 2018-786281	20181011
PRIORITY APPLN. INFO.:			DE 2017-102017218434 A	20171016
			WO 2018-EP77686	W 20181011

AB A shaped part having at least two layers, comprises at least one layer

made of high-strength steel with a tensile strength ≥ 500 MPa and a hardness ≥ 160 HV, and at least one layer made of a steel that has an enamel layer on the outer side. The shaped part are suitable for producing pipelines, pressure vessels, reactors or in app. engineering, in particular for the transport of aq. and/or corrosive media.

IT 2306234-82-0P

RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(enamelling of high-strength steels)

RN 2306234-82-0 CAPLUS

CN Iron alloy, base, Fe 85-99, Mn 0.5-3, Al 0-3, Si 0.1-2.5, P 0-1.5, Cr 0-1, Mo 0-1, V 0-1, Ti 0-0.8, Nb 0-0.5, C 0-0.4, B 0-0.1, S 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	85 - 99	7439-89-6
Mn	0.5 - 3	7439-96-5
Al	0 - 3	7429-90-5
Si	0.1 - 2.5	7440-21-3
P	0 - 1.5	7723-14-0
Cr	0 - 1	7440-47-3
Mo	0 - 1	7439-98-7
V	0 - 1	7440-62-2
Ti	0 - 0.8	7440-32-6
Nb	0 - 0.5	7440-03-1
C	0 - 0.4	7440-44-0
B	0 - 0.1	7440-42-8
S	0 - 0.1	7704-34-9

IPCI B21B0001-38 [I]; C21D0008-02 [I]; C21D0009-46 [I]; C22C0038-02 [I]; C23D0005-00 [I]

IPCR B21B0001-38 [I]; C21D0008-02 [I]; C21D0009-46 [I]; C22C0038-02 [I]; C23D0005-00 [I]

CC 55-6 (Ferrous Metals and Alloys)

Section cross-reference(s): 57

ST enamel strength steel bilayer

IT Enameling

Enamels (vitreous)

Pipelines

Pressure vessels

Reactors

(enamelling of high-strength steels)

IT 2306234-83-1P, preparation

RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(enameled; enamelling of high-strength steels)

IT 12597-69-2P, Steel, preparation 59816-66-9P, preparation

2306234-82-0P

RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(enamelling of high-strength steels)

L13 ANSWER 17 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2019:802752 CAPLUS Full-text

DOCUMENT NUMBER: 170:538935

TITLE: Manufacture of steel components having a metal coating protecting it against corrosion

INVENTOR(S): Banik, Janko; Koeyer, Maria; Rosenstock, Dirk; Ruthenberg, Manuela

PATENT ASSIGNEE(S): Thyssenkrupp AG, Germany; Thyssenkrupp Steel Europe AG

SOURCE: Ger. Offen., 17pp.; Chemical Indexing Equivalent to 170:538936 (WO)

CODEN: GWXXBX

DOCUMENT TYPE: Patent

LANGUAGE: German

FAMILY ACC. NUM. COUNT: 2

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
DE 102017218704	A1	20190425	DE 2017-102017218704	20171019

WO 2019076720	A1	20190425	WO 2018-EP77692	20181011
CN 110997951	A	20200410	CN 2018-80049166	20181011
EP 3697936	A1	20200826	EP 2018-804228	20181011
US 20200216925	A1	20200709	US 2020-16647894	20200317
PRIORITY APPLN. INFO.:			DE 2017-102017218704 A	20171019
			WO 2018-EP77692	W 20181011

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB A method for producing a ~~steel~~ component comprising a ~~steel~~ substrate and an aluminum alloy-based anti-corrosion ~~coating~~, is described for use in the automotive sector.

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
Anon				EP 1767286 A1	CAPLUS
Anon				US 20120085467 A1	CAPLUS
Anon				EP 2377965 A2	CAPLUS
Anon				EP 2993248 A1	CAPLUS

IT 2307271-66-3P

RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(strips; manuf. of ~~steel~~ components having a metal ~~coating~~ protecting it against corrosion)

RN 2307271-66-3 CAPLUS

CN Iron alloy, base, Fe 94-99, Mn 0.5-3, Cr 0-1, C 0.1-0.5, Si 0.1-0.5, Ti 0-0.2, Al 0-0.1, B 0-0.1, Nb 0-0.1, P 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	94 - 99	7439-89-6
Mn	0.5 - 3	7439-96-5
Cr	0 - 1	7440-47-3
C	0.1 - 0.5	7440-44-0
Si	0.1 - 0.5	7440-21-3
Ti	0 - 0.2	7440-32-6
Al	0 - 0.1	7429-90-5
B	0 - 0.1	7440-42-8
Nb	0 - 0.1	7440-03-1
P	0 - 0.1	7723-14-0

IPCI C22C0038-04 [I]; C23C0002-12 [I]; C23C0002-26 [I]; C21D0001-673 [I]

IPCR C22C0038-04 [I]; C21D0001-673 [I]; C23C0002-12 [I]; C23C0002-26 [I]

CC 55-10 (Ferrous Metals and Alloys)

Section cross-reference(s): 56

ST ~~steel~~ metal prevention corrosion ~~coating~~

IT Automobile bodies

(chassis; manuf. of ~~steel~~ components having a metal ~~coating~~ protecting it against corrosion)

IT Anticorrosive ~~coating~~ materials

Automobile bodies

Automotive bumpers

(manuf. of ~~steel~~ components having a metal ~~coating~~ protecting it against corrosion)

IT 1273096-81-3P, Aluminum alloy 2307271-67-4P

RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(anti-corrosion ~~coatings~~; manuf. of ~~steel~~ components having a metal ~~coating~~ protecting it against corrosion)

IT 1333-74-0, Hydrogen, uses

RL: MOA (Modifier or additive use); USES (Uses)
(in ~~steel~~; manuf. of ~~steel~~ components having a metal ~~coating~~ protecting it against corrosion)

IT 12597-69-2P, ~~Steel~~, preparation 2307271-66-3P

RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(strips; manuf. of ~~steel~~ components having a metal ~~coating~~ protecting it against corrosion)

ACCESSION NUMBER: 2019:746016 CAPLUS Full-text
 DOCUMENT NUMBER: 170:527029
 TITLE: Enamelling of high-strength steels
 INVENTOR(S): Myslowicki, Stefan
 PATENT ASSIGNEE(S): ThyssenKrupp AG, Germany; ThyssenKrupp Steel Europe AG
 SOURCE: Ger. Offen., 20pp.; Chemical Indexing Equivalent to
 170:527030 (WO)
 CODEN: GWXXBX

DOCUMENT TYPE: Patent
 LANGUAGE: German
 FAMILY ACC. NUM. COUNT: 2

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
DE 102017218434	A1	20190418	DE 2017-102017218434	20171016
WO 2019076717	A1	20190425	WO 2018-EP77686	20181011
EP 3697545	A1	20200826	EP 2018-786281	20181011

PRIORITY APPLN. INFO.:

DE 2017-102017218434	A	20171016
WO 2018-EP77686	W	20181011

AB A shaped part having at least two layers, comprises at least one layer made of high-strength steel with a tensile strength ≥ 500 MPa and a hardness ≥ 160 HV, and at least one layer made of a steel that has an enamel layer on the outer side. The shaped part are suitable for producing pipelines, pressure vessels, reactors or in app. engineering, in particular for the transport of aq. and/or corrosive media.

RETABLER

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
Anon				DE 102008022709 A1	CAPLUS
Anon				DE 1533303 C2	
Anon				EP 2227574 B1	CAPLUS

IT 2306234-82-0P

RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
 (enamelling of high-strength steels)

RN 2306234-82-0 CAPLUS

CN Iron alloy, base, Fe 85-99, Mn 0.5-3, Al 0-3, Si 0.1-2.5, P 0-1.5, Cr 0-1, Mo 0-1, V 0-1, Ti 0-0.8, Nb 0-0.5, C 0-0.4, B 0-0.1, S 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	85 - 99	7439-89-6
Mn	0.5 - 3	7439-96-5
Al	0 - 3	7429-90-5
Si	0.1 - 2.5	7440-21-3
P	0 - 1.5	7723-14-0
Cr	0 - 1	7440-47-3
Mo	0 - 1	7439-98-7
V	0 - 1	7440-62-2
Ti	0 - 0.8	7440-32-6
Nb	0 - 0.5	7440-03-1
C	0 - 0.4	7440-44-0
B	0 - 0.1	7440-42-8
S	0 - 0.1	7704-34-9

IPCI C23D0005-00 [I]; B23K0020-04 [I]

IPCR C23D0005-00 [I]; B23K0020-04 [I]

CC 55-6 (Ferrous Metals and Alloys)

Section cross-reference(s): 57

ST enamel strength steel bilayer

IT Enameling

Enamels (vitreous)

Pipelines

Pressure vessels

Reactors

(enamelling of high-strength steels)

IT 2306234-83-1P, preparation

RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(enameled; enamelling of high-strength steels)

IT 12597-69-2P, Steel, preparation 59816-66-9P, preparation
 2306234-82-0P
 RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
 (enamelling of high-strength steels)

L13 ANSWER 19 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2019:570060 CAPLUS Full-text
 DOCUMENT NUMBER: 170:493791
 TITLE: Method for manufacturing hot stamped parts with aluminum-silicon alloy coating and hot stamped parts
 INVENTOR(S): Tan, Ning; Fu, Jiang; Hong, Jiyao; Fang, Xuehua
 PATENT ASSIGNEE(S): Baoshan Iron & Steel Co., Ltd., Peop. Rep. China
 SOURCE: Faming Zhuanli Shenqing, 13pp.
 CODEN: CNXXEV
 DOCUMENT TYPE: Patent
 LANGUAGE: Chinese
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
CN 109518114	A	20190326	CN 2018-11035118	20180906
WO 2020030200	A1	20200213	WO 2019-CN104708	20190906
EP 3770295	A1	20210127	EP 2019-847997	20190906
PRIORITY APPLN. INFO.:			CN 2018-10896744	A 20180808
			CN 2018-11035118	A 20180906
			WO 2019-CN104708	W 20190906

AB The title method comprises the following steps of: processing steel plate coated with aluminum-silicon alloy coating to form a blank of a desired shape of the part, heat treating the blank, and hot stamping. The blank heat treatment adopts two-stage or three-stage heating and heat preservation, and the heating and heat preservation are stepwise heating. The steel plate coated with aluminum-silicon alloy coating include a substrate and an aluminum-silicon alloy coating on at least one surface thereof. The method fully considers the characteristics of the aluminum-silicon coating, is able to effectively solve the problem of roll banding of the aluminum-silicon coating, reduces the nodulation probability of the roller of the heat treatment furnace, improves the service life of the roller, and ensures the integrity of the coating of the hot stamped part as well as the mech. property, welding property, coating property and corrosion resisting property of the part.

IT 2305367-85-3P, Aluminum 0-0.3, boron 0-0.1, carbon 0.04-0.8, chromium 0-3, manganese 0.1-5, phosphorus 0-0.3, silicon 0-1.2, sulfur 0-0.1, titanium 0-0.5, iron bal.
 RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
 (method for manufg. hot stamped parts with aluminum-silicon alloy coating and hot stamped parts)

RN 2305367-85-3 CAPLUS

CN Iron alloy, base, Fe 89-100, Mn 0.1-5, Cr 0-3, Si 0-1.2, C 0-0.8, Ti 0-0.5, Al 0-0.3, P 0-0.3, B 0-0.1, S 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	89 - 100	7439-89-6
Mn	0.1 - 5	7439-96-5
Cr	0 - 3	7440-47-3
Si	0 - 1.2	7440-21-3
C	0 - 0.8	7440-44-0
Ti	0 - 0.5	7440-32-6
Al	0 - 0.3	7429-90-5
P	0 - 0.3	7723-14-0
B	0 - 0.1	7440-42-8
S	0 - 0.1	7704-34-9

IPCI C23C0002-12; C23C0002-40; C22C0038-02; C22C0038-04; C22C0038-06;
 C22C0038-28; C22C0038-32; C22C0038-38; C21D0001-26; C21D0008-00;
 B21D0022-02

IPCR C23C0002-12 [I]; B21D0022-02 [I]; C21D0001-26 [I]; C21D0008-00 [I];
 C22C0038-02 [I]; C22C0038-04 [I]; C22C0038-06 [I]; C22C0038-28 [I];

CC C22C0038-32 [I]; C22C0038-38 [I]; C23C0002-40 [I]
 56-11 (Nonferrous Metals and Alloys)
 ST hot stamping steel aluminum silicon coating
 IT Cooling
 Heat treatment
 (method for manufg. hot stamped parts with aluminum-silicon alloy
 coating and hot stamped parts)
 IT Metalworking
 (stamping; method for manufg. hot stamped parts with aluminum-silicon
 alloy coating and hot stamped parts)
 IT 2305367-85-3P, Aluminum 0-0.3, boron 0-0.1, carbon 0.04-0.8,
 chromium 0-3, manganese 0.1-5, phosphorus 0-0.3, silicon 0-1.2, sulfur
 0-0.1, titanium 0-0.5, iron bal. 2305367-88-6P, Iron 0-4, silicon 4-14,
 aluminum bal.
 RL: IMF (Industrial manufacture); TEM (Technical or engineered material
 use); PREP (Preparation); USES (Uses)
 (method for manufg. hot stamped parts with aluminum-silicon alloy
 coating and hot stamped parts)

L13 ANSWER 20 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2019:340815 CAPLUS Full-text

DOCUMENT NUMBER: 170:379972

TITLE: Hot stamping method of zinc-based coated steel
 plate or steel strip with excellent corrosion
 resistance

INVENTOR(S): Bi, Wenzhen; Hong, Jiyao; Wang, Li

PATENT ASSIGNEE(S): Baoshan Iron & Steel Co., Ltd., Peop. Rep. China

SOURCE: Faming Zhuanli Shenqing, 7pp.; Chemical Indexing
 Equivalent to 173:85818 (WO)

CODEN: CNXXEV

DOCUMENT TYPE: Patent

LANGUAGE: Chinese

FAMILY ACC. NUM. COUNT: 2

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
CN 109365606	A	20190222	CN 2018-11453322	20181130
WO 2020108593	A1	20200604	WO 2019-CN121859	20191129

PRIORITY APPLN. INFO.: CN 2018-11453322 A 20181130

AB The invention discloses a hot stamping method of zinc-based coated
 steel plate or steel strip with excellent corrosion resistance, which
 improves the corrosion resistance of the steel plate or the steel
 strip and avoids cracking of the substrate. The above steel plate or
 steel strip includes the following components in percentage by wt.: C
 0.1-0.8%, Si 0.05-2.0%, Mn 0.5-3.0%, P <0.1%, S <0.05%, Al <0.1%, N
 <0.01%, and balance of Fe and impurities, and also includes at least one
 of Cr 0.01-1.0%, Mo 0.01-1.0%, Ti <0.2%, Nb 0.01-0.08%, V 0.01-1.0%, and B
 0.005-0.08%; the zinc-based coating includes the following components in
 percentage by wt.: Al 0.15%-6.5%, Mg 0.2-7%, RE <0.2%, Sr 0.002-0.2%, and
 balance of Zn and impurities, and the coating further includes at least
 one or more of Mn, Cr, Al, and Mg, and the total amt. thereof is more than
 0.1%.

IT 2293976-55-1, Aluminum 0-0.1, boron 0.005-0.1, carbon 0.1-0.8,
 chromium 0.01-1, iron bal., manganese 0.5-3, molybdenum 0.01-1, niobium
 0.01-0.1, phosphorus 0-0.1, silicon 0.05-2, titanium 0-0.2, vanadium
 0.01-1

RL: MSC (Miscellaneous); PEP (Physical, engineering or chemical process);
 TEM (Technical or engineered material use); PROC (Process); USES (Uses)

(Hot stamping method of zinc-based coated steel
 plate or steel strip with excellent corrosion resistance)

RN 2293976-55-1 CAPLUS

CN Iron alloy, base, Fe 91-99, Mn 0.5-3, Si 0-2, Cr 0-1, Mo 0-1, V 0-1, C
 0.1-0.8, Ti 0-0.2, Al 0-0.1, B 0-0.1, Nb 0-0.1, P 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	91 - 99	7439-89-6
Mn	0.5 - 3	7439-96-5
Si	0 - 2	7440-21-3
Cr	0 - 1	7440-47-3

Mo	0	-	1	7439-98-7
V	0	-	1	7440-62-2
C	0.1	-	0.8	7440-44-0
Ti	0	-	0.2	7440-32-6
Al	0	-	0.1	7429-90-5
B	0	-	0.1	7440-42-8
Nb	0	-	0.1	7440-03-1
P	0	-	0.1	7723-14-0

IPCI B21D0022-02; C23C0002-06; C23C0002-40; C22C0018-00; C21D0008-02
 IPCR B21D0022-02 [I]; C21D0008-02 [I]; C22C0018-00 [I]; C23C0002-06 [I];
 C23C0002-40 [I]
 CC 55-6 (Ferrous Metals and Alloys)
 ST corrosion resistance zinc alloy coating steel hot stamping
 IT Anticorrosive coating materials
 (Hot stamping method of zinc-based coated steel
 plate or steel strip with excellent corrosion resistance)
 IT Metalworking
 (stamping, hot; Hot stamping method of zinc-based coated
 steel plate or steel strip with excellent corrosion
 resistance)
 IT 2293976-55-1, Aluminum 0-0.1, boron 0.005-0.1, carbon 0.1-0.8,
 chromium 0.01-1, iron bal., manganese 0.5-3, molybdenum 0.01-1, niobium
 0.01-0.1, phosphorus 0-0.1, silicon 0.05-2, titanium 0-0.2, vanadium
 0.01-1
 RL: MSC (Miscellaneous); PEP (Physical, engineering or chemical process);
 TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (Hot stamping method of zinc-based coated steel
 plate or steel strip with excellent corrosion resistance)
 IT 2226545-76-0
 RL: PEP (Physical, engineering or chemical process); TEM (Technical or
 engineered material use); PROC (Process); USES (Uses)
 (Hot stamping method of zinc-based coated steel
 plate or steel strip with excellent corrosion resistance)
 OS.CITING REF COUNT: 1 THERE ARE 1 CAPLUS RECORDS THAT CITE THIS RECORD
 (1 CITINGS)

L13 ANSWER 21 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN
 ACCESSION NUMBER: 2018:2601319 CAPLUS Full-text
 DOCUMENT NUMBER: 170:116258
 TITLE: Method for producing a steel automotive component
 provided with an aluminum alloy anti-corrosion coating
 Rosenstock, Dirk; Banik, Janko
 INVENTOR(S): ThyssenKrupp Steel Europe AG, Germany; ThyssenKrupp AG
 PATENT ASSIGNEE(S): PCT Int. Appl., 25pp.; Chemical Indexing Equivalent to
 SOURCE: 170:116256 (DE)
 CODEN: PIXXD2

DOCUMENT TYPE: Patent
 LANGUAGE: German
 FAMILY ACC. NUM. COUNT: 2

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2018234102	A1	20181227	WO 2018-EP65498	20180612
DE 102017210201	A1	20181220	DE 2017-102017210201	20170619
EP 3642371	A1	20200429	EP 2018-738199	20180612
			DE 2017-102017210201 A	20170619
			WO 2018-EP65498 W	20180612

PRIORITY APPLN. INFO.:

AB A method is described for producing a corrosion-resistant steel
 automotive component comprising a substrate and an anticorrosive coating.

IT 2254829-63-3P

RL: IMF (Industrial manufacture); TEM (Technical or engineered material
 use); PREP (Preparation); USES (Uses)
 (strips; method for producing a steel automotive component
 provided with an aluminum alloy anti-corrosion coating)

RN 2254829-63-3 CAPLUS

CN Iron alloy, base, Fe 94-99, Mn 0.5-3, Cr 0-1, C 0.2-0.5, Si 0.1-0.5, Ti
 0-0.2, Al 0-0.1, B 0-0.1, Nb 0-0.1, P 0-0.1 (CA INDEX NAME)

Component	Component	Component
	Percent	Registry Number

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=====+=====+=====
Fe      94    -   99      7439-89-6
Mn      0.5  -    3      7439-96-5
Cr       0   -    1      7440-47-3
C       0.2  -   0.5      7440-44-0
Si      0.1  -   0.5      7440-21-3
Ti       0   -   0.2      7440-32-6
Al       0   -   0.1      7429-90-5
B        0   -   0.1      7440-42-8
Nb       0   -   0.1      7440-03-1
P        0   -   0.1      7723-14-0

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IPCI C21D0008-02 [I]; C23C0002-12 [I]; C21D0009-46 [I]; C21D0001-673 [I];
B32B0015-01 [I]
IPCR C21D0008-02 [I]; B32B0015-01 [I]; C21D0001-673 [I]; C21D0009-46 [I];
C23C0002-12 [I]
CC 55-10 (Ferrous Metals and Alloys)
Section cross-reference(s): 56
ST steel automobile metal coating corrosion aluminum alloy
IT Anticorrosive coating materials
(metallic; method for producing a steel automotive component
provided with an aluminum alloy anti-corrosion coating)
IT Automobile bodies
Automobile doors
Automobile roofs
Automotive bumpers
Heat treatment
(method for producing a steel automotive component provided
with an aluminum alloy anti-corrosion coating)
IT 254455-65-7P
RL: IMF (Industrial manufacture); TEM (Technical or engineered material
use); PREP (Preparation); USES (Uses)
(coatings; method for producing a steel automotive
component provided with an aluminum alloy anti-corrosion
coating)
IT 870820-47-6P, 22MnB5 2254829-63-3P
RL: IMF (Industrial manufacture); TEM (Technical or engineered material
use); PREP (Preparation); USES (Uses)
(strips; method for producing a steel automotive component
provided with an aluminum alloy anti-corrosion coating)
OS.CITING REF COUNT: 1 THERE ARE 1 CAPLUS RECORDS THAT CITE THIS RECORD
(1 CITINGS)

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L13 ANSWER 22 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN
ACCESSION NUMBER: 2018:2544202 CAPLUS Full-text
DOCUMENT NUMBER: 170:116256
TITLE: Method for producing a steel automotive component
provided with an aluminum alloy anti-corrosion coating
INVENTOR(S): Rosenstock, Dirk; Banik, Janko
PATENT ASSIGNEE(S): ThyssenKrupp AG, Germany; ThyssenKrupp Steel Europe AG
SOURCE: Ger. Offen., 16pp.; Chemical Indexing Equivalent to
170:116258 (WO)
CODEN: GWXXBX

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DOCUMENT TYPE: Patent
LANGUAGE: German
FAMILY ACC. NUM. COUNT: 2

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PATENT INFORMATION:
PATENT NO.      KIND  DATE      APPLICATION NO.      DATE
-----
DE 102017210201  A1   20181220  DE 2017-102017210201  20170619
CN 109136775    A    20190104  CN 2017-10986828      20171020
WO 2018234102   A1   20181227  WO 2018-EP65498      20180612
EP 3642371      A1   20200429  EP 2018-738199      20180612
PRIORITY APPLN. INFO.: DE 2017-102017210201 A 20170619
WO 2018-EP65498      W 20180612

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AB A method is described for producing a corrosion-resistant steel
automotive component comprising a substrate and an anticorrosive coating.

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RETABLE

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Referenced Author | Year | VOL | PG | Referenced Work | Referenced
(RAU) | (RPY) | (RVL) | (RPG) | (RWK) | File

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=====+=====+=====+=====+=====+=====+=====

Anon				DE 102007061489 A1	CAPLUS
Anon				DE 102009007909 A1	CAPLUS
Anon				WO 2015036151 A1	CAPLUS
Anon				WO 2016034476 A1	CAPLUS

IT 2254829-63-3P
 RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
 (strips; method for producing a steel automotive component provided with an aluminum alloy anti-corrosion coating)

RN 2254829-63-3 CAPLUS

CN Iron alloy, base, Fe 94-99, Mn 0.5-3, Cr 0-1, C 0.2-0.5, Si 0.1-0.5, Ti 0-0.2, Al 0-0.1, B 0-0.1, Nb 0-0.1, P 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	94 - 99	7439-89-6
Mn	0.5 - 3	7439-96-5
Cr	0 - 1	7440-47-3
C	0.2 - 0.5	7440-44-0
Si	0.1 - 0.5	7440-21-3
Ti	0 - 0.2	7440-32-6
Al	0 - 0.1	7429-90-5
B	0 - 0.1	7440-42-8
Nb	0 - 0.1	7440-03-1
P	0 - 0.1	7723-14-0

IPCI C22C0038-04 [I]; C21D0008-02 [I]; C23C0002-12 [I]

IPCR C22C0038-04 [I]; C21D0008-02 [I]; C23C0002-12 [I]

CC 55-10 (Ferrous Metals and Alloys)

Section cross-reference(s): 56

ST steel automotive metal coating corrosion aluminum alloy

IT Anticorrosive coating materials

(metallic; method for producing a steel automotive component provided with an aluminum alloy anti-corrosion coating)

IT Automobile bodies

Automobile doors

Automobile roofs

Automotive bumpers

Heat treatment

(method for producing a steel automotive component provided with an aluminum alloy anti-corrosion coating)

IT 254455-65-7P

RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(coatings; method for producing a steel automotive component provided with an aluminum alloy anti-corrosion coating)

IT 870820-47-6P, 22MnB5 2254829-63-3P

RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(strips; method for producing a steel automotive component provided with an aluminum alloy anti-corrosion coating)

OS.CITING REF COUNT: 1 THERE ARE 1 CAPLUS RECORDS THAT CITE THIS RECORD (1 CITINGS)

L13 ANSWER 23 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2018:2321302 CAPLUS Full-text

DOCUMENT NUMBER: 170:49880

TITLE: Steel-based electromagnetic shield multilayer screen products

INVENTOR(S): Wieschalla, Vanessa; Nierhoff, Daniel; Wolske, Vanessa; Becker, Jens-Ulrik

PATENT ASSIGNEE(S): ThyssenKrupp AG, Germany; ThyssenKrupp Steel Europe AG

SOURCE: Ger., 17pp. CODEN: GWXXAW

DOCUMENT TYPE: Patent

LANGUAGE: German

FAMILY ACC. NUM. COUNT: 2

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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DE 102017216975 B3 20181129 DE 2017-102017216975 20170925
 WO 2019057547 A1 20190328 WO 2018-EP74424 20180911
 PRIORITY APPLN. INFO.: DE 2017-102017216975 A 20170925
 AB An electromagnetic radiation shielding multilayer material is manufd. for
 shielding from electromagnetic radiation, static elec. and/or static
 magnetic fields.

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
=====	=====	=====	=====	=====	=====
Anon				EP 1426982 A1	CAPLUS
Anon				WO 1991012960 A1	
Anon				DE 3710322 A1	CAPLUS

IT 2253656-70-9P

RL: IMF (Industrial manufacture); TEM (Technical or engineered material
 use); PREP (Preparation); USES (Uses)
 (layers; steel-based electromagnetic shield
 multilayer screen products)

RN 2253656-70-9 CAPLUS

CN Iron alloy, base, Fe 94-100, Mn 0.1-3, C 0-0.5, Cr 0-0.5, Cu 0-0.5, Si 0-0.5, Ti
 0-0.3, Ni 0-0.2, Al 0-0.1, As 0-0.1, B 0-0.1, Mo 0-0.1, N 0-0.1, Nb 0-0.1, P
 0-0.1, S 0-0.1, Sn 0-0.1, V 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
=====	=====	=====
Fe	94 - 100	7439-89-6
Mn	0.1 - 3	7439-96-5
C	0 - 0.5	7440-44-0
Cr	0 - 0.5	7440-47-3
Cu	0 - 0.5	7440-50-8
Si	0 - 0.5	7440-21-3
Ti	0 - 0.3	7440-32-6
Ni	0 - 0.2	7440-02-0
Al	0 - 0.1	7429-90-5
As	0 - 0.1	7440-38-2
B	0 - 0.1	7440-42-8
Mo	0 - 0.1	7439-98-7
N	0 - 0.1	17778-88-0
Nb	0 - 0.1	7440-03-1
P	0 - 0.1	7723-14-0
S	0 - 0.1	7704-34-9
Sn	0 - 0.1	7440-31-5
V	0 - 0.1	7440-62-2

IPCI C22C0038-02 [I]; H05K0009-00 [I]; C22C0038-04 [I]; C22C0038-18 [I]

IPCR C22C0038-02 [I]; C22C0038-04 [I]; C22C0038-18 [I]; H05K0009-00 [I]

CC 55-3 (Ferrous Metals and Alloys)

Section cross-reference(s): 73, 76, 77

ST multilayer screen electromagnetic shield stainless steel alloy

IT Electromagnetic shields

Hot rolling

Multilayers

(steel-based electromagnetic shield multilayer screen
 products)

IT 2253656-70-9P 2253656-71-0P

RL: IMF (Industrial manufacture); TEM (Technical or engineered material
 use); PREP (Preparation); USES (Uses)
 (layers; steel-based electromagnetic shield
 multilayer screen products)

L13 ANSWER 24 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2018:1950769 CAPLUS Full-text

DOCUMENT NUMBER: 169:495369

TITLE: Microstructural features and corrosion analysis of
 A517 steel joint processed by friction stir welding

AUTHOR(S): Ansari pour, Morteza; Soltanipour, Abdol Reza; Dehnavi,
 Mohamad Reza

CORPORATE SOURCE: Materials Engineering Department, Malek Ashtar
 University of Technology, Shahin Shahr, Iran

SOURCE: Materials Research Express (2018), 5(6),
066543/1-066543/13
CODEN: MREAC3; ISSN: 2053-1591
DIGITAL OBJECT ID: 10.1088/2053-1591/aacc80
PUBLISHER: IOP Publishing Ltd.
DOCUMENT TYPE: Journal; (online computer file)
LANGUAGE: English

AB Microstructural observations of friction stir welds of A517 (B) steel showed that within the range of welding variables, martensite phase was hindered. Stir zone microstructure displayed coarse-grained upper bainite assocd. with granular bainite. HAZ consisted of decompd. bainite morphol. of lath-like and equiaxed. Electron backscatter diffraction anal. showed a random oriented recrystd. grain. The corrosion behavior in 3.5 wt% NaCl soln. revealed neg. shift of corrosion potential with increasing of traverse speed. However, the effect of welding parameters on cathodic behavior was more predominant than that on anodic behavior; assocd. with the microstructural alterations. Pitting of corrosion rust layer was identified as the main mechanism of corrosion attack in base material and welds. Although, corrosion c.d. of weld in all of the applied welding condition was slightly lower than that in the base material, however, this study provides recommendation for application of A517 steel jointed by friction stir welding in marine environment.

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
=====	=====	=====	=====	=====	=====
Bhadeshia, H	1999	A273-	58	Mater Sci Eng	CAPLUS
Casalino, G	2012		8239	Proc of SPIE-The Int	
Casalino, G	2014		8963	Proc of SPIE-The Int	
Chen, Y	2005	398	47	Mater Sci Eng A	
Choi, Y	2005	391	162	J Alloys Compd	CAPLUS
Cui, H	2016	681	426	J of Alloys and Comp	CAPLUS
Gao, K	2010	52	3428	Corros Sci	CAPLUS
Ghosh, M	2013	22	3890	J Mater Eng Perform	CAPLUS
Huang, H	1994	36	1027	Corros Sci	CAPLUS
Lee, W	2004	58	1041	Mater Lett	CAPLUS
Li, L	2012	7	3773	Int J Electrochem Sc	CAPLUS
Lu, B	2009	57	41	Acta Mater	CAPLUS
Manvatkar, V	2015	94	36	Scr Mater	CAPLUS
Medina, G	2016	21	146	Soldagem & Inspecao	
Meshram, S	2017	25	94	Journal of Manufactu	
Mishra, R	2005	50	1	Mater Sci Eng R	
Nelson, T	2016	231	66	Mater Process Techno	CAPLUS
Park, H	2004	371A	160	Mater Sci Eng	
Paul, C	2015	10	10246	Int J Electrochem Sc	
Ramirez, A	2013		75	Proc of the 1st Int	
Ren, R	2012	85	283	Electrochimica Acta	CAPLUS
Sato, Y	2005	53	637	Acta Mater	CAPLUS
Sato, Y	2001	32A	3033	Metall Mater Trans	CAPLUS
Sherif, E	2015	10	34	Int J Electrochem Sc	CAPLUS
Sherif, E	2011	129	961	Mater Chem Phy	CAPLUS
Sutton, M	2003	70	2215	Eng Fract Mech	
Sutton, M	2003	354A	6	Mater Sci Eng	
Wang, H	2015	10	5827	Int J Electrochem Sc	CAPLUS
Wang, X	2014	9	4574	Int J Electrochem Sc	
Wang, X	2014	21	474	J Nat Gas Sci Eng	CAPLUS
Wert, J	2003	49	607	Scr Mater	CAPLUS
Yan, J	2005	10	725	Sci Tech Weld Joinin	CAPLUS
Zajac, S	2005		387	Proc of the Int Conf	CAPLUS
Zhang, Q	2002	77	603	Mater Chem Phys	
Zhang, R	2010	41A	1448	Metall Mater Trans	CAPLUS
Zhang, S	2013	75	293	Corros Sci	CAPLUS

IT 52346-86-8, A517B, processes

RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(microstructural features and corrosion anal. of A517 steel joint processed by friction stir welding)

RN 52346-86-8 CAPLUS

CN Steel, (UNS K11630) (CA INDEX NAME)

Component	Component	Component
	Percent	Registry Number

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=====+=====+=====
Fe      97      -   98      7439-89-6
Mn      0.70    -   1.00    7439-96-5
Cr      0.40    -   0.65    7440-47-3
Si      0.20    -   0.35    7440-21-3
Mo      0.15    -   0.25    7439-98-7
C       0.12    -   0.21    7440-44-0
V       0.03    -   0.08    7440-62-2
S       0       -   0.04    7704-34-9
P       0       -   0.035   7723-14-0
Ti      0.01    -   0.03    7440-32-6
B       0.0005  -   0.005   7440-42-8

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CC  55-9 (Ferrous Metals and Alloys)
ST  steel joint processed friction stir welding microstructural feature
corrosion
IT  Corrosion
Corrosion resistance
Current density
Electric current-potential relationship
Friction welding
Friction welds
Grain size
Microstructure
Recrystallization
(microstructural features and corrosion anal. of A517 steel
joint processed by friction stir welding)
IT  12173-93-2, Martensite, formation (nonpreparative) 12427-23-5, Bainite
RL: FMU (Formation, unclassified); FORM (Formation, nonpreparative)
(microstructural features and corrosion anal. of A517 steel
joint processed by friction stir welding)
IT  52346-86-8, A517B, processes
RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM
(Technical or engineered material use); PROC (Process); USES (Uses)
(microstructural features and corrosion anal. of A517 steel
joint processed by friction stir welding)

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L13 ANSWER 25 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

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ACCESSION NUMBER: 2018:1916470 CAPLUS Full-text
DOCUMENT NUMBER: 169:454845
TITLE: Aluminum alloy plated electric resistance welded pipe
for quenching and method of manufacturing aluminum
plated hollow member
INVENTOR(S): Maki, Jun; Fujita, Soshi; Nakamura, Toyomitsu
PATENT ASSIGNEE(S): Nippon Steel & Sumitomo Metal Corporation, Japan
SOURCE: Jpn. Tokkyo Koho, 23pp.
CODEN: JTXFFF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

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PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 6406475	B1	20181017	JP 2018-513042	20171120
WO 2019097729	A1	20190523	WO 2017-JP41697	20171120
CN 111247266	A	20200605	CN 2017-80096110	20171120
IN 202017014250	A	20200814	IN 2020-17014250	20200331
US 20200347489	A1	20201105	US 2020-16753961	20200406
			WO 2017-JP41697	W 20171120

PRIORITY APPLN. INFO.:

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

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AB  The aluminum alloy plated elec. resistance welded pipe for quenching
comprises a base material made of tubular steel plate and an elec.
resistance welded part provided in abutting part of steel plate and
extending in longitudinal direction. The base material comprises in
mass%: carbon 0.06-0.5, silicon 0.01-0.8, manganese 0.6-3, phosphorous
0-0.05, sulfur 0-0.05, aluminum 0-0.1, oxygen 0-0.006, nitrogen 0-0.02,
titanium 0.01-0.1, boron 0-0.1, niobium 0-0.1, vanadium 0-0.3, chromium
0-0.5, molybdenum 0-0.5, nickel 0-0.5, copper 0-0.5, calcium 0-0.005, rare
earth metal 0-0.005, iron balance and impurities. The base material is
positioned on the surface of steel sheet and has an intermetallic compd.
layer contg. an aluminum-iron-silicon based intermetallic compd. and an

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aluminum plating layer located on the surface of the intermetallic compd. layer and contg. aluminum and silicon. The thickness of intermetallic compd. layer is X (μm), the thickness of aluminum layer is Y (μm), and when the thickness of steel pipe is t (mm) and outer diam. of steel pipe is D (mm), the following formula is satisfied: $70 \times X/D \leq Y/t \leq 30$. The method of manufg. aluminum plated hollow member comprises: positioning the base material on the surface of steel sheet, heating aluminum-plated elec. resistance welded pipe, forming the heated aluminum-plated elec. resistance welded pipe into desired shape, and rapidly cooling the aluminum plating elec. resistance welded pipe. According to the present invention, it is possible to manuf. high strength aluminum plated hollow member by hot working, and it is possible to obtain part that has reduced wt.

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
====	====	====	====	====	====
Anon	1983			JP 58204179 A	CAPLUS
Anon	2008			JP 2008069398 A	CAPLUS
Anon	2009			WO 2009131233 A1	CAPLUS
Anon	2014			JP 2014118628 A	CAPLUS
Anon	2017			JP 2017026147 A	CAPLUS

IT 2247299-93-8

RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(aluminum alloy plated elec. resistance welded pipe for quenching and method of manufg. aluminum plated hollow member)

RN 2247299-93-8 CAPLUS

CN Iron alloy, base, Fe 93-99, Mn 0.6-3, Si 0-0.8, C 0.1-0.5, Cr 0-0.5, Cu 0-0.5, Mo 0-0.5, Ni 0-0.5, V 0-0.3, Al 0-0.1, B 0-0.1, Nb 0-0.1, Ti 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
====	====	====
Fe	93 - 99	7439-89-6
Mn	0.6 - 3	7439-96-5
Si	0 - 0.8	7440-21-3
C	0.1 - 0.5	7440-44-0
Cr	0 - 0.5	7440-47-3
Cu	0 - 0.5	7440-50-8
Mo	0 - 0.5	7439-98-7
Ni	0 - 0.5	7440-02-0
V	0 - 0.3	7440-62-2
Al	0 - 0.1	7429-90-5
B	0 - 0.1	7440-42-8
Nb	0 - 0.1	7440-03-1
Ti	0 - 0.1	7440-32-6

IPCI C23C0002-28 [I]; C23C0002-12 [I]; C23C0002-40 [I]; C23C0002-26 [I];
C23C0028-00 [I]; C22C0038-00 [I]; C22C0038-60 [I]; C21D0009-08 [N];
C21D0001-18 [N]; C21D0009-50 [N]; C22C0021-00 [N]

IPCR C23C0002-28 [I]; C22C0038-00 [I]; C22C0038-60 [I]; C23C0002-12 [I];
C23C0002-26 [I]; C23C0002-40 [I]; C23C0028-00 [I]

CC 56-6 (Nonferrous Metals and Alloys)

IT 2247299-93-8

RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(aluminum alloy plated elec. resistance welded pipe for quenching and method of manufg. aluminum plated hollow member)

L13 ANSWER 26 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2018:1651585 CAPLUS Full-text

DOCUMENT NUMBER: 169:330484

TITLE: Method for producing a hot-formed coated steel product

INVENTOR(S): Beentjes, Petrus Cornelis Jozef; Van Schooneveld, Hugo

PATENT ASSIGNEE(S): Tata Steel IJmuiden B.V., Neth.

SOURCE: PCT Int. Appl., 28pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 2

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2018158166	A1	20180907	WO 2018-EP54600	20180223
CA 3051002	A1	20180907	CA 2018-3051002	20180223
MX 2019010192	A	20191002	MX 2019-10192	20180223
CN 110352260	A	20191018	CN 2018-80014405	20180223
KR 2019124211	A	20191104	KR 2019-7023413	20180223
EP 3589772	A1	20200108	EP 2018-714700	20180223
JP 2020510755	T	20200409	JP 2019-546825	20180223
BR 112019015673	A2	20200707	BR 2019-112019015673	20180223
US 20200165712	A1	20200528	US 2019-16485606	20190813
IN 201947037974	A	20190927	IN 2019-47037974	20190920
PRIORITY APPLN. INFO.:			EP 2017-158418	A 20170228
			EP 2017-158419	A 20170228
			WO 2018-EP54600	W 20180223

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB The invention relates to an Al-Si-alloy coated steel strip for hot press forming and to a method for producing the Al-Si-alloy coated steel strip in a continuous coating process.

IT 2243499-83-2D, Aluminum 0-3, boron 0-0.1, carbon 0-0.5, chromium 0-4, copper 0-2, manganese 0.4-4, molybdenum 0-1, nickel 0-2, niobium 0-0.3, phosphorus 0-0.1, silicon 0-3, titanium 0-0.3, tungsten 0-0.5, vanadium 0-0.5, iron bal., S 0-0.05, N 0.001-0.03, Ca 0-0.05, O 0-0.008
RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(method for producing hot-formed coated steel product)

RN 2243499-83-2 CAPLUS

CN Iron alloy, base, Fe 79-100, Mn 0.4-4, Cr 0-4, Al 0-3, Si 0-3, Cu 0-2, Ni 0-2, Mo 0-1, C 0-0.5, V 0-0.5, W 0-0.5, Nb 0-0.3, Ti 0-0.3, B 0-0.1, P 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	79 - 100	7439-89-6
Mn	0.4 - 4	7439-96-5
Cr	0 - 4	7440-47-3
Al	0 - 3	7429-90-5
Si	0 - 3	7440-21-3
Cu	0 - 2	7440-50-8
Ni	0 - 2	7440-02-0
Mo	0 - 1	7439-98-7
C	0 - 0.5	7440-44-0
V	0 - 0.5	7440-62-2
W	0 - 0.5	7440-33-7
Nb	0 - 0.3	7440-03-1
Ti	0 - 0.3	7440-32-6
B	0 - 0.1	7440-42-8
P	0 - 0.1	7723-14-0

IPCI C23C0002-12 [I]; C23C0002-28 [I]; C23C0002-40 [I]

IPCR C23C0002-12 [I]; C23C0002-28 [I]; C23C0002-40 [I]

CC 56-7 (Nonferrous Metals and Alloys)

ST hot formed aluminum silicon alloy coated steel product prodn

IT Paints
(adhesion; method for producing hot-formed coated steel product)

IT Heating
(convective, prediffusion annealing; method for producing hot-formed coated steel product)

IT Aluminizing
(hot dip; method for producing hot-formed coated steel product)

IT Hot-dip coating process
(hot-dip aluminizing; method for producing hot-formed coated steel product)

IT Metal forming
(hot; method for producing hot-formed coated steel product)

IT Automobile bodies
Cooling
Cutting
Diffusion coating materials
Immersion coating process
Phase composition
Surface structure
Thickness
(method for producing hot-formed coated steel product)

IT Adhesion, physical
(paint; method for producing hot-formed coated steel product)

IT Induction heating
Radiant heating
(prediffusion annealing; method for producing hot-formed coated steel product)

IT Annealing
(prediffusion; method for producing hot-formed coated steel product)

IT 12004-62-5 12043-58-2 596799-27-8, Aluminum iron silicide (Al₂Fe₂Si)
RL: FMU (Formation, unclassified); FORM (Formation, nonpreparative)
(method for producing hot-formed coated steel product)

IT 7440-70-2D, Calcium, trace in steel 7704-34-9D, Sulfur, trace in steel 7727-37-9D, Nitrogen, trace in steel 7782-44-7D, Oxygen, trace in steel
RL: OCU (Occurrence, unclassified); OCCU (Occurrence)
(method for producing hot-formed coated steel product)

IT 2243499-83-2D, Aluminum 0-3, boron 0-0.1, carbon 0-0.5, chromium 0-4, copper 0-2, manganese 0.4-4, molybdenum 0-1, nickel 0-2, niobium 0-0.3, phosphorus 0-0.1, silicon 0-3, titanium 0-0.3, tungsten 0-0.5, vanadium 0-0.5, iron bal., S 0-0.05, N 0.001-0.03, Ca 0-0.05, O 0-0.008
RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(method for producing hot-formed coated steel product)

IT 12597-69-2, Steel, processes 2243499-81-0, Aluminum 96-100, silicon 0.4-4
RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(method for producing hot-formed coated steel product)

OS.CITING REF COUNT: 1 THERE ARE 1 CAPLUS RECORDS THAT CITE THIS RECORD (1 CITINGS)

L13 ANSWER 27 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN
ACCESSION NUMBER: 2018:1651584 CAPLUS Full-text
DOCUMENT NUMBER: 169:330483
TITLE: Method for producing a steel strip with an aluminum alloy coating layer
INVENTOR(S): Hensen, Guido Cornelis
PATENT ASSIGNEE(S): Tata Steel IJmuiden B.V., Neth.
SOURCE: PCT Int. Appl., 29pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 2
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2018158165	A1	20180907	WO 2018-EP54599	20180223
CA 3051515	A1	20180907	CA 2018-3051515	20180223
CN 110352259	A	20191018	CN 2018-80014404	20180223
KR 2019124210	A	20191104	KR 2019-7023412	20180223
EP 3589771	A1	20200108	EP 2018-714699	20180223
BR 112019015695	A2	20200407	BR 2019-112019015695	20180223
JP 2020510756	T	20200409	JP 2019-546864	20180223
US 20200017948	A1	20200116	US 2019-16485655	20190813
IN 201947038244	A	20191004	IN 2019-47038244	20190923

PRIORITY APPLN. INFO.:

EP 2017-158418 A 20170228
EP 2017-158419 A 20170228
WO 2018-EP54599 W 20180223

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB The invention relates to a method for producing a steel strip with an aluminum alloy coating layer in a continuous coating process. The invention also relates to an steel strip coated with an aluminum alloy coating layer that can be produced in accordance with the method, the use of such a coated steel strip and the product made by using the coated steel strip.

IT 2243499-83-3D, Aluminum 0-3, boron 0-0.1, carbon 0-0.5, chromium 0-4, copper 0-2, manganese 0.4-4, molybdenum 0-1, nickel 0-2, niobium 0-0.3, phosphorus 0-0.1, silicon 0-3, titanium 0-0.3, tungsten 0-0.5, vanadium 0-0.5, iron bal., S 0-0.05, N 0.001-0.03, Ca 0-0.05, O 0-0.008
RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(method for producing steel strip with aluminum alloy coating layer)

RN 2243499-83-2 CAPLUS

CN Iron alloy, base, Fe 79-100, Mn 0.4-4, Cr 0-4, Al 0-3, Si 0-3, Cu 0-2, Ni 0-2, Mo 0-1, C 0-0.5, V 0-0.5, W 0-0.5, Nb 0-0.3, Ti 0-0.3, B 0-0.1, P 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	79 - 100	7439-89-6
Mn	0.4 - 4	7439-96-5
Cr	0 - 4	7440-47-3
Al	0 - 3	7429-90-5
Si	0 - 3	7440-21-3
Cu	0 - 2	7440-50-8
Ni	0 - 2	7440-02-0
Mo	0 - 1	7439-98-7
C	0 - 0.5	7440-44-0
V	0 - 0.5	7440-62-2
W	0 - 0.5	7440-33-7
Nb	0 - 0.3	7440-03-1
Ti	0 - 0.3	7440-32-6
B	0 - 0.1	7440-42-8
P	0 - 0.1	7723-14-0

IPCI C23C0002-12 [I]; C23C0002-28 [I]; C23C0002-40 [I]

IPCR C23C0002-12 [I]; C23C0002-28 [I]; C23C0002-40 [I]

CC 56-7 (Nonferrous Metals and Alloys)

ST aluminum alloy coated steel strip hot dip prodn method

IT Recrystallization
(annealing, before hot dipping; method for producing steel strip with aluminum alloy coating layer)

IT Induction heating
Radiant heating
(annealing; method for producing steel strip with aluminum alloy coating layer)

IT Annealing
(diffusion; method for producing steel strip with aluminum alloy coating layer)

IT Aluminizing
(hot dip, continuous; method for producing steel strip with aluminum alloy coating layer)

IT Hot-dip coating process
(hot-dip aluminizing, continuous; method for producing steel strip with aluminum alloy coating layer)

IT Metal forming
(hot; method for producing steel strip with aluminum alloy coating layer)

IT Automobile bodies
Cooling
Cutting
Diffusion coating materials
Electric heating
Phase composition
Temperature

Thickness
(method for producing steel strip with aluminum alloy coating layer)

IT Crack propagation
(resistance; method for producing steel strip with aluminum alloy coating layer)

IT Wetting
(time; method for producing steel strip with aluminum alloy coating layer)

IT 12004-62-5 12043-58-2 596799-27-8, Aluminum iron silicide (Al₂Fe₂Si)
RL: FMU (Formation, unclassified); FORM (Formation, nonpreparative)
(method for producing steel strip with aluminum alloy coating layer)

IT 7440-70-2D, Calcium, trace in steel 7704-34-9D, Sulfur, trace in steel 7727-37-9D, Nitrogen, trace in steel 7782-44-7D, Oxygen, trace in steel
RL: OCU (Occurrence, unclassified); OCCU (Occurrence)
(method for producing steel strip with aluminum alloy coating layer)

IT 12597-69-2, Steel, processes 2243499-81-0, Aluminum 96-100, silicon 0.4-4 2243499-83-2D, Aluminum 0-3, boron 0-0.1, carbon 0-0.5, chromium 0-4, copper 0-2, manganese 0.4-4, molybdenum 0-1, nickel 0-2, niobium 0-0.3, phosphorus 0-0.1, silicon 0-3, titanium 0-0.3, tungsten 0-0.5, vanadium 0-0.5, iron bal., S 0-0.05, N 0.001-0.03, Ca 0-0.05, O 0-0.008 2243499-84-3, Aluminum 97, iron 2.3, silicon 0.9 2243499-85-4, Aluminum 96, iron 2.3, silicon 1.9 2243499-86-5, Aluminum 96, iron 2.8, silicon 0.9
RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(method for producing steel strip with aluminum alloy coating layer)

IT 2243499-82-1P, Aluminum 50-55, iron 43-48, silicon 0.4-4
RL: PRP (Properties); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(method for producing steel strip with aluminum alloy coating layer)

L13 ANSWER 28 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2018:863056 CAPLUS Full-text
DOCUMENT NUMBER: 168:486049
TITLE: Steel welding part with aluminum or aluminum alloy plating layer and manufacture method thereof
INVENTOR(S): Pan, Hua; Su, Yongchao; Lei, Ming; Shi, Lei; Jiang, Haomin
PATENT ASSIGNEE(S): Baoshan Iron & Steel Co., Ltd., Peop. Rep. China
SOURCE: PCT Int. Appl., 17pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: Chinese
FAMILY ACC. NUM. COUNT: 2
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2018077067	A1	20180503	WO 2017-CN106516	20171017
CN 106334875	A	20170118	CN 2016-10953787	20161027
MX 2019004121	A	20190606	MX 2019-4121	20171017
KR 2019069471	A	20190619	KR 2019-7013481	20171017
EP 3533558	A1	20190904	EP 2017-864438	20171017
JP 2019535894	T	20191212	JP 2019-520992	20171017
US 20200038998	A1	20200206	US 2019-16339215	20190403
IN 201917015151	A	20190719	IN 2019-17015151	20190415
PRIORITY APPLN. INFO.:			CN 2016-10953787	A 20161027
			WO 2017-CN106516	W 20171017

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB The invention discloses a steel welding part with aluminum or aluminum alloy plating layer and manuf. method thereof. The steel welding part with aluminum or aluminum alloy plating layer comprises a steel substrate and a plating layer, the plating layer comprises an intermetallic compd. alloy layer in contact with the substrate, and a metal alloy layer thereon; which is characterized in that on at least one of the plated surfaces of the weld blank, the plating layer located

in the area to be welded of the weld blank is completely removed, and the end face of the welding blank part plating layer removed the region to be welded is perpendicular to the surface of the substrate which is parallel to weld seam to form an included angle β , and the included angle $\beta = 0-80^\circ$. A method of manufg. steel welding part with aluminum or aluminum alloy plating layer is characterized in that it includes the steps of: obtaining weld blank by welding according to the requirements of steel welding part with aluminum or aluminum alloy plating layer, welding the area to be welded of the weld blank where the plating layer has been completely removed to form a welded joint; obtaining a part by hot stamping, selecting a cooling rate which is greater than the crit. transformation speed of the matrix martensite quenching, and cooling. This invention ensures tensile strength, elongation rate and corrosion resistance of welding joint after hot stamping.

IT 2067242-22-0, Aluminum 0-0.3, boron 0-0.1, carbon 0.1-0.8, chromium 0-3, manganese 0.1-5, phosphorus 0-0.3, silicon 0-1, sulfur 0-0.1, titanium 0-0.5, iron bal.
 RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (steel welding part with aluminum or aluminum alloy plating layer and manuf. method thereof)

RN 2067242-22-0 CAPLUS

CN Iron alloy, base, Fe 89-100, Mn 0.1-5, Cr 0-3, Si 0-1, C 0.1-0.8, Ti 0-0.5, Al 0-0.3, P 0-0.3, B 0-0.1, S 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	89 - 100	7439-89-6
Mn	0.1 - 5	7439-96-5
Cr	0 - 3	7440-47-3
Si	0 - 1	7440-21-3
C	0.1 - 0.8	7440-44-0
Ti	0 - 0.5	7440-32-6
Al	0 - 0.3	7429-90-5
P	0 - 0.3	7723-14-0
B	0 - 0.1	7440-42-8
S	0 - 0.1	7704-34-9

IPCI B23K0026-32 [I]; C22C0038-04 [I]
 IPCR B23K0026-32 [I]; C22C0038-04 [I]
 CC 56-9 (Nonferrous Metals and Alloys)
 Section cross-reference(s): 47

ST steel laser welding corrosion strength

IT Corrosion resistance
 Elongation, mechanical
 Laser welding
 Plating process
 Tensile strength
 (steel welding part with aluminum or aluminum alloy plating layer and manuf. method thereof)

IT Intermetallic compounds
 RL: FMU (Formation, unclassified); FORM (Formation, nonpreparative)
 (steel welding part with aluminum or aluminum alloy plating layer and manuf. method thereof)

IT 2067242-22-0, Aluminum 0-0.3, boron 0-0.1, carbon 0.1-0.8, chromium 0-3, manganese 0.1-5, phosphorus 0-0.3, silicon 0-1, sulfur 0-0.1, titanium 0-0.5, iron bal.
 RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (steel welding part with aluminum or aluminum alloy plating layer and manuf. method thereof)

IT 1273096-81-3, Aluminum alloy
 RL: TEM (Technical or engineered material use); USES (Uses)
 (steel welding part with aluminum or aluminum alloy plating layer and manuf. method thereof)

TITLE: Low-carbon steel sheet and plated steel sheet for automobile parts
 INVENTOR(S): Sano, Kohichi; Uno, Makoto; Nishiyama, Ryoichi; Yamaguchi, Yuji; Sugiura, Natsuko; Nakata, Masahiro
 PATENT ASSIGNEE(S): Nippon Steel & Sumitomo Metal Corporation, Japan
 SOURCE: PCT Int. Appl., 54pp.
 CODEN: PIXXD2
 DOCUMENT TYPE: Patent
 LANGUAGE: Japanese
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2018026015	A1	20180208	WO 2017-JP28478	20170804
TW 1629367	B	20180711	TW 2017-126478	20170804
JP 6358406	B2	20180718	JP 2017-562089	20170804
KR 2019012262	A	20190208	KR 2019-7000430	20170804
KR 2205432	B1	20210120		
MX 2019000051	A	20190401	MX 2019-51	20170804
CN 109563586	A	20190402	CN 2017-80047871	20170804
BR 112019000422	A2	20190430	BR 2019-112019000422	20170804
EP 3495529	A1	20190612	EP 2017-837116	20170804
US 20190233926	A1	20190801	US 2018-16312222	20181220
US 10889879	B2	20210112		
IN 201817049387	A	20190322	IN 2018-17049387	20181227
PRIORITY APPLN. INFO.:			JP 2016-155090	A 20160805
			WO 2017-JP28478	W 20170804

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB The steel plate has chem. compn. as: aluminum 0.010-0.6, boron 0.0005-0.1, calcium 0.0001-0.05, carbon 0.008-0.15, chromium 0.05-1, copper 0.01-2, iron and impurities balance, magnesium 0.0001-0.05, manganese 0.60-2.5, molybdenum 0.01-1, nickel 0.01-2, niobium 0-0.2, nitrogen 0-0.006, phosphorus 0-0.05, rare earth metal 0.0001-0.05, silicon 0.01-1.7, sulfur 0-0.02, titanium 0-0.2, titanium and niobium 0.015-0.2, zirconium 0.0001-0.05, in mass%, and is provided with a structure represented by, in terms of area ratio, 5-95% ferrite and 5-95% bainite. When a crystal grain is defined as a region which is surrounded by grain boundaries having disorientation of 15°-or higher and for which the equiv. circle diam. is 0.3µm or larger, the proportion of crystal grains having an intragranular disorientation of 5-14°-relative to all of crystal grains is 20-100% in terms of area ratio. The steel plate comprises hard material crystal grains A in which ppts. or clusters with max. diam. of no larger than 8 nm are distributed in no. d. of 1×10¹⁶-1×10¹⁹ particles/cm³, and soft material crystal grains B in which ppts. or clusters with a max. diam. of no larger than 8 nm are distributed in no. d. of no higher than 1×10¹⁵ particles/cm³, and the vol.% of hard material crystal grains A/(vol.% of hard material crystal grains A+vol.% of soft material crystal grains B) is 0.1-0.9. The plated steel plate has galvanized galvanizing plating layer. The steel plate has high strength, good ductility and stretch flangeability, and high yield stress.

IT 2178084-33-6
 RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
 (low-carbon steel sheet and plated steel sheet for automobile parts)

RN 2178084-33-6 CAPLUS

CN Iron alloy, base, Fe 89-99, Mn 0.6-2.5, Cu 0-2, Ni 0-2, Si 0-1.7, Cr 0-1, Mo 0-1, Al 0-0.6, C 0-0.2, Nb 0-0.2, Ti 0-0.2, B 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	89 - 99	7439-89-6
Mn	0.6 - 2.5	7439-96-5
Cu	0 - 2	7440-50-8
Ni	0 - 2	7440-02-0
Si	0 - 1.7	7440-21-3
Cr	0 - 1	7440-47-3
Mo	0 - 1	7439-98-7
Al	0 - 0.6	7429-90-5
C	0 - 0.2	7440-44-0

Nb	0	-	0.2	7440-03-1
Ti	0	-	0.2	7440-32-6
B	0	-	0.1	7440-42-8

IPCI C22C0038-00 [I]; C22C0038-58 [I]; C21D0009-46 [N]

IPCR C22C0038-00 [I]; C21D0009-46 [N]; C22C0038-58 [I]

CC 55-3 (Ferrous Metals and Alloys)

ST low carbon steel sheet plating automobile part

IT Automobile parts

Elongation, mechanical

Galvannealing

Grain size

Hot-dip galvanizing

Microstructure

Sheet materials

Tensile strength

Yield strength

(low-carbon steel sheet and plated steel sheet for

automobile parts)

IT 2178084-33-6

RL: PRP (Properties); TEM (Technical or engineered material use); USES

(Uses)

(low-carbon steel sheet and plated steel sheet for

automobile parts)

OS.CITING REF COUNT: 1 THERE ARE 1 CAPLUS RECORDS THAT CITE THIS RECORD
(1 CITINGS)

L13 ANSWER 30 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2017:848898 CAPLUS Full-text

TITLE: Contact Fatigue Resistance of Carburized Gears from
Chromium-Nickel Steels

AUTHOR(S): Rudenko, S. P.; Val'ko, A. L.

CORPORATE SOURCE: United Institute for Mechanical Engineering, National
Academy of Sciences of Belarus, Minsk, Belarus

SOURCE: Metal Science and Heat Treatment (2017), 59(1-2),
60-64

CODEN: MHTRAN; ISSN: 0026-0673

DIGITAL OBJECT ID: 10.1007/s11041-017-0103-3

PUBLISHER: Springer

DOCUMENT TYPE: Journal; (online computer file)

LANGUAGE: English

AB The contact fatigue resistance of carburized gears produced from
chromium-nickel steels is studied. The curves of deep contact fatigue of
the material of the gears are plotted in terms of the criterion of
equality of the characteristics of diffusion layers. An expression for
ultimate deep contact fatigue resistance of carburized gears is derived.

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
=====	+	+	+	=====	+
Anon				A A Susin, Thermoche	
Anon				A I Petrusevich, Con	
Anon				A N Utkina, Yu Yu Ch	
Anon				B A Balashov, R R Ga	
Anon				B V Gold, E P Obolen	
Anon				E B Vulgakov (ed.),	
Anon				E I Tesker, Advanced	
Anon				N M Ryzhov, "Technol	
Anon				S P Rudenko and A L	
Anon				S P Rudenko, "A stud	
Anon				S P Rudenko, "Comput	
Anon				S P Rudenko, "Fatigu	
Anon				S P Rudenko, A L Val	
Anon				V E Antonyuk, B V Iv	
Anon				Yu S Eliseev, V V Kr	

IT INDEXING IN PROGRESS

IT 37312-00-8

RL: PEP (Physical, engineering or chemical process); PRP (Properties);
PROC (Process)

(contact fatigue resistance of carburized gears from chromium-nickel
steels)

RN 37312-00-8 CAPLUS
 CN Iron alloy, base, Fe 95-97, Ni 0.80-1.10, Cr 0.70-1.10, Mn 0.70-1.00, Si 0.17-0.37, Cu 0-0.30, C 0.16-0.23, W 0-0.20, Mo 0-0.15, V 0-0.05, P 0-0.035, S 0-0.035, Ti 0-0.03, B 0.001 (20KhGMR) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	95 - 97	7439-89-6
Ni	0.80 - 1.10	7440-02-0
Cr	0.70 - 1.10	7440-47-3
Mn	0.70 - 1.00	7439-96-5
Si	0.17 - 0.37	7440-21-3
Cu	0 - 0.30	7440-50-8
C	0.16 - 0.23	7440-44-0
W	0 - 0.20	7440-33-7
Mo	0 - 0.15	7439-98-7
V	0 - 0.05	7440-62-2
P	0 - 0.035	7723-14-0
S	0 - 0.035	7704-34-9
Ti	0 - 0.03	7440-32-6
B	0.001	7440-42-8

CC 55-7 (Ferrous Metals and Alloys)
 ST chromium nickel ~~steel~~ carburized gear contact fatigue resistance
 IT Diffusion
 Fatigue resistance
 Gears
 Microhardness
 Microstructure
 (contact fatigue resistance of carburized gears from chromium-nickel ~~steels~~)
 IT 12681-03-7 12742-08-4 37312-00-8 39411-21-7
 RL: PEP (Physical, engineering or chemical process); PRP (Properties);
 PROC (Process)
 (contact fatigue resistance of carburized gears from chromium-nickel ~~steels~~)

L13 ANSWER 31 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2017:342418 CAPLUS Full-text
 DOCUMENT NUMBER: 166:297159
 TITLE: Method for manufacturing ~~steel~~ plate with aluminum or aluminum alloy ~~coating~~ by hot stamping
 INVENTOR(S): Liu, Xin; Hong, Zhenjun; Tan, Ning; Jin, Xinyan; Liu, Junxiang; Hong, Jiyao
 PATENT ASSIGNEE(S): Baoshan Iron & Steel Co., Ltd., Peop. Rep. China
 SOURCE: Faming Zhuanli Shenqing, 15pp.
 CODEN: CNXXEV
 DOCUMENT TYPE: Patent
 LANGUAGE: Chinese
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
CN 106466697	A	20170301	CN 2016-10664566	20160812
CN 106466697	B	20200131		

PRIORITY APPLN. INFO.: CN 2016-10664566 20160812

AB The invention discloses a manuf. method of ~~steel~~ plate, which comprises the following steps: blanking the ~~steel~~ plate with aluminum or aluminum alloy ~~coating~~ by blanking or laser cutting, induction heating, hot stamping in die, and cooling. The temp. and time of heating are detd. by the thickness of ~~steel~~ plate. The components of the ~~steel~~ plate is as follows: C 0.08-0.8%, Si 0.05-1.0%, Mn 0.1-5%, P<0.3%, S<0.1%, Al<0.3%, Ti<0.5%, B 0.0005-0.1%, Cr 0.01-3%, and balance of Fe and inevitable impurities. The ~~coating~~ comprises alloy ~~layer~~, aluminum enriched intermetallic compd. ~~layer~~, intermediate ~~layer~~ and surface ~~layer~~. The components of the alloy ~~layer~~ is Si 0-6%, Fe 75-96%, Al 2-12%; the components of the aluminum enriched intermetallic compd. ~~layer~~ is Si 0-2%, Fe 30-50%, Al 40-60%; the components of the intermediate ~~layer~~ is Si 2-6%, Fe 50-65%, Al 20-35%; and the components of the surface ~~layer~~ is Si 2-6%, Fe 50-65%, Al 20-35%. The product has high strength, complex

shape, good formability, high precision, and small springback, which can be used for automobile parts such as bumper, pillar reinforced plate, floor inside passage, and stiffening beam, etc..

IT 2067242-22-0P, Aluminum 0-0.3, boron 0-0.1, carbon 0.1-0.8, chromium 0-3, manganese 0.1-5, phosphorus 0-0.3, silicon 0-1, sulfur 0-0.1, titanium 0-0.5, iron bal.
 RL: IMF (Industrial manufacture); PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PREP (Preparation); PROC (Process); USES (Uses)
 (method for manufg. steel plate with aluminum or aluminum alloy coating by hot stamping)

RN 2067242-22-0 CAPLUS

CN Iron alloy, base, Fe 89-100, Mn 0.1-5, Cr 0-3, Si 0-1, C 0.1-0.8, Ti 0-0.5, Al 0-0.3, P 0-0.3, B 0-0.1, S 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	89 - 100	7439-89-6
Mn	0.1 - 5	7439-96-5
Cr	0 - 3	7440-47-3
Si	0 - 1	7440-21-3
C	0.1 - 0.8	7440-44-0
Ti	0 - 0.5	7440-32-6
Al	0 - 0.3	7429-90-5
P	0 - 0.3	7723-14-0
B	0 - 0.1	7440-42-8
S	0 - 0.1	7704-34-9

IPCI B21D0053-88; C22C0038-02; C22C0038-04; C22C0038-06; C22C0038-32; C22C0038-60; C23C0002-12; C23C0002-40

IPCR B21D0053-88 [I]; C22C0038-02 [I]; C22C0038-04 [I]; C22C0038-06 [I]; C22C0038-32 [I]; C22C0038-60 [I]; C23C0002-12 [I]; C23C0002-40 [I]

CC 55-1 (Ferrous Metals and Alloys)

ST hot stamping aluminum alloy steel plate coating manuf

IT Coating materials
 Cooling
 Induction heating
 Industrial manufacturing
 Laser cutting
 Quenching (cooling)
 Transmissions (mechanical)
 (method for manufg. steel plate with aluminum or aluminum alloy coating by hot stamping)

IT Metalworking
 (stamping, hot; method for manufg. steel plate with aluminum or aluminum alloy coating by hot stamping)

IT 2067242-22-0P, Aluminum 0-0.3, boron 0-0.1, carbon 0.1-0.8, chromium 0-3, manganese 0.1-5, phosphorus 0-0.3, silicon 0-1, sulfur 0-0.1, titanium 0-0.5, iron bal. 2087430-40-6P, Aluminum 2-12, iron 75-96, silicon 0-6 2087430-41-7P, Aluminum 40-60, iron 30-50, silicon 0-2 2087430-42-8P, Aluminum 20-35, iron 50-65, silicon 2-6
 RL: IMF (Industrial manufacture); PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PREP (Preparation); PROC (Process); USES (Uses)
 (method for manufg. steel plate with aluminum or aluminum alloy coating by hot stamping)

IT 2087430-39-3, Iron 0-4, silicon 5-11, Aluminum bal.
 RL: PEP (Physical, engineering or chemical process); PROC (Process)
 (method for manufg. steel plate with aluminum or aluminum alloy coating by hot stamping)

IT 7429-90-5, Aluminum, processes
 RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (method for manufg. steel plate with aluminum or aluminum alloy coating by hot stamping)

L13 ANSWER 32 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2017:227313 CAPLUS Full-text

DOCUMENT NUMBER: 166:249360

TITLE: Hot rolled steel sheet and its manufacture for

INVENTOR(S): automobile parts
Sakakibara, Chikami; Sugiura, Natsuko; Tanaka,
Yasuaki; Tanei, Hiroshi; Fujii, Takashi; Yokoyama,
Takashi
PATENT ASSIGNEE(S): Nippon Steel & Sumitomo Metal Corporation, Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 16pp.
CODEN: JKXXAF

DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 2

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2017031454	A	20170209	JP 2015-150831	20150730
JP 6620446	B2	20191218		
WO 2017022025	A1	20170209	WO 2015-JP71845	20150731
PRIORITY APPLN. INFO.:			JP 2015-150831	T0 20150730

AB To provide hot-rolled steel plate excellent in pickling property and without an increase in equipment cost, generation of internal oxide layer of a high strength hot rolled steel sheet contg. relatively large amts. of Si and Mn is suppressed, and method for manufg. thereof. Hot-rolled steel plate comprises C: 0.04-0.6%, Si: 0.01-3%, Mn: 0.1-5%, P: 0.04% or less, S: 0.05% or less, Al: 0.001-2%, N: 0.01% or less, O: 0.01% or less, one or more of Sb, Sn and Te: total amt. of 0.01-0.3% and remainder of Fe and unavoidable impurities, and has thickness of the internal oxide layer of 5 µm or less, a concd. layer of Sb, Sn and Te as an upper layer of the internal oxide layer, and has mech. properties with a tensile strength of 590 MPa or more.

IT 2079034-18-5P
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(high strength hot rolled steel sheet and its manuf. for automobile parts)

RN 2079034-18-5 CAPLUS

CN Iron alloy, base, Fe 80-100, Mn 0.1-5, Si 0-3, Al 0-2, Cr 0-2, Cu 0-2, Ni 0-2, Mo 0-1, C 0-0.6, Nb 0-0.3, Sb 0-0.3, Sn 0-0.3, Te 0-0.3, Ti 0-0.3, V 0-0.3, B 0-0.1
(CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	80 - 100	7439-89-6
Mn	0.1 - 5	7439-96-5
Si	0 - 3	7440-21-3
Al	0 - 2	7429-90-5
Cr	0 - 2	7440-47-3
Cu	0 - 2	7440-50-8
Ni	0 - 2	7440-02-0
Mo	0 - 1	7439-98-7
C	0 - 0.6	7440-44-0
Nb	0 - 0.3	7440-03-1
Sb	0 - 0.3	7440-36-0
Sn	0 - 0.3	7440-31-5
Te	0 - 0.3	13494-80-9
Ti	0 - 0.3	7440-32-6
V	0 - 0.3	7440-62-2
B	0 - 0.1	7440-42-8

IPCI C22C0038-00 [I]; C22C0038-60 [I]; C21D0009-46 [I]; C22C0038-00 [I];
C22C0038-60 [I]; C21D0009-46 [I]

IPCR C22C0038-00 [I]; C21D0009-46 [I]; C22C0038-60 [I]

CC 55-3 (Ferrous Metals and Alloys)

ST hot rolled steel sheet manuf automobile part

IT Automobile parts
Casting of metals
Hot rolling
Melting
Microstructure
Pickling
Sheet materials
Tensile strength
(high strength hot rolled steel sheet and its manuf. for

automobile parts)
IT 2079034-18-5P
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(high strength hot rolled steel sheet and its manuf. for automobile parts)
OS.CITING REF COUNT: 1 THERE ARE 1 CAPLUS RECORDS THAT CITE THIS RECORD
(1 CITINGS)

L13 ANSWER 33 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN
ACCESSION NUMBER: 2017:100416 CAPLUS Full-text
DOCUMENT NUMBER: 166:179501
TITLE: Steel welding part with aluminum or aluminum alloy plating layer and manufacture method thereof
INVENTOR(S): Pan, Hua; Su, Yongchao; Lei, Ming; Shi, Lei; Jiang, Haomin
PATENT ASSIGNEE(S): Baoshan Iron & Steel Co., Ltd., Peop. Rep. China
SOURCE: Faming Zhuanli Shenqing, 8pp.
CODEN: CNXXEV
DOCUMENT TYPE: Patent
LANGUAGE: Chinese
FAMILY ACC. NUM. COUNT: 2
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
CN 106334875	A	20170118	CN 2016-10953787	20161027
WO 2018077067	A1	20180503	WO 2017-CN106516	20171017
MX 2019004121	A	20190606	MX 2019-4121	20171017
KR 2019069471	A	20190619	KR 2019-7013481	20171017
EP 3533558	A1	20190904	EP 2017-864438	20171017
JP 2019535894	T	20191212	JP 2019-520992	20171017
US 20200038998	A1	20200206	US 2019-16339215	20190403
IN 201917015151	A	20190719	IN 2019-17015151	20190415
PRIORITY APPLN. INFO.:			CN 2016-10953787	A 20161027
			WO 2017-CN106516	W 20171017

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB The invention discloses a steel welding part with aluminum or aluminum alloy plating layer and manuf. method thereof. The steel welding part with aluminum or aluminum alloy plating layer comprises a steel substrate and a plating layer, the plating layer comprises an intermetallic compd. alloy layer in contact with the substrate, and a metal alloy layer thereon; which is characterized in that on at least one of the plated surfaces of the weld blank, the plating layer located in the area to be welded of the weld blank is completely removed, and the end face of the welding blank part plating layer removed the region to be welded is perpendicular to the surface of the substrate which is parallel to weld seam to form an included angle β , and the included angle $\beta = 0-80^\circ$. A method of manufg. steel welding part with aluminum or aluminum alloy plating layer is characterized in that it includes the steps of: obtaining weld blank by welding according to the requirements of steel welding part with aluminum or aluminum alloy plating layer, welding the area to be welded of the weld blank where the plating layer has been completely removed to form a welded joint; obtaining a part by hot stamping, selecting a cooling rate which is greater than the crit. transformation speed of the matrix martensite quenching, and cooling. This invention ensures tensile strength, elongation rate and corrosion resistance of welding joint after hot stamping.

IT 2067242-22-0, Aluminum 0-0.3, boron 0-0.1, carbon 0.1-0.8, chromium 0-3, manganese 0.1-5, phosphorus 0-0.3, silicon 0-1, sulfur 0-0.1, titanium 0-0.5, iron bal.
RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(steel welding part with aluminum or aluminum alloy plating layer and manuf. method thereof)
RN 2067242-22-0 CAPLUS
CN Iron alloy, base, Fe 89-100, Mn 0.1-5, Cr 0-3, Si 0-1, C 0.1-0.8, Ti 0-0.5, Al 0-0.3, P 0-0.3, B 0-0.1, S 0-0.1 (CA INDEX NAME)

Component	Component	Component
	Percent	Registry Number


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=====+=====+=====
Fe      89   - 100      7439-89-6
Mn      0.1 -   5      7439-96-5
Cr       0   -   3      7440-47-3
Si       0   -   1      7440-21-3
C       0.1 - 0.8      7440-44-0
Ti       0   - 0.5      7440-32-6
Al       0   - 0.3      7429-90-5
P        0   - 0.3      7723-14-0
B        0   - 0.1      7440-42-8
S        0   - 0.1      7704-34-9

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IPCI B23K0026-32; C22C0038-04; C22C0038-02; C22C0038-06; C22C0038-14;
C22C0038-18; C23C0002-12; B23K0103-20
IPCR B23K0026-32 [I]; B23K0103-20 [N]; C22C0038-02 [I]; C22C0038-04 [I];
C22C0038-06 [I]; C22C0038-14 [I]; C22C0038-18 [I]; C23C0002-12 [I]
CC 56-9 (Nonferrous Metals and Alloys)
Section cross-reference(s): 47
ST steel welding part aluminum alloy plating layer
IT Metalworking
(stamping, hot; steel welding part with aluminum or aluminum
alloy plating layer and manuf. method thereof)
IT Corrosion-resistant materials
Industrial manufacturing
Joints, mechanical
Laser ablation
Laser welding
Plating process
Welding apparatus
Welds
(steel welding part with aluminum or aluminum alloy plating
layer and manuf. method thereof)
IT 12003-42-8 12004-62-5 12043-58-2
RL: FMU (Formation, unclassified); FORM (Formation, nonpreparative)
(steel welding part with aluminum or aluminum alloy plating
layer and manuf. method thereof)
IT 1273096-81-3P, Aluminum alloy
RL: IMF (Industrial manufacture); PEP (Physical, engineering or chemical
process); TEM (Technical or engineered material use); PREP (Preparation);
PROC (Process); USES (Uses)
(steel welding part with aluminum or aluminum alloy plating
layer and manuf. method thereof)
IT 2067242-22-0, Aluminum 0-0.3, boron 0-0.1, carbon 0.1-0.8,
chromium 0-3, manganese 0.1-5, phosphorus 0-0.3, silicon 0-1, sulfur
0-0.1, titanium 0-0.5, iron bal.
RL: PEP (Physical, engineering or chemical process); TEM (Technical or
engineered material use); PROC (Process); USES (Uses)
(steel welding part with aluminum or aluminum alloy plating
layer and manuf. method thereof)
OS.CITING REF COUNT: 2 THERE ARE 2 CAPLUS RECORDS THAT CITE THIS RECORD
(2 CITINGS)

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L13 ANSWER 34 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN
ACCESSION NUMBER: 2016:2049760 CAPLUS Full-text
DOCUMENT NUMBER: 167:333389
TITLE: Method for hot forming a coated metal part and
formed part
INVENTOR(S): Verloop, Willem Cornelis; Van Genderen, Marc Jacco;
Van Tol, Ronald Theodoor; Hensen, Guido Cornelis;
Loiseaux, Jenny
PATENT ASSIGNEE(S): Tata Steel IJmuiden B.V., Neth.
SOURCE: U.S., No pp. given
CODEN: USXXAM
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 2
PATENT INFORMATION:
PATENT NO. KIND DATE APPLICATION NO. DATE
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US 9127329 B2 20150908 US 2013-13818041 20130220
US 20130153094 A1 20130620

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WO 2012028224 A1 20120308 WO 2011-EP3601 20110719
 PRIORITY APPLN. INFO.: EP 2010-9041 A 20100831
 WO 2011-EP3601 W 20110719

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB A method for manufg. a coated part having very high mech. properties using hot forming techniques. The method includes: -providing an annealed steel strip or blank or pre-shaped part that was coated with a metal or metal alloy before the annealing -if a strip is provided, cutting a blank from the strip before or after the annealing -optionally forming a pre-shaped part from the blank -heating the blank or preshaped part to a temp. of 500° C. at an av. heating rate of 16° C./s or more -further heating the blank or pre-shaped part to a temp. between 700 and 1000° C. -hot forming the blank or preshaped part into a hot formed part -hardening the hot formed part. A method for manufg. a coated steel strip, blank or pre-shaped part, and a coated steel strip, blank or part and a hot formed part.

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
=====	=====	=====	=====	=====	=====
Anon	2009			DE 102008022400 A1	CAPLUS
Anon	2009			WO 2009021743 A1	CAPLUS
Anon	2009			WO 2009096351 A1	CAPLUS
Anon	2010			WO 2010005121 A1	CAPLUS
Anon	2010			WO 2010069588 A1	CAPLUS
Anon	2010			WO 2010085983 A1	CAPLUS
Anon	2010			EP 2177641 A1	CAPLUS
Anon	2002			"Glossary of Metallu	
Anon	2011			International Search	
Brandstatter	2011			US 20110045316 A1	CAPLUS
Hensen	2011			US 20110236719 A1	CAPLUS
Maki	2011			US 20110174418 A1	CAPLUS
Mehler	1962			US 3056694 A	CAPLUS
Oh	2008			US 20080286603 A1	CAPLUS
Thirion	2012			US 20120085467 A1	CAPLUS
Toki	2011			US 20110048585 A1	CAPLUS
Vlot	2010			US 20100026048 A1	CAPLUS

IT 1360605-36-2

RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (method for manuf. coated steel parts by hot forming)

RN 1360605-36-2 CAPLUS

CN Iron alloy, base, Fe 94-99, Mn 0.5-3, Cr 0-1, C 0.1-0.5, Si 0.1-0.5, Ti 0-0.2, Al 0-0.1, B 0-0.1, Nb 0-0.1, P 0-0.1, V 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
=====	=====	=====
Fe	94 - 99	7439-89-6
Mn	0.5 - 3	7439-96-5
Cr	0 - 1	7440-47-3
C	0.1 - 0.5	7440-44-0
Si	0.1 - 0.5	7440-21-3
Ti	0 - 0.2	7440-32-6
Al	0 - 0.1	7429-90-5
B	0 - 0.1	7440-42-8
Nb	0 - 0.1	7440-03-1
P	0 - 0.1	7723-14-0
V	0 - 0.1	7440-62-2

IPCI C21D0008-02 [I]; C21D0009-46 [I]; C23C0002-06 [I]; C23C0002-40 [I];
 B32B0015-01 [I]; C21D0001-673 [I]; C21D0008-04 [I]; C21D0009-48 [I];
 C22C0038-02 [I]; C22C0038-04 [I]; C23C0010-28 [I]; C23C0010-60 [I];
 C21D0008-02 [I]; B32B0015-01 [I]

IPCR C21D0008-02 [I]; B32B0015-01 [I]; C21D0001-673 [I]; C21D0008-04 [I];
 C21D0009-46 [I]; C21D0009-48 [I]; C22C0038-02 [I]; C22C0038-04 [I];
 C23C0002-06 [I]; C23C0002-40 [I]; C23C0010-28 [I]; C23C0010-60 [I]

NCL 001/001.000; 148/533.000; 148/330.000

CC 55-3 (Ferrous Metals and Alloys)

ST steel strip coating hot deformation

IT Plastic deformation

(hot; method for manuf. coated steel parts by hot forming)

IT 1360605-37-3
 RL: TEM (Technical or engineered material use); USES (Uses)
 (coating; method for manuf. coated steel parts by hot forming)

IT 1360605-36-2
 RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (method for manuf. coated steel parts by hot forming)

L13 ANSWER 35 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2016:1997298 CAPLUS Full-text

DOCUMENT NUMBER: 167:180612

TITLE: Coated steel strips, methods of making the same, methods of using the same, stamping blanks prepared from the same, stamped products prepared from the same, and articles of manufacture which contain such a stamped product

INVENTOR(S): Drillet, Pascal; Spehner, Dominique; Kefferstein, Ronald

PATENT ASSIGNEE(S): Arcelormittal France, Fr.

SOURCE: U.S. Pat. Appl. Publ., No pp. given
 CODEN: USXXCO

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 2

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 20110165436	A1	20110707	US 2011-447777	20110318
WO 2008053273	A1	20080508	WO 2006-IB4019	20061030
EP 3290199	A1	20180307	EP 2017-192410	20061030
EP 3290199	B1	20190821		
EP 3290200	A1	20180307	EP 2017-192418	20061030
EP 3587104	A1	20200101	EP 2019-185736	20061030
EP 3587105	A1	20200101	EP 2019-185743	20061030
US 20130029172	A1	20130131	US 2012-13621015	20120915
US 9708683	B2	20170718		
US 20170260603	A1	20170914	US 2017-15606770	20170526
US 10550447	B2	20200204		
US 20190271055	A1	20190905	US 2019-16413774	20190516
US 10590507	B2	20200317		
US 20190271056	A1	20190905	US 2019-16413799	20190516
US 20190271057	A1	20190905	US 2019-16413825	20190516
US 20190271058	A1	20190905	US 2019-16414022	20190516
US 10597747	B2	20200324		
US 20190276912	A1	20190912	US 2019-16413729	20190516
US 10577674	B2	20200303		

PRIORITY APPLN. INFO.:

WO 2006-IB4019	W	20061030
EP 2006-842403	A3	20061030
EP 2017-192410	A3	20061030
US 2011-447777	A3	20110318
US 2012-13621015	A1	20120915
US 2017-15606770	A1	20170526

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB Coated steel having a well defined and uniform thickness is useful and advantageous for prepg. products by hot stamping. Products prepd. by hot stamping such a steel are particularly advantageous when subjected to a subsequent spot welding step.

IT 1022915-01-0
 RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (aluminum coated steel strips stamping blanks and articles of manuf. which contain such a stamped product)

RN 1022915-01-0 CAPLUS

CN Iron alloy, base, Fe 94-99, Mn 0.5-3, Cr 0-1, C 0.2-0.5, Si 0.1-0.5, Ti 0-0.2, Al 0-0.1, B 0-0.1, P 0-0.1 (CA INDEX NAME)

Component Component Component

	Percent	Registry Number
=====+	=====+	=====
Fe	94 - 99	7439-89-6
Mn	0.5 - 3	7439-96-5
Cr	0 - 1	7440-47-3
C	0.2 - 0.5	7440-44-0
Si	0.1 - 0.5	7440-21-3
Ti	0 - 0.2	7440-32-6
Al	0 - 0.1	7429-90-5
B	0 - 0.1	7440-42-8
P	0 - 0.1	7723-14-0

INCL 428653000; 072342100; 072047000
 IPCI B32B0015-01 [I]; B21D0022-00 [I]; C21D0009-46 [I]
 IPCR B32B0015-01 [I]; B21D0022-00 [I]; C21D0009-46 [I]
 NCL 428/653.000; 072/047.000; 072/342.100
 CC 55-11 (Ferrous Metals and Alloys)
 ST aluminum coated steel strip stamping article spot welding
 IT Metalworking
 (stamping; aluminum coated steel strips stamping
 blanks and articles of manuf. which contain such a stamped product)
 IT 7429-90-5, Aluminum, uses 952598-91-3, Aluminum 87-90, iron 2-4, silicon
 8-11
 RL: NUU (Other use, unclassified); USES (Uses)
 (aluminum coated steel strips stamping blanks and
 articles of manuf. which contain such a stamped product)
 IT 1022915-01-0
 RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM
 (Technical or engineered material use); PROC (Process); USES (Uses)
 (aluminum coated steel strips stamping blanks and
 articles of manuf. which contain such a stamped product)

L13 ANSWER 36 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN
 ACCESSION NUMBER: 2016:1770673 CAPLUS Full-text
 DOCUMENT NUMBER: 165:549448
 TITLE: Production of hot or cold strips from steel having
 high copper content
 INVENTOR(S): Redenius, Alexander; Evertz, Thomas; Palzer, Peter
 PATENT ASSIGNEE(S): Salzgitter Flachstahl GmbH, Germany
 SOURCE: PCT Int. Appl., 23pp.; Chemical Indexing Equivalent to
 165:549447 (DE)
 CODEN: PIXXD2
 DOCUMENT TYPE: Patent
 LANGUAGE: German
 FAMILY ACC. NUM. COUNT: 2
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2016174020	A1	20161103	WO 2016-EP59266	20160426
DE 102015106780	A1	20161103	DE 2015-102015106780	20150430
PRIORITY APPLN. INFO.:			DE 2015-102015106780 A	20150430

AB A hot or cold strip of steel with high copper content, is manufd. by:
 melting a steel melt contg. (in wt.%) 0-0.4% C, 0-3% Mn, 0-2% Al, 0-2%
 Si, more than 0.8% Cu, 0-0.2% P, 0-0.05% S, and 0-0.3% N, with optional
 addn. of Sn, Ni, Cr, V, Nb, Ti, Mo, W, B, Co, Sb and/or Zr, the remainder
 being iron and unavoidable impurities; casting the melt under an atm.
 having an oxygen content <10 vol.%, by a near-net-shape casting method, in
 particular horizontal strip casting or vertical casting according to the
 two-roll method, into a pre-strip having a thickness in of 1-30 mm;
 cooling the cast pre-strip at a cooling rate ≥100 K/s at the
 actively cooled strip surface until forming a rigid boundary layer.

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
FANG YUAN	2014			US 20140366602 A1	
GUELTON NICOLAS PATRICE	2004			EP 1466024 A1	CAPLUS
IKI HIROSHI	2000			JP 2000045045 A	CAPLUS
IUNG THIERRY	2001			EP 1072689 A1	CAPLUS
MARUYAMA NAOKI	2005			JP 2005036271 A	CAPLUS
MIZOGUCHI TOSHIAKI NIPP	1995			EP 0641867 A1	CAPLUS

UENISHI AKIHIRO | 2000 | | | EP 0969112 A1 | CAPLUS
YAMAKAWA TSUNAHIRO | 1992 | | | US 5098489 A | CAPLUS
IT 2031158-69-5P
RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(strips; prodn. of hot or cold strips from steel having high copper content)
RN 2031158-69-5 CAPLUS
CN Iron alloy, base, Fe 68-99, Cu 0.8-5, Cr 0-4, Co 0-3, Mn 0-3, Mo 0-3, W 0-3, Al 0-2, Ni 0-2, Si 0-2, Nb 0-0.9, Ti 0-0.9, V 0-0.9, Sn 0-0.5, Zr 0-0.5, C 0-0.4, B 0-0.3, N 0-0.3, P 0-0.2 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	68 - 99	7439-89-6
Cu	0.8 - 5	7440-50-8
Cr	0 - 4	7440-47-3
Co	0 - 3	7440-48-4
Mn	0 - 3	7439-96-5
Mo	0 - 3	7439-98-7
W	0 - 3	7440-33-7
Al	0 - 2	7429-90-5
Ni	0 - 2	7440-02-0
Si	0 - 2	7440-21-3
Nb	0 - 0.9	7440-03-1
Ti	0 - 0.9	7440-32-6
V	0 - 0.9	7440-62-2
Sn	0 - 0.5	7440-31-5
Zr	0 - 0.5	7440-67-7
C	0 - 0.4	7440-44-0
B	0 - 0.3	7440-42-8
N	0 - 0.3	17778-88-0
P	0 - 0.2	7723-14-0

IPCI C22C0038-00 [I]; B22D0011-00 [I]; B22D0011-06 [I]; B22D0011-106 [I]; B22D0011-124 [I]; B22D0011-14 [I]; B22D0011-22 [I]; B22D0015-00 [I]; B22D0037-00 [I]; C21D0006-00 [I]; C21D0008-02 [I]; C21D0001-26 [I]; C22C0038-02 [I]; C22C0038-04 [I]; C22C0038-06 [I]; C22C0038-16 [I]; B22D0011-112 [I]; C21D0006-02 [I]
IPCR C22C0038-00 [I]; B22D0011-00 [I]; B22D0011-06 [I]; B22D0011-106 [I]; B22D0011-112 [I]; B22D0011-124 [I]; B22D0011-14 [I]; B22D0011-22 [I]; B22D0015-00 [I]; B22D0037-00 [I]; C21D0001-26 [I]; C21D0006-00 [I]; C21D0006-02 [I]; C21D0008-02 [I]; C22C0038-02 [I]; C22C0038-04 [I]; C22C0038-06 [I]; C22C0038-16 [I]
CC 55-3 (Ferrous Metals and Alloys)
ST hot cold strip steel copper casting cooling
IT Annealing
Casting of metals
Cooling
Hot rolling
(prodn. of hot or cold strips from steel having high copper content)
IT 124-38-9, Carbon dioxide, uses 630-08-0, Carbon monoxide, uses 7440-37-1, Argon, uses 7727-37-9, Nitrogen, uses 7782-44-7, Oxygen, uses
RL: NUU (Other use, unclassified); USES (Uses)
(casting atm.; prodn. of hot or cold strips from steel having high copper content)
IT 2031158-68-4P 2031158-69-5P
RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(strips; prodn. of hot or cold strips from steel having high copper content)

L13 ANSWER 37 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN
ACCESSION NUMBER: 2016:1770568 CAPLUS Full-text
DOCUMENT NUMBER: 165:549447
TITLE: Production of hot or cold strips from steel having high copper content
INVENTOR(S): Redenius, Alexander; Evertz, Thomas; Palzer, Peter

PATENT ASSIGNEE(S): Salzgitter Flachstahl GmbH, Germany
SOURCE: Ger. Offen., 9pp.; Chemical Indexing Equivalent to
165:549448 (WO)
CODEN: GWXXBX
DOCUMENT TYPE: Patent
LANGUAGE: German
FAMILY ACC. NUM. COUNT: 2
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
DE 102015106780	A1	20161103	DE 2015-102015106780	20150430
WO 2016174020	A1	20161103	WO 2016-EP59266	20160426
			DE 2015-102015106780 A	20150430

PRIORITY APPLN. INFO.:

AB A hot or cold strip of ~~steel~~ with high copper content, is manufd. by:
melting a ~~steel~~ melt contg. (in wt.%) 0-0.4% C, 0-3% Mn, 0-2% Al, 0-2%
Si, more than 0.8% Cu, 0-0.2% P, 0-0.05% S, and 0-0.3% N, with optional
addn. of Sn, Ni, Cr, V, Nb, Ti, Mo, W, B, Co, Sb and/or Zr, the remainder
being iron and unavoidable impurities; casting the melt under an atm.
having an oxygen content <10 vol.%, by a near-net-shape casting method, in
particular horizontal strip casting or vertical casting according to the
two-roll method, into a pre-strip having a thickness in of 1-30 mm;
cooling the cast pre-strip at a cooling rate ≥100 K/s at the
actively cooled strip surface until forming a rigid boundary layer.

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
Anon				DE 112013001434 T5	CAPLUS
Anon				WO 2015003755 A1	CAPLUS
Anon				EP 2546368 A1	CAPLUS
Anon				DE 60306365 T2	
Anon	2013			M Bausch et al:Ultra	

IT 2031158-69-5P

RL: IMF (Industrial manufacture); TEM (Technical or engineered material
use); PREP (Preparation); USES (Uses)
(strips; prodn. of hot or cold strips from ~~steel~~ having high
copper content)

RN 2031158-69-5 CAPLUS

CN Iron alloy, base, Fe 68-99, Cu 0.8-5, Cr 0-4, Co 0-3, Mn 0-3, Mo 0-3, W 0-3, Al
0-2, Ni 0-2, Si 0-2, Nb 0-0.9, Ti 0-0.9, V 0-0.9, Sn 0-0.5, Zr 0-0.5, C 0-0.4, B
0-0.3, N 0-0.3, P 0-0.2 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	68 - 99	7439-89-6
Cu	0.8 - 5	7440-50-8
Cr	0 - 4	7440-47-3
Co	0 - 3	7440-48-4
Mn	0 - 3	7439-96-5
Mo	0 - 3	7439-98-7
W	0 - 3	7440-33-7
Al	0 - 2	7429-90-5
Ni	0 - 2	7440-02-0
Si	0 - 2	7440-21-3
Nb	0 - 0.9	7440-03-1
Ti	0 - 0.9	7440-32-6
V	0 - 0.9	7440-62-2
Sn	0 - 0.5	7440-31-5
Zr	0 - 0.5	7440-67-7
C	0 - 0.4	7440-44-0
B	0 - 0.3	7440-42-8
N	0 - 0.3	17778-88-0
P	0 - 0.2	7723-14-0

IPCI C22C0038-04 [I]; C22C0038-16 [I]; C21D0008-00 [I]; B22D0011-06 [I];

B22D0011-116 [I]; B22D0011-12 [I]; C22C0111-00 [I]

IPCR C22C0038-04 [I]; B22D0011-06 [I]; B22D0011-116 [I]; B22D0011-12 [I];

C21D0008-00 [I]; C22C0038-16 [I]; C22C0111-00 [N]

CC 55-3 (Ferrous Metals and Alloys)

ST hot cold strip ~~steel~~ copper casting cooling

IT Annealing

Casting of metals
Cooling
Hot rolling
(prodn. of hot or cold strips from ~~steel~~ having high copper content)

IT 124-38-9, Carbon dioxide, uses 630-08-0, Carbon monoxide, uses 7440-37-1, Argon, uses 7727-37-9, Nitrogen, uses 7782-44-7, Oxygen, uses
RL: NUU (Other use, unclassified); USES (Uses)
(casting atm.; prodn. of hot or cold strips from ~~steel~~ having high copper content)

IT 2031158-68-4P ~~2031158-69-5P~~
RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(strips; prodn. of hot or cold strips from ~~steel~~ having high copper content)

L13 ANSWER 38 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2016:1617614 CAPLUS Full-text

DOCUMENT NUMBER: 165:466273

TITLE: Composition and manufacture of carbon ~~steel~~ sheet suitable for hot stamping, and hot stamping molded parts

INVENTOR(S): Azuma, Masafumi; Suwa, Yoshihiro; Kondo, Yusuke; Sato, Koichi

PATENT ASSIGNEE(S): Nippon Steel & Sumitomo Metal Corporation, Japan

SOURCE: PCT Int. Appl., 49pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2016158961	A1	20161006	WO 2016-JP60145	20160329
CA 2979978	A1	20161006	CA 2016-2979978	20160329
KR 2017122823	A	20171106	KR 2017-7027982	20160329
KR 2000863	B1	20190716		
CN 107427889	A	20171201	CN 2016-80017529	20160329
CN 107427889	B	20191025		
MX 2017012377	A	20171214	MX 2017-12377	20160329
EP 3278895	A1	20180207	EP 2016-772842	20160329
EP 3278895	B1	20200311		
BR 112017020165	A2	20180605	BR 2017-112017020165	20160329
RU 2683397	C1	20190328	RU 2017-135379	20160329
JP 6515356	B2	20190522	JP 2017-510030	20160329
ES 2781465	T3	20200902	ES 2016-772842	20160329
TW I597370	B	20170901	TW 2016-110064	20160330
US 20180044754	A1	20180215	US 2017-15559731	20170919
IN 201717033300	A	20171201	IN 2017-17033300	20170920

PRIORITY APPLN. INFO.: JP 2015-72280 A 20150331
WO 2016-JP60145 W 20160329

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB A ~~steel~~ sheet for hot stamping contains, in percentage by wt., C: 0.100%-0.600%, Si: 0.50%-3.00%, Mn: 1.20%-4.00%, Ti: 0.005%-0.100%, B: 0.0005%-0.100%, P: 0.100% or less, S: 0.0001%-0.0100%, Al: 0.005%-1.000%, and N: 0.100% or less, with the remainder comprising Fe and impurities. The ~~steel~~ sheet surface roughness is such that Rz > 2.5 µm, and the surface is ~~coated~~ with 50 mg/m2-1,500 mg/m2 of oil ~~coated~~ thereon.

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
Anon	1997			JP 976004 A	
HAYASHI KUNIO	2012			WO 2012053636 A1	CAPLUS
KAWASAKI KAORU	2011			WO 2011158818 A1	CAPLUS
KOJIMA TAKESHI	2014			JP 2014159624 A	CAPLUS
KUSUMI KAZUHISA	2008			JP 2008240046 A	CAPLUS
SETO KAZUHIRO	2010			JP 2010174302 A	CAPLUS

IT ~~2015959-64-3P~~

RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or

engineered material use); PREP (Preparation); USES (Uses)
(compn. and manuf. of carbon ~~steel~~ sheet suitable for hot
stamping, and hot stamping molded parts)

RN 2015959-64-3 CAPLUS

CN Iron alloy, base, Fe 83-98,Mn 1.2-4,Si 0.5-3,Cr 0-2,Cu 0-2,Mo 0-2,Ni
0-2,Al 0-1,C 0.1-0.6,B 0-0.1,Nb 0-0.1,P 0-0.1,Ti 0-0.1,V 0-0.1,W 0-0.1
(CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	83 - 98	7439-89-6
Mn	1.2 - 4	7439-96-5
Si	0.5 - 3	7440-21-3
Cr	0 - 2	7440-47-3
Cu	0 - 2	7440-50-8
Mo	0 - 2	7439-98-7
Ni	0 - 2	7440-02-0
Al	0 - 1	7429-90-5
C	0.1 - 0.6	7440-44-0
B	0 - 0.1	7440-42-8
Nb	0 - 0.1	7440-03-1
P	0 - 0.1	7723-14-0
Ti	0 - 0.1	7440-32-6
V	0 - 0.1	7440-62-2
W	0 - 0.1	7440-33-7

IPCI B21D0022-20 [I]; B21D0024-00 [I]; C21D0009-46 [I]; C22C0038-00 [I];
C22C0038-14 [I]; C22C0038-58 [I]; C23F0011-00 [I]; C23G0001-08 [I];

IPCR B21D0022-20 [I]; B21D0024-00 [I]; C21D0009-46 [I]; C22C0038-00 [I];
C22C0038-14 [I]; C22C0038-58 [I]; C23F0011-00 [I]; C23G0001-08 [I];

CC 55-3 (Ferrous Metals and Alloys)

ST carbon ~~steel~~ sheet manuf hot stamping molded part

IT Adhesion, physical

Annealing

Casting of metals

Cold rolling

Hot rolling

Lubrication

Pickling

Scale (deposits)

Sheet materials

Surface roughness

Tensile strength

(compn. and manuf. of carbon ~~steel~~ sheet suitable for hot
stamping, and hot stamping molded parts)

IT Metalworking

(stamping, hot; compn. and manuf. of carbon ~~steel~~ sheet
suitable for hot stamping, and hot stamping molded parts)

IT 2015959-64-3P

RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or
engineered material use); PREP (Preparation); USES (Uses)

(compn. and manuf. of carbon ~~steel~~ sheet suitable for hot
stamping, and hot stamping molded parts)

OS.CITING REF COUNT: 1 THERE ARE 1 CAPLUS RECORDS THAT CITE THIS RECORD
(1 CITINGS)

L13 ANSWER 39 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2015:1942164 CAPLUS Full-text

DOCUMENT NUMBER: 164:40753

TITLE: ~~Steel~~ sheet provided with a sacrificial cathodically
protected ~~coating~~ comprising lanthanum

INVENTOR(S): Allely, Christian; Petitjean, Jacques

PATENT ASSIGNEE(S): ArcelorMittal Investigacion y Desarrollo, S.L., Spain

SOURCE: PCT Int. Appl., 20pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: French

FAMILY ACC. NUM. COUNT: 2

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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WO 2015181581	A1	20151203	WO 2014-IB61788	20140528
CA 2950476	A1	20151203	CA 2015-2950476	20150528
WO 2015181318	A1	20151203	WO 2015-EP61891	20150528
KR 2017010773	A	20170201	KR 2016-7032934	20150528
CN 106460138	A	20170222	CN 2015-80027730	20150528
EP 3149217	A1	20170405	EP 2015-724718	20150528
EP 3149217	B1	20180711		
JP 2017524806	T	20170831	JP 2016-569819	20150528
JP 6762879	B2	20200930		
ES 2689039	T3	20181108	ES 2015-724718	20150528
RU 2689979	C2	20190530	RU 2016-146657	20150528
ZA 2016007435	A	20171220	ZA 2016-7435	20161027
IN 201617039713	A	20170310	IN 2016-17039713	20161121
IN 343260	B	20200804		
MX 2016015550	A	20170425	MX 2016-15550	20161125
US 20170198374	A1	20170713	US 2016-15314457	20161128
US 10676804	B2	20200609		

PRIORITY APPLN. INFO.:

WO 2014-IB61788	A	20140528
WO 2015-EP61891	W	20150528

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB The invention relates to a ~~steel~~ sheet provided with a sacrificial cathodically protected ~~coating~~ comprising between 1 and 40 % by wt. zinc, between 0.01 and 0.4 % by wt. lanthanum, and optionally up to 10 % by wt. magnesium, optionally up to 15 % by wt. silicon, and optionally up to 0.3 % by wt., in cumulative amts., of addnl. components, the remainder consisting of aluminum and unavoidable impurities or residual elements. The invention also relates to a method of producing parts by hot or cold swaging and the parts which can be obtained in this way.

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
LIXIN FENG	2010			CN 101736217 A	CAPLUS
MORIMOTO YASUhide	2009			JP 2009120942 A	CAPLUS
NOSE KOICHI	2008			EP 1997927 A1	CAPLUS
ZHAO YUNJIE	2013			CN 103045980 A	CAPLUS

IT 1173986-65-6

RL: NUU (Other use, unclassified); USES (Uses)
(~~steel~~ sheet provided with sacrificial cathodically protected
~~coating~~ comprising lanthanum)

RN 1173986-65-6 CAPLUS

CN Iron alloy, base, Fe 94-99, Mn 0.5-3, Cr 0-1, C 0.2-0.5, Si 0.1-0.5, Ti 0-0.2, Al 0-0.1, B 0-0.1, Cu 0-0.1, Ni 0-0.1, P 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	94 - 99	7439-89-6
Mn	0.5 - 3	7439-96-5
Cr	0 - 1	7440-47-3
C	0.2 - 0.5	7440-44-0
Si	0.1 - 0.5	7440-21-3
Ti	0 - 0.2	7440-32-6
Al	0 - 0.1	7429-90-5
B	0 - 0.1	7440-42-8
Cu	0 - 0.1	7440-50-8
Ni	0 - 0.1	7440-02-0
P	0 - 0.1	7723-14-0

IPCI C23C0002-12 [I]; C22C0021-10 [I]

IPCR C23C0002-12 [I]; C22C0021-10 [I]

CC 56-3 (Nonferrous Metals and Alloys)

ST ~~steel~~ sheet sacrificial cathodically protected ~~coating~~ lanthanum swaging

IT Anticorrosive ~~coating~~ materials

Coating process

Swaging

(~~steel~~ sheet provided with sacrificial cathodically protected
~~coating~~ comprising lanthanum)

IT 7439-91-0, Lanthanum, uses

RL: MOA (Modifier or additive use); USES (Uses)

(~~steel~~ sheet provided with sacrificial cathodically protected

IT coating comprising lanthanum)
 12597-69-2, Steel, uses 1173986-65-6
 RL: NUU (Other use, unclassified); USES (Uses)
 (steel sheet provided with sacrificial cathodically protected
 coating comprising lanthanum)
 IT 1832643-11-4
 RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM
 (Technical or engineered material use); PROC (Process); USES (Uses)
 (steel sheet provided with sacrificial cathodically protected
 coating comprising lanthanum)

L13 ANSWER 40 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2015:1942163 CAPLUS Full-text
 DOCUMENT NUMBER: 164:40752
 TITLE: Steel sheet provided with a sacrificial cathodically
 protected coating comprising lanthanum
 INVENTOR(S): Allely, Christian; Petitjean, Jacques
 PATENT ASSIGNEE(S): ArcelorMittal, Luxembourg
 SOURCE: PCT Int. Appl., 21pp.
 CODEN: PIXXD2
 DOCUMENT TYPE: Patent
 LANGUAGE: French
 FAMILY ACC. NUM. COUNT: 2
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2015181318	A1	20151203	WO 2015-EP61891	20150528
WO 2015181581	A1	20151203	WO 2014-IB61788	20140528
CA 2950476	A1	20151203	CA 2015-2950476	20150528
KR 2017010773	A	20170201	KR 2016-7032934	20150528
CN 106460138	A	20170222	CN 2015-80027730	20150528
EP 3149217	A1	20170405	EP 2015-724718	20150528
EP 3149217	B1	20180711		
JP 2017524806	T	20170831	JP 2016-569819	20150528
JP 6762879	B2	20200930		
ES 2689039	T3	20181108	ES 2015-724718	20150528
RU 2689979	C2	20190530	RU 2016-146657	20150528
IN 201617039713	A	20170310	IN 2016-17039713	20161121
IN 343260	B	20200804		
MX 2016015550	A	20170425	MX 2016-15550	20161125
US 20170198374	A1	20170713	US 2016-15314457	20161128
US 10676804	B2	20200609		

PRIORITY APPLN. INFO.:
 WO 2014-IB61788 A 20140528
 WO 2015-EP61891 W 20150528

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB The invention relates to a steel sheet provided with a sacrificial
 cathodically protected coating comprising between 1 and 40 % by wt.
 zinc, between 0.01 and 0.4 % by wt. lanthanum, and optionally up to 10 %
 by wt. magnesium, optionally up to 15 % by wt. silicon, and optionally up
 to 0.3 % by wt., in cumulative amts., of addnl. components, the remainder
 consisting of aluminum and unavoidable impurities or residual elements.
 The invention also relates to a method of producing parts by hot or cold
 swaging and the parts which can be obtained in this way.

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
LIXIN FENG	2010			CN 101736217 A	CAPLUS
MORIMOTO YASUhide	2009			JP 2009120942 A	CAPLUS
NOSE KOICHI	2008			EP 1997927 A1	CAPLUS
ZHAO YUNJIE	2013			CN 103045980 A	CAPLUS

IT 1173986-65-6
 RL: NUU (Other use, unclassified); USES (Uses)
 (steel sheet provided with sacrificial cathodically protected
 coating comprising lanthanum)

RN 1173986-65-6 CAPLUS
 CN Iron alloy, base, Fe 94-99, Mn 0.5-3, Cr 0-1, C 0.2-0.5, Si 0.1-0.5, Ti
 0-0.2, Al 0-0.1, B 0-0.1, Cu 0-0.1, Ni 0-0.1, P 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
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=====+=====+=====
Fe      94    -   99      7439-89-6
Mn      0.5  -    3      7439-96-5
Cr       0    -    1      7440-47-3
C       0.2  -   0.5      7440-44-0
Si      0.1  -   0.5      7440-21-3
Ti       0    -   0.2      7440-32-6
Al       0    -   0.1      7429-90-5
B        0    -   0.1      7440-42-8
Cu       0    -   0.1      7440-50-8
Ni       0    -   0.1      7440-02-0
P        0    -   0.1      7723-14-0

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IPCI C23C0002-12 [I]; C22C0021-10 [I]
IPCR C23C0002-12 [I]; C22C0021-10 [I]
CC   56-3 (Nonferrous Metals and Alloys)
ST   steel sheet sacrificial cathodically protected coating swaging
IT   Anticorrosive coating materials
      Coating process
      (steel sheet provided with sacrificial cathodically protected
      coating comprising lanthanum)
IT   12597-69-2, Steel, uses 1173986-65-6
      RL: NUU (Other use, unclassified); USES (Uses)
      (steel sheet provided with sacrificial cathodically protected
      coating comprising lanthanum)
IT   1832625-87-2
      RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM
      (Technical or engineered material use); PROC (Process); USES (Uses)
      (steel sheet provided with sacrificial cathodically protected
      coating comprising lanthanum)

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L13 ANSWER 41 OF 103  CAPLUS  COPYRIGHT 2021 ACS on STN
ACCESSION NUMBER:      2015:512917  CAPLUS Full-text
DOCUMENT NUMBER:       162:428426
TITLE:                 Metal powder for powder-based production processes and
                        method for production of a metallic component from
                        metal powder
INVENTOR(S):           Fechte-Heinen, Rainer; Mayer, Stefan; Offergeld,
                        Andreas; Patberg, Lothar; Cott, Andreas
PATENT ASSIGNEE(S):    ThyssenKrupp Steel Europe AG, Germany
SOURCE:                Ger. Offen., 7pp.; Chemical Indexing Equivalent to
                        162:428425 (WO)
                        CODEN: GWXXBX
DOCUMENT TYPE:          Patent
LANGUAGE:               German
FAMILY ACC. NUM. COUNT: 2
PATENT INFORMATION:

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PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
DE 102013110417	A1	20150326	DE 2013-102013110417	20130920
WO 2015039986	A2	20150326	WO 2014-EP69603	20140915
WO 2015039986	A3	20150827		
EP 3046704	A2	20160727	EP 2014-771830	20140915
PRIORITY APPLN. INFO.:			DE 2013-102013110417 A	20130920
			WO 2014-EP69603 W	20140915

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AB   The invention relates to metal powder for powder-based prodn. processes
      wherein a component is structured in layers or as a compact green body
      from metal powder and is strengthened by welding or sintering. In order
      that such a metal powder is easily weldable and can be cost-effectively
      produced, and is thus in particular suitable for fast, economically
      efficient prodn. of functional components in large quantities in an
      additive prodn. process (rapid manufg.), the metal powder according to the
      invention has a particle size distribution in the range of 5 - 150 µm
      and contains primarily iron and unavoidable impurities, wherein the iron
      proportion thereof is in the range from 89.6 to 99.9 wt.%. The invention
      further relates to the use of such a metal powder (steel powder) for
      powder-based prodn. processes and a method for producing a metallic
      component through layered structuring and welding or sintering using such
      a metal powder.

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RETABLE
Referenced Author   | Year | VOL | PG   | Referenced Work   | Referenced

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	(RAU)	(RPY)	(RVL)	(RPG)	(RWK)	File
Anon					DE 10039144 C1	CAPLUS
Anon					WO 2011152774 A1	CAPLUS
IT	1674360-61-2P					
	RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses) (metal powder for powder-based prodn. processes and method for prodn. of metallic component from metal powder)					
RN	1674360-61-2	CAPLUS				
CN	Iron alloy, base, Fe 90-100, Mn 0-3.8, Si 0-1, Cu 0-0.7, Mo 0-0.6, C 0-0.5, Cr 0-0.4, Ni 0-0.4, Ti 0-0.3, Co 0-0.2, Nb 0-0.2, P 0-0.2, V 0-0.2, B 0-0.1 (CA INDEX NAME)					

Component	Component Percent	Component Registry Number
Fe	90 - 100	7439-89-6
Mn	0 - 3.8	7439-96-5
Si	0 - 1	7440-21-3
Cu	0 - 0.7	7440-50-8
Mo	0 - 0.6	7439-98-7
C	0 - 0.5	7440-44-0
Cr	0 - 0.4	7440-47-3
Ni	0 - 0.4	7440-02-0
Ti	0 - 0.3	7440-32-6
Co	0 - 0.2	7440-48-4
Nb	0 - 0.2	7440-03-1
P	0 - 0.2	7723-14-0
V	0 - 0.2	7440-62-2
B	0 - 0.1	7440-42-8

IPCI B22F0003-10 [I]
 IPCR B22F0003-10 [I]
 CC 55-4 (Ferrous Metals and Alloys)
 ST steel powder metallurgy sintering welding mech property
 IT 1674360-61-2P
 RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
 (metal powder for powder-based prodn. processes and method for prodn. of metallic component from metal powder)
 OS.CITING REF COUNT: 2 THERE ARE 2 CAPLUS RECORDS THAT CITE THIS RECORD
 (2 CITINGS)

L13 ANSWER 42 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN
 ACCESSION NUMBER: 2015:512916 CAPLUS Full-text
 DOCUMENT NUMBER: 162:428425
 TITLE: Metal powder for powder-based production processes and method for production of a metallic component from metal powder
 INVENTOR(S): Fechte-Heinen, Rainer; Mayer, Stefan; Offergeld, Andreas; Patberg, Lothar; Cott, Andreas
 PATENT ASSIGNEE(S): ThyssenKrupp Steel Europe AG, Germany
 SOURCE: PCT Int. Appl., 16pp.; Chemical Indexing Equivalent to 162:428426 (DE)
 CODEN: PIXXD2
 DOCUMENT TYPE: Patent
 LANGUAGE: German
 FAMILY ACC. NUM. COUNT: 2
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2015039986	A2	20150326	WO 2014-EP69603	20140915
WO 2015039986	A3	20150827		
DE 102013110417	A1	20150326	DE 2013-102013110417	20130920
EP 3046704	A2	20160727	EP 2014-771830	20140915
PRIORITY APPLN. INFO.:			DE 2013-102013110417 A	20130920
			WO 2014-EP69603	W 20140915

AB The invention relates to metal powder for powder-based prodn. processes wherein a component is structured in layers or as a compact green body from metal powder and is strengthened by welding or sintering. In order

that such a metal powder is easily weldable and can be cost-effectively produced, and is thus in particular suitable for fast, economically efficient prodn. of functional components in large quantities in an additive prodn. process (rapid manufg.), the metal powder according to the invention has a particle size distribution in the range of 5 - 150 µm and contains primarily iron and unavoidable impurities, wherein the iron proportion thereof is in the range from 89.6 to 99.9 wt.%. The invention further relates to the use of such a metal powder (steel powder) for powder-based prodn. processes and a method for producing a metallic component through layered structuring and welding or sintering using such a metal powder.

IT 1674360-61-2P

RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(metal powder for powder-based prodn. processes and method for prodn. of metallic component from metal powder)

RN 1674360-61-2 CAPLUS

CN Iron alloy, base, Fe 90-100, Mn 0-3.8, Si 0-1, Cu 0-0.7, Mo 0-0.6, C 0-0.5, Cr 0-0.4, Ni 0-0.4, Ti 0-0.3, Co 0-0.2, Nb 0-0.2, P 0-0.2, V 0-0.2, B 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	90 - 100	7439-89-6
Mn	0 - 3.8	7439-96-5
Si	0 - 1	7440-21-3
Cu	0 - 0.7	7440-50-8
Mo	0 - 0.6	7439-98-7
C	0 - 0.5	7440-44-0
Cr	0 - 0.4	7440-47-3
Ni	0 - 0.4	7440-02-0
Ti	0 - 0.3	7440-32-6
Co	0 - 0.2	7440-48-4
Nb	0 - 0.2	7440-03-1
P	0 - 0.2	7723-14-0
V	0 - 0.2	7440-62-2
B	0 - 0.1	7440-42-8

IPCI B22F0007-02 [I]; B22F0007-02 [I]; C22C0033-02 [I]

IPCR B22F0007-02 [I]; C22C0033-02 [I]

CC 55-4 (Ferrous Metals and Alloys)

ST steel powder metallurgy sintering welding mech property

IT 1674360-61-2P

RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(metal powder for powder-based prodn. processes and method for prodn. of metallic component from metal powder)

L13 ANSWER 43 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2014:2105582 CAPLUS Full-text

DOCUMENT NUMBER: 162:84344

TITLE: Method for hot forming a zinc or zinc alloy coated strip, sheet or blank

INVENTOR(S): Hensen, Guido Cornelis; Verloop, Willem Cornelis; Neelis, Bastiaan Maarten

PATENT ASSIGNEE(S): Tata Steel IJmuiden B.V., Neth.

SOURCE: PCT Int. Appl., 22 pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2014198399	A2	20141218	WO 2014-EP1540	20140606
WO 2014198399	A3	20150226		

PRIORITY APPLN. INFO.: EP 2013-3043 A 20130614
EP 2013-4166 A 20130823

AB The invention relates to a method for hot forming a strip, sheet or blank coated with a zinc or zinc based alloy layer to form a hot formed

product. According to the invention a no. of specific steps are taken to perform this method within certain limits. The invention also relates to the hot formed product produced using this method.

IT 1639926-81-0
RL: NUU (Other use, unclassified); USES (Uses)
(substrate; method for hot forming zinc or zinc alloy coated strip, sheet or blank)

RN 1639926-81-0 CAPLUS

CN Iron alloy, base, Fe 87-99, Mn 0.5-3.5, W 0-3, Nb 0-2, V 0-2, Cr 0-1, Si 0.1-0.8, C 0.1-0.5, Al 0-0.2, Ti 0-0.2, B 0-0.1, P 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	87 - 99	7439-89-6
Mn	0.5 - 3.5	7439-96-5
W	0 - 3	7440-33-7
Nb	0 - 2	7440-03-1
V	0 - 2	7440-62-2
Cr	0 - 1	7440-47-3
Si	0.1 - 0.8	7440-21-3
C	0.1 - 0.5	7440-44-0
Al	0 - 0.2	7429-90-5
Ti	0 - 0.2	7440-32-6
B	0 - 0.1	7440-42-8
P	0 - 0.1	7723-14-0

IPCI C22F0001-16 [I]; C23C0002-06 [I]; C23C0002-26 [I]; C23C0002-28 [I]; C23C0002-40 [I]; C21D0001-673 [I]; C23C0028-00 [I]

IPCR C23C0002-06 [I]; C21D0001-673 [I]; C23C0002-26 [I]; C23C0002-28 [I]; C23C0002-40 [I]; C23C0028-00 [I]

CC 56-6 (Nonferrous Metals and Alloys)

ST steel zinc alloy anticorrosive coating electroplating

IT Anticorrosive coating materials
Electrodeposition
Mechanical hardness
(method for hot forming zinc or zinc alloy coated strip, sheet or blank)

IT 7440-66-6, Zinc, processes 1273147-93-5, Zinc alloy
RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(method for hot forming zinc or zinc alloy coated strip, sheet or blank)

IT 870820-47-6, 22MnB5 1639926-81-0
RL: NUU (Other use, unclassified); USES (Uses)
(substrate; method for hot forming zinc or zinc alloy coated strip, sheet or blank)

L13 ANSWER 44 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2014:1754974 CAPLUS Full-text

DOCUMENT NUMBER: 161:584497

TITLE: Product formed by hot forming of metallic coated steel sheet, method to form the product, and steel strip

INVENTOR(S): Chen, Shangping; Hensen, Guido Cornelis

PATENT ASSIGNEE(S): Tata Steel IJmuiden BV, Neth.

SOURCE: PCT Int. Appl., 18 pp.
CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2014166630	A1	20141016	WO 2014-EP951	20140409
EP 2984198	A1	20160217	EP 2014-716760	20140409
PRIORITY APPLN. INFO.:			EP 2013-1845	A 20130410
			WO 2014-EP951	W 20140409

AB The invention relates to a product formed by hot forming of a metallic coated steel sheet, wherein the formed product has a substrate layer of hot formed steel, a metal affected zone and a diffusion coating

layer on the substrate layer, and optionally a metal oxide layer on the diffusion coating layer. According to the disclosure, a low carbon zone is present between the substrate layer and the metal affected zone. The invention also relates to a method for producing a metallic coated hot formed product, and to a steel strip to be used in the method.

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
=====	=====	=====	=====	=====	=====
ABE MASAYUKI	2012			US 20120006451 A1	
HENSEN GUIDO CORNELIS	2010			WO 2010069588 A1	CAPLUS
HIRAMATSU TERUSHI	2001			JP 2001064751 A	CAPLUS
KATAGIRI YUKIO	2011			JP 2011208164 A	CAPLUS
Karbasian, H	2010	210	2103	Journal Of Materials	CAPLUS
NAKAMURA NOBUYUKI	2009			EP 2053139 A1	CAPLUS
PUERTA VELASQUEZ JUAN D	2014			WO 2014037627 A1	CAPLUS

IT 1630724-35-4

RL: NUU (Other use, unclassified); PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process); USES (Uses)
(substrate; product formed by hot forming of metallic coated steel sheet, method to form the product, and steel strip)

RN 1630724-35-4 CAPLUS

CN Iron alloy, base, Fe 87-99, Mn 0.5-3, W 0-3, Nb 0-2, V 0-2, Cr 0-1, C 0.1-0.5, Si 0.1-0.5, Al 0-0.2, Ti 0-0.2, B 0-0.1, P 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
=====	=====	=====
Fe	87 - 99	7439-89-6
Mn	0.5 - 3	7439-96-5
W	0 - 3	7440-33-7
Nb	0 - 2	7440-03-1
V	0 - 2	7440-62-2
Cr	0 - 1	7440-47-3
C	0.1 - 0.5	7440-44-0
Si	0.1 - 0.5	7440-21-3
Al	0 - 0.2	7429-90-5
Ti	0 - 0.2	7440-32-6
B	0 - 0.1	7440-42-8
P	0 - 0.1	7723-14-0

IPCI C22C0038-00 [I]; C21D0001-00 [I]

IPCR C22C0038-00 [I]; C21D0001-00 [I]

CC 55-3 (Ferrous Metals and Alloys)

ST steel sheet strip hot dip metal anticorrosive coating

IT Anticorrosive coating materials

Hot-dip coating process

(product formed by hot forming of metallic coated steel sheet, method to form the product, and steel strip)

IT 39308-06-0D, iron 0.011. 1630724-36-5 1630724-38-7

RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(anticorrosive coating; product formed by hot forming of metallic coated steel sheet, method to form the product, and steel strip)

IT 870820-47-6, 22MnB5 1630724-35-4

RL: NUU (Other use, unclassified); PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process); USES (Uses)
(substrate; product formed by hot forming of metallic coated steel sheet, method to form the product, and steel strip)

OS.CITING REF COUNT: 3 THERE ARE 3 CAPLUS RECORDS THAT CITE THIS RECORD (3 CITINGS)

L13 ANSWER 45 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2014:755736 CAPLUS Full-text

DOCUMENT NUMBER: 160:679480

TITLE: Steel sheets for hot pressing, hot pressed steel

INVENTOR(S): members, and method for manufacture of the members
 PATENT ASSIGNEE(S): Miyoshi, Tatsuya; Nakajima, Seiji; Ando, Satoru
 SOURCE: JFE Steel Corporation, Japan
 PCT Int. Appl., 29pp.
 CODEN: PIXXD2
 DOCUMENT TYPE: Patent
 LANGUAGE: Japanese
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2014068939	A1	20140508	WO 2013-JP6347	20131028
KR 2015052266	A	20150513	KR 2015-7008668	20131028
KR 1731740	B1	20170428		
CN 104755655	A	20150701	CN 2013-80056511	20131028
CN 104755655	B	20170922		
EP 2915904	A1	20150909	EP 2013-850861	20131028
EP 2915904	B1	20190612		
JP 5888430	B2	20160322	JP 2014-544298	20131028
IN 2015DN02108	A	20150814	IN 2015-DN2108	20150316
IN 302263	B	20181026		
US 20150337415	A1	20151126	US 2015-14438993	20150428
US 10030290	B2	20180724		

PRIORITY APPLN. INFO.: JP 2012-239973 A 20121031
 WO 2013-JP6347 W 20131028

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB Base steel sheet equipped with galvanized layer and a layer, contg. polysiloxanes having C₂ functional group, formed in the order is claimed. Preferably, the steel sheet consists of C 0.15-0.5, Si 0.05-2.0, Mn 0.5-3, P ≤0.1, S ≤0.05, Al ≤0.10, N ≤0.010, optionally Cr 0.01-1, Ti ≤0.20, B 0.0005-0.08, and/or Sb 0.003-0.03 wt.%, and balance Fe; the galvanized layer comprises a 0.01-5 g/m² 1st layer of ≥60 wt.% Ni and balance Zn and a 10-90 g/m² 2nd layer of 10-25 wt.% Ni and balance Zn; and the polysiloxane layer also contains less wt. parts (polysiloxane basis) silane coupling agents. Also claimed is the hot pressed member of the given steel having a surface characterized by a ≥0.20 kcps x-ray diffractometry peak for Zn₂SiO₄ at 2θ = 36.1°. The member is manufd. by heating the sheet to a temp. between Ac₃ and 1000°, e.g. at av. heating rate of ≥100°/s, followed by its hot pressing. The members are resistant to pit and crevice corrosion even when used under severe conditions and are esp. suitable for use in automobiles.

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
Anon	2012			JP 4883240 B1	CAPLUS
KUZE YUKINOBU	2011			WO 2011070859 A1	CAPLUS
SAITO TAKASHI	2007			JP 2007063578 A	CAPLUS
YANO HIROKAZU	2007			JP 2007246775 A	CAPLUS

IT 1609017-11-9D, Sb(0.003-0.03)

RL: TEM (Technical or engineered material use); USES (Uses)
 (steel sheets having nickel-zinc alloy and polysiloxane coatings for prepn. of hot pressed members showing excellent corrosion resistance)

RN 1609017-11-9 CAPLUS

CN Iron alloy, base, Fe 93-99, Mn 0.5-3, Si 0-2, Cr 0-1, C 0.2-0.5, Ti 0.2, Al 0.1, P 0.1, B 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	93 - 99	7439-89-6
Mn	0.5 - 3	7439-96-5
Si	0 - 2	7440-21-3
Cr	0 - 1	7440-47-3
C	0.2 - 0.5	7440-44-0
Ti	0.2	7440-32-6
Al	0.1	7429-90-5
P	0.1	7723-14-0
B	0 - 0.1	7440-42-8

IPCI C23C0028-00 [I]; B21D0022-20 [I]; B32B0015-08 [I]; C21D0001-18 [I];
 C21D0009-00 [I]; C22C0018-00 [I]; C22C0019-03 [I]; C22C0038-00 [I];
 C22C0038-60 [I]; C25D0005-26 [I]
 IPCR C23C0028-00 [I]; B21D0022-20 [I]; B32B0015-08 [I]; C21D0001-18 [I];
 C21D0009-00 [I]; C22C0018-00 [I]; C22C0019-03 [I]; C22C0038-00 [I];
 C22C0038-60 [I]; C25D0005-26 [I]
 CC 55-6 (Ferrous Metals and Alloys)
 Section cross-reference(s): 42, 56
 ST hot pressing steel sheet corrosion resistant; polysiloxane coated
 galvanized steel hot pressing; nickel zinc alloy underlayer silicone
 coated steel
 IT Polysiloxanes
 RL: TEM (Technical or engineered material use); USES (Uses)
 (C>4 group-contg., coating on galvanized steel;
 steel sheets having nickel-zinc alloy and polysiloxane
 coatings for prepn. of hot pressed members showing excellent
 corrosion resistance)
 IT Polysiloxanes
 RL: TEM (Technical or engineered material use); USES (Uses)
 (Me Ph, KR-311; steel sheets having nickel-zinc alloy and
 polysiloxane coatings for prepn. of hot pressed members
 showing excellent corrosion resistance)
 IT Silanes
 RL: MOA (Modifier or additive use); USES (Uses)
 (coupling agent, in silicone layer; steel sheets
 having nickel-zinc alloy and polysiloxane coatings for prepn.
 of hot pressed members showing excellent corrosion resistance)
 IT Polysiloxanes
 RL: TEM (Technical or engineered material use); USES (Uses)
 (epoxy, ES-1001N; steel sheets having nickel-zinc alloy and
 polysiloxane coatings for prepn. of hot pressed members
 showing excellent corrosion resistance)
 IT Epoxy resins
 RL: TEM (Technical or engineered material use); USES (Uses)
 (polysiloxane-, ES-1001N; steel sheets having nickel-zinc
 alloy and polysiloxane coatings for prepn. of hot pressed
 members showing excellent corrosion resistance)
 IT Metalworking
 (pressing; steel sheets having nickel-zinc alloy and
 polysiloxane coatings for prepn. of hot pressed members
 showing excellent corrosion resistance)
 IT Coupling agents
 (silane, in silicone layer; steel sheets having
 nickel-zinc alloy and polysiloxane coatings for prepn. of hot
 pressed members showing excellent corrosion resistance)
 IT Corrosion-resistant materials
 Hot-press molding
 (steel sheets having nickel-zinc alloy and polysiloxane
 coatings for prepn. of hot pressed members showing excellent
 corrosion resistance)
 IT Galvanized steel
 RL: PEP (Physical, engineering or chemical process); TEM (Technical or
 engineered material use); PROC (Process); USES (Uses)
 (steel sheets having nickel-zinc alloy and polysiloxane
 coatings for prepn. of hot pressed members showing excellent
 corrosion resistance)
 IT 919-30-2, KBE 903 2602-34-8, KBE 403
 RL: MOA (Modifier or additive use); USES (Uses)
 (coupling agent, in silicone layer; steel sheets
 having nickel-zinc alloy and polysiloxane coatings for prepn.
 of hot pressed members showing excellent corrosion resistance)
 IT 13597-65-4P, Zinc silicate (Zn2SiO4)
 RL: IMF (Industrial manufacture); TEM (Technical or engineered material
 use); PREP (Preparation); USES (Uses)
 (steel sheets having nickel-zinc alloy and polysiloxane
 coatings for prepn. of hot pressed members showing excellent
 corrosion resistance)
 IT 7440-36-0D, Antimony, trace in alloys 238084-01-0 1379822-01-1
 1609017-10-8 1609017-11-9D, Sb(0.003-0.03)
 RL: TEM (Technical or engineered material use); USES (Uses)
 (steel sheets having nickel-zinc alloy and polysiloxane

coatings for prepn. of hot pressed members showing excellent corrosion resistance)

OS.CITING REF COUNT: 1 THERE ARE 1 CAPLUS RECORDS THAT CITE THIS RECORD (2 CITINGS)

L13 ANSWER 46 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2014:451007 CAPLUS Full-text

DOCUMENT NUMBER: 160:475772

TITLE: Compression coil springs and their manufacture including coiling process in austenite temperature region

INVENTOR(S): Ono, Yuitirou; Shiraishi, Tohru; Ono, Yoshiki; Takahashi, Keita

PATENT ASSIGNEE(S): NHK Spring Co., Ltd., Japan

SOURCE: PCT Int. Appl., 50pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 2

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2014042066	A1	20140320	WO 2013-JP73937	20130905
JP 5361098	B1	20131204	JP 2012-202416	20120914
JP 2014055343	A	20140327		
CN 104619878	A	20150513	CN 2013-80047783	20130905
CN 104619878	B	20161116		
KR 2015054969	A	20150520	KR 2015-7009184	20130905
KR 2191407	B1	20201215		
EP 2896712	A1	20150722	EP 2013-837663	20130905
EP 2896712	B1	20190807		
KR 2020010619	A	20200130	KR 2020-7002286	20130905
US 20150252863	A1	20150910	US 2015-14427106	20150310
US 9752636	B2	20170905		
IN 2015KN00953	A	20151225	IN 2015-KN953	20150407

PRIORITY APPLN. INFO.:

JP 2012-202416	A	20120914
KR 2015-7009184	A3	20130905
WO 2013-JP73937	W	20130905

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB The coil springs comprise steel wires with equiv. circle diam. 2.5-10 mm contg. C 0.45-0.80, Si 0.15-2.50, Mn 0.3-1.0 wt.%, and Fe balance, wherein (i) arbitrary cross-sections of the wires show core hardness 570-700HV, (ii) the wires have surface layers with higher-than-av. concn. of C, and (iii) the wires show compressive residual stress ≥ 200 MPa and ≥ 60 MPa at 0.2 mm-depth and 0.4 mm-depth from the surfaces, resp. along the max. principal stress direction under application of compressive load in the inner diam. side of the coil springs. Also claimed are coil springs using steel wires contg. C 0.45-0.80, Si 0.15-2.50, Mn 0.3-1.0, and Cr, B, Ni, Ti, Cu, Nb, V, Mo, and/or W 0.005-4.5 wt.%. The manufg. method, using coil spring forming app. equipped with feed rollers, coiling parts having wire guides, coiling tools, and pitch tools, cutting means, and heating means for raising temp. to austenite region within 2.5 s between the feed roller exits to the coiling tools, includes coiling steel wires by hot forming, cutting, quenching the formed coils still at temp. in austenite region, tempering, shot-peening, setting in this order, and carburizing (between heating and quenching processes) by directly spraying hydrocarbon gas on the wire surfaces. The coil springs with excellent fatigue resistance are esp. useful as automotive valve springs and clutch torsion springs.

RETABLER

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
Anon	1981			JP 56152921 A	
Anon	1989			JP 01177318 A	CAPLUS
Anon	1992			JP 499126 A	
Anon	1993			JP 586418 A	
Anon	2012			JP 5064590 B1	CAPLUS
HONDA YOSHINORI	2001			JP 2001082518 A	CAPLUS
KONDO SATORU	2000			JP 2000326036 A	CAPLUS
MORITA TOSHIYUKI	2008			JP 2008045178 A	CAPLUS

NISSAN MOTOR | 2012 | | | JP 2012077367 A | CAPLUS
 IT 1581259-99-5
 RL: TEM (Technical or engineered material use); USES (Uses)
 (manuf. of compression coil springs including coiling process in
 austenite temp. region)
 RN 1581259-99-5 CAPLUS
 CN Iron alloy, base, Fe 91-99, B 0-4.5, Cr 0-4.5, Cu 0-4.5, Mo 0-4.5, Nb 0-4.5, Ni
 0-4.5, Ti 0-4.5, V 0-4.5, W 0-4.5, Si 0.2-2.5, Mn 0.3-1, C 0.4-0.8 (CA INDEX
 NAME)

Component	Component Percent	Component Registry Number
=====+=====+=====		
Fe	91 - 99	7439-89-6
B	0 - 4.5	7440-42-8
Cr	0 - 4.5	7440-47-3
Cu	0 - 4.5	7440-50-8
Mo	0 - 4.5	7439-98-7
Nb	0 - 4.5	7440-03-1
Ni	0 - 4.5	7440-02-0
Ti	0 - 4.5	7440-32-6
V	0 - 4.5	7440-62-2
W	0 - 4.5	7440-33-7
Si	0.2 - 2.5	7440-21-3
Mn	0.3 - 1	7439-96-5
C	0.4 - 0.8	7440-44-0

IPCI C22C0038-00 [I]; B21F0003-02 [I]; B21F0035-00 [I]; B24C0001-10 [I];
 B24C0011-00 [I]; C21D0001-06 [I]; C21D0007-06 [I]; C21D0008-06 [I];
 C21D0009-02 [I]; C22C0038-04 [I]; C22C0038-54 [I]; C23C0008-22 [I];
 C23C0008-80 [I]; F16F0001-06 [I]
 IPCR C22C0038-00 [I]; B21F0003-02 [I]; B21F0035-00 [I]; B24C0001-10 [I];
 B24C0011-00 [I]; C21D0001-06 [I]; C21D0007-06 [I]; C21D0008-06 [I];
 C21D0009-02 [I]; C22C0038-04 [I]; C22C0038-54 [I]; C23C0008-22 [I];
 C23C0008-80 [I]; F16F0001-06 [I]

CC 55-3 (Ferrous Metals and Alloys)
 ST compression coil spring manuf austenite temp region coiling; steel wire
 heating quenching tempering shot peening carburizing

IT 1581259-99-5
 RL: TEM (Technical or engineered material use); USES (Uses)
 (manuf. of compression coil springs including coiling process in
 austenite temp. region)

OS.CITING REF COUNT: 2 THERE ARE 2 CAPLUS RECORDS THAT CITE THIS RECORD
 (2 CITINGS)

L13 ANSWER 47 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2014:174777 CAPLUS Full-text

DOCUMENT NUMBER: 160:297675

TITLE: Hot-dip galvanized steel sheet and manufacturing
 method therefor

INVENTOR(S): Fujita, Soshi; Yamanaka, Shintaro

PATENT ASSIGNEE(S): Nippon Steel & Sumitomo Metal Corporation, Japan

SOURCE: PCT Int. Appl., 58pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2014021452	A1	20140206	WO 2013-JP71004	20130802
JP 5648755	B2	20150107	JP 2013-551091	20130802
KR 2015036681	A	20150407	KR 2015-7004127	20130802
KR 1653510	B1	20160901		
CN 104508169	A	20150408	CN 2013-80040033	20130802
CN 104508169	B	20170222		
TW I488978	B	20150621	TW 2013-127806	20130802
BR 112015001809	A2	20170704	BR 2015-112015001809	20130802
BR 112015001809	B1	20201110		
MX 2015001224	A	20150410	MX 2015-1224	20150127
MX 370268	B	20191209		

US 20150225829	A1	20150813	US 2015-14418852	20150130
US 10131981	B2	20181120		
IN 2015DN01525	A	20150703	IN 2015-DN1525	20150224
PRIORITY APPLN. INFO.:			JP 2012-172739	A 20120803
			WO 2013-JP71004	W 20130802

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB The present invention provides a hot-dip galvanized ~~steel~~ sheet having excellent plating wettability and plating adhesion even when the base ~~steel~~ sheet contains Si and Mn, and provides a manufg. method therefor. The galvanized ~~steel~~ sheet pertaining to the present invention includes a base ~~steel~~ sheet contg. Si, Mn, and other predetd. components, and a galvanized ~~layer~~ formed on at least one surface of the base ~~steel~~ sheet. The base ~~steel~~ sheet has an HA value and an HB that satisfy all of the following relational expressions, wherein HA is the av. hardness of the surface ~~layer~~ that extends to a depth of 50 μ m from the interface between the base ~~steel~~ sheet and the galvanized ~~layer~~, and HB is the av. hardness of deep portions in excess of 50 μ m from the interface. $50 \leq HA \leq 500 \dots (1) 50 \leq HB \leq 500 \dots (2) 0.5 \leq HA/HB \leq 0.9 \dots (3)$. The galvanized ~~steel~~ sheet is manufd. by hot-dip galvanizing of a base ~~steel~~ sheet which is processed by annealing and soaking in controlled conditions (details described).

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
=====	=====	=====	=====	=====	=====
Anon	1999			JP 11343551 A	CAPLUS
MIYATA MAI	2010			JP 2010132975 A	CAPLUS

IT 1428957-53-2

RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(base ~~steel~~ sheet; manuf. of hot-dip galvanized ~~steel~~ sheet contg. Si and Mn in base ~~steel~~ sheet and showing good wettability and plating adhesion)

RN 1428957-53-2 CAPLUS

CN Iron alloy, base, Fe 78-99, Mn 0.5-5, Si 0.1-3, Al 0-1, B 0-1, Ca 0-1, Cr 0-1, Cu 0-1, misch metal 0-1, Mo 0-1, Nb 0-1, Ni 0-1, Ti 0-1, V 0-1, W 0-1, Zr 0-1, C 0-0.5, P 0-0.5 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
=====	=====	=====
Fe	78 - 99	7439-89-6
Mn	0.5 - 5	7439-96-5
Si	0.1 - 3	7440-21-3
Al	0 - 1	7429-90-5
B	0 - 1	7440-42-8
Ca	0 - 1	7440-70-2
Cr	0 - 1	7440-47-3
Cu	0 - 1	7440-50-8
Misch metal	0 - 1	8049-20-5
Mo	0 - 1	7439-98-7
Nb	0 - 1	7440-03-1
Ni	0 - 1	7440-02-0
Ti	0 - 1	7440-32-6
V	0 - 1	7440-62-2
W	0 - 1	7440-33-7
Zr	0 - 1	7440-67-7
C	0 - 0.5	7440-44-0
P	0 - 0.5	7723-14-0

IPCI C23C0002-06 [I]; C21D0009-46 [I]; C22C0018-00 [I]; C22C0038-00 [I]; C22C0038-58 [I]; C23C0002-02 [I]; C23C0002-28 [I]

IPCR C23C0002-06 [I]; C21D0009-46 [I]; C22C0018-00 [I]; C22C0038-00 [I]; C22C0038-58 [I]; C23C0002-02 [I]; C23C0002-28 [I]

CC 55-6 (Ferrous Metals and Alloys)

ST hot dip galvanized ~~steel~~ base silicon manganese wettability adhesion; ~~steel~~ annealing soaking hot dip galvanizing base sheet hardness

IT Galvanized ~~steel~~

RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(hot-dip; manuf. of hot-dip galvanized ~~steel~~ sheet contg. Si and Mn in base ~~steel~~ sheet and showing good wettability and

plating adhesion)

IT Alloying
Annealing
Hot-dip galvanizing
(manuf. of hot-dip galvanized steel sheet contg. Si and Mn in base steel sheet and showing good wettability and plating adhesion)

IT Heat treatment
(soaking; manuf. of hot-dip galvanized steel sheet contg. Si and Mn in base steel sheet and showing good wettability and plating adhesion)

IT 124-38-9, Carbon dioxide, uses 630-08-0, Carbon monoxide, uses 7727-37-9, Nitrogen, uses
RL: NUU (Other use, unclassified); USES (Uses)
(annealing atm.; manuf. of hot-dip galvanized steel sheet contg. Si and Mn in base steel sheet and showing good wettability and plating adhesion)

IT 7440-45-1D, Cerium, trace in alloy 12709-15-8D, Ce 0.02%, P 0.010%, Al 0.04%, processes 144920-07-0D, Ce 0.02%, P 0.019%, Al 0.05%, processes 1428957-53-2
RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(base steel sheet; manuf. of hot-dip galvanized steel sheet contg. Si and Mn in base steel sheet and showing good wettability and plating adhesion)

IT 53881-87-1 109581-27-3 109581-29-5 723302-58-7 763111-21-3
1242002-97-6 1554190-57-6 1554190-62-3 1554190-66-7 1554190-71-4
1554190-72-5 1554190-73-6 1554190-78-1 1554190-82-7 1554190-84-9
1554190-88-3 1554190-90-7 1554190-95-2 1554190-99-6 1554191-01-3
1554191-06-8 1554191-11-5 1554191-14-8 1554191-17-1
RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(galvanizing layer; manuf. of hot-dip galvanized steel sheet contg. Si and Mn in base steel sheet and showing good wettability and plating adhesion)

OS.CITING REF COUNT: 2 THERE ARE 2 CAPLUS RECORDS THAT CITE THIS RECORD
(2 CITINGS)

L13 ANSWER 48 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2013:1659555 CAPLUS Full-text

DOCUMENT NUMBER: 159:643708

TITLE: Steel sheet provided with Al-Zn-Si base anticorrosive coating offering sacrificial cathodic protection, method for production of a part using the sheet

INVENTOR(S): Allely, Christian; Chassagne, Julie; Corlu, Beril

PATENT ASSIGNEE(S): ArcelorMittal Investigacion y Desarrollo SL, Spain

SOURCE: PCT Int. Appl., 26pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: French

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2013156688	A1	20131024	WO 2012-FR149	20120417
CA 2870532	A1	20131024	CA 2012-2870532	20120417
CA 2870532	C	20161213		
AU 2012377741	A1	20141204	AU 2012-377741	20120417
AU 2012377741	B2	20160317		
CN 104302802	A	20150121	CN 2012-80073231	20120417
CN 104302802	B	20170412		
KR 2015008114	A	20150121	KR 2014-7032019	20120417
KR 1667131	B1	20161017		
EP 2839049	A1	20150225	EP 2012-722750	20120417
EP 2839049	B1	20171018		
MX 2014012626	A	20150511	MX 2014-12626	20120417
MX 358552	B	20180823		
JP 2015520797	T	20150723	JP 2015-506274	20120417
JP 6348105	B2	20180627		
KR 2016114735	A	20161005	KR 2016-7026204	20120417

ES 2652028	T3	20180131	ES 2012-722750	20120417
KR 2018017229	A	20180220	KR 2018-7003561	20120417
KR 1886611	B1	20180809		
EA 30016	B1	20180629	EA 2014-1136	20120417
BR 112014025697	B1	20201020	BR 2014-112014025697	20120417
ZA 2014007327	A	20170830	ZA 2014-7327	20141009
IN 2014CN07902	A	20160701	IN 2014-CN7902	20141028
US 20150284861	A1	20151008	US 2015-14394885	20150617
US 10253418	B2	20190409		

PRIORITY APPLN. INFO.:

KR 2014-7032019	A3	20120417
KR 2016-7026204	A3	20120417
WO 2012-FR149	W	20120417

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB The invention relates to a ~~steel~~ sheet provided with a ~~coating~~ offering sacrificial cathodic protection, comprising, wt.%: Zn 5-50, Si 0.1- 15, and optionally Mg up to 10 and up to 0.3 in terms of total content, of addnl. elements, as well as comprising a protective element selected from Sn 0.1-5, In 0.01-0.5 and combinations of same, the remainder consisting of Al. The invention also relates to a method for producing parts by hot or cold pressing and to the resulting parts.

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
NIPPON STEEL CORP	2002			EP 1225246 A1	CAPLUS
POSCO	2009			US 20090238715 A1	
THYSSENKRUPP STEEL EURO	2011			WO 2011157690 A1	CAPLUS

IT 1173986-65-6

RL: NUU (Other use, unclassified); USES (Uses)
(~~steel~~ sheet provided with Al-Zn-Si base anticorrosive
~~coating~~ offering sacrificial cathodic protection, method for
prodn. of part using the sheet)

RN 1173986-65-6 CAPLUS

CN Iron alloy, base, Fe 94-99, Mn 0.5-3, Cr 0-1, C 0.2-0.5, Si 0.1-0.5, Ti 0-0.2, Al 0-0.1, B 0-0.1, Cu 0-0.1, Ni 0-0.1, P 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	94 - 99	7439-89-6
Mn	0.5 - 3	7439-96-5
Cr	0 - 1	7440-47-3
C	0.2 - 0.5	7440-44-0
Si	0.1 - 0.5	7440-21-3
Ti	0 - 0.2	7440-32-6
Al	0 - 0.1	7429-90-5
B	0 - 0.1	7440-42-8
Cu	0 - 0.1	7440-50-8
Ni	0 - 0.1	7440-02-0
P	0 - 0.1	7723-14-0

IPCI C23C0002-04 [I]; C23C0002-12 [I]; C23C0002-28 [I]; C21D0001-673 [I]; C21D0008-02 [I]

IPCR C23C0002-04 [I]; C21D0001-673 [I]; C21D0008-02 [I]; C23C0002-12 [I]; C23C0002-28 [I]

CC 56-3 (Nonferrous Metals and Alloys)

ST ~~steel~~ anticorrosive ~~coating~~ cathodic protection aluminum zinc silicon alloy

IT Anticorrosive ~~coating~~ materials

Cathodic protection

(~~steel~~ sheet provided with Al-Zn-Si base anticorrosive
~~coating~~ offering sacrificial cathodic protection, method for
prodn. of part using the sheet)

IT 1469993-24-5 1469993-25-6 1469993-26-7 1469993-27-8 1469993-28-9
1469993-29-0 1469993-30-3

RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)

(~~coating~~; ~~steel~~ sheet provided with Al-Zn-Si base
anticorrosive ~~coating~~ offering sacrificial cathodic
protection, method for prodn. of part using the sheet)

IT 1173986-65-6

RL: NUU (Other use, unclassified); USES (Uses)

(steel sheet provided with Al-Zn-Si base anticorrosive coating offering sacrificial cathodic protection, method for prodn. of part using the sheet)

IT 12597-69-2, Steel, uses 870820-47-6, 22MnB5
 RL: NUU (Other use, unclassified); USES (Uses)
 (substrate; steel sheet provided with Al-Zn-Si base anticorrosive coating offering sacrificial cathodic protection, method for prodn. of part using the sheet)

OS.CITING REF COUNT: 4 THERE ARE 4 CAPLUS RECORDS THAT CITE THIS RECORD
 (4 CITINGS)

L13 ANSWER 49 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2013:1612663 CAPLUS Full-text
 DOCUMENT NUMBER: 161:113844
 TITLE: Result prediction of steel carbonization when carbonitriding
 AUTHOR(S): Gliner, R. E.; Vybornov, V. V.; Pryanichnikov, V. A.
 CORPORATE SOURCE: Nizhegorodskii Gosudarstvennyi Tekhnicheskii Universitet, Nizhny Novgorod, Russia
 SOURCE: Tekhnologiya Metallov (2013), (4), 8-14
 CODEN: TMEEAL; ISSN: 1684-2499
 PUBLISHER: OOO "Nauka i Tekhnologii"
 DOCUMENT TYPE: Journal
 LANGUAGE: Russian

AB The features of the steel during carburizing carbonitriding to the coeffs. of absorption and diffusion of carbon. Revealed that complete satn. of carbon and nitrogen results in a significant acceleration of the absorption of carbon and, correspondingly, the speed of the carburizing. The possibility of harmonization of different carburizing alloy steels.

IT 56995-50-7, 20KhGR
 RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (result prediction of steel carburization during carbonitriding)

RN 56995-50-7 CAPLUS

CN Iron alloy, base, Fe 96-98,Cr 0.75-1.05,Mn 0.70-1.00,Si 0.17-0.37,Cu 0-0.30,Ni 0-0.30,C 0.18-0.24,W 0-0.20,Mo 0-0.15,V 0-0.05,P 0-0.035,S 0-0.035,Ti 0-0.03,B 0.001 (20KhGR) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	96 - 98	7439-89-6
Cr	0.75 - 1.05	7440-47-3
Mn	0.70 - 1.00	7439-96-5
Si	0.17 - 0.37	7440-21-3
Cu	0 - 0.30	7440-50-8
Ni	0 - 0.30	7440-02-0
C	0.18 - 0.24	7440-44-0
W	0 - 0.20	7440-33-7
Mo	0 - 0.15	7439-98-7
V	0 - 0.05	7440-62-2
P	0 - 0.035	7723-14-0
S	0 - 0.035	7704-34-9
Ti	0 - 0.03	7440-32-6
B	0.001	7440-42-8

CC 55-7 (Ferrous Metals and Alloys)

ST carbonitriding steel carburization prediction

IT Absorptivity
 Carbonitriding
 Composition
 Diffusion
 Diffusion coating process
 (result prediction of steel carburization during carbonitriding)

IT 74-82-8, Methane, uses 7664-41-7, Ammonia, uses
 RL: NUU (Other use, unclassified); USES (Uses)
 (result prediction of steel carburization during carbonitriding)

IT 39467-50-0, 20KhGNM, processes 56995-50-7, 20KhGR

71390-26-6, 07Kh3GNM 578731-16-5, 20Kh3N3MFBA
 RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM
 (Technical or engineered material use); PROC (Process); USES (Uses)
 (result prediction of ~~steel~~ carburization during
 carbonitriding)

L13 ANSWER 50 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2013:1460865 CAPLUS Full-text
 DOCUMENT NUMBER: 159:503793
 TITLE: Hot-pressed zinc-nickel alloy-coated steel article
 and its manufacture
 INVENTOR(S): Nakajima, Seiji; Miyoshi, Tatsuya; Ando, Satoru
 PATENT ASSIGNEE(S): JFE Steel Corp., Japan
 SOURCE: Jpn. Kokai Tokkyo Koho, 11 pp.
 CODEN: JKXXAF
 DOCUMENT TYPE: Patent
 LANGUAGE: Japanese
 FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2013185184	A	20130919	JP 2012-49868	20120307
PRIORITY APPLN. INFO.:			JP 2012-49868	20120307

AB The hot-pressed article has a plating layer satisfying total deposition of Zn and Ni 5-90 g/m² and Ni deposition ratio based on the total deposition 10-25 wt.% on a steel sheet surface and comprises high-strength parts having tensile strength ≥1000 MPa and low-strength parts having tensile strength <1000 Pa. The article is manufd. by heating a steel sheet contg. C 0.15-0.5, Si 0.05-2.0, Mn 0.5-3, P ≤0.1, S ≤0.05, Al ≤0.1, and N ≤0.01 wt.% coated with 5-90 g/m² of Zn-(10-25 wt.%) Ni alloy to have coexistence of high-temp. parts at ≥ Ac3 transformation point and ≤1000° and low-temp. parts at ≥0° and < Ac3 transformation point and then starting hot-pressing when the high-temp. parts become 600-800°. The article has excellent resistance to corrosion and chipping after coating and is suitable for automotive parts.

IT 1356847-15-8D, Sb(0.003-0.03%)
 RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (hot-pressed zinc-nickel alloy-coated steel article
 having high-strength parts and low-strength parts and its manuf. by
 heating coated steel sheet and hot-pressing)

RN 1356847-15-8 CAPLUS

CN Iron alloy, base, Fe 93-99, Mn 0.5-3, Si 0-2, Cr 0-1, C 0.2-0.5, Ti 0-0.2, Al 0-0.1, B 0-0.1, P 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	93 - 99	7439-89-6
Mn	0.5 - 3	7439-96-5
Si	0 - 2	7440-21-3
Cr	0 - 1	7440-47-3
C	0.2 - 0.5	7440-44-0
Ti	0 - 0.2	7440-32-6
Al	0 - 0.1	7429-90-5
B	0 - 0.1	7440-42-8
P	0 - 0.1	7723-14-0

IPCI C25D0005-26 [I]; C22C0038-00 [I]; C21D0009-00 [I]; C22C0038-60 [I];
 C21D0001-18 [I]

IPCR C25D0005-26 [I]; C21D0001-18 [I]; C21D0009-00 [I]; C22C0038-00 [I];
 C22C0038-60 [I]

CC 55-11 (Ferrous Metals and Alloys)

ST zinc nickel alloy coated steel heating hot pressing

IT Heat treatment

Hot-press molding

Metal forming

(hot-pressed zinc-nickel alloy-coated steel article
 having high-strength parts and low-strength parts and its manuf. by
 heating coated steel sheet and hot-pressing)

IT 7440-36-0D, Antimony, trace in alloy 238084-01-0 1299468-35-1
 1356847-15-8D, Sb(0.003-0.03%)
 RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (hot-pressed zinc-nickel alloy-coated steel article
 having high-strength parts and low-strength parts and its manuf. by
 heating coated steel sheet and hot-pressing)

IT 1379822-01-1
 RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (primer; hot-pressed zinc-nickel alloy-coated steel
 article having high-strength parts and low-strength parts and its
 manuf. by heating coated steel sheet and
 hot-pressing)

OS.CITING REF COUNT: 1 THERE ARE 1 CAPLUS RECORDS THAT CITE THIS RECORD
 (1 CITINGS)

L13 ANSWER 51 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2013:650770 CAPLUS Full-text
 DOCUMENT NUMBER: 158:624577
 TITLE: Anti-scale and anti-corrosion hybrid coatings for
 steel substrates
 INVENTOR(S): Gordon, Douglas Jesus Figueroa; Harding, Tim; Boehm,
 Sivasambu; Li, Wu; Weirman, Chris
 PATENT ASSIGNEE(S): Tata Steel UK Limited, UK
 SOURCE: PCT Int. Appl., 15pp.
 CODEN: PIXXD2
 DOCUMENT TYPE: Patent
 LANGUAGE: English
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2013056847	A1	20130425	WO 2012-EP4384	20121019
PRIORITY APPLN. INFO.:			EP 2011-8421	A 20111019

AB Method of producing a coated steel substrate suitable for hot-forming
 or other high temp. applications, which comprises the steps of: (i)
 providing a steel substrate; (ii) prep. a coating mixt. comprising a
 curable org. component as a first binder, a curable inorg. component as a
 second binder, a cross-linking component to chem. cross-link the curable
 org. component and the curable inorg. component, and a metal or metal
 alloy particle having an aluminum content of at least 50% and a balance of
 50% or less of a non-aluminum metal; (iii) applying the mixt. on the
 steel substrate; (iv) curing the mixt. to produce a dense network
 structure of the coating on the steel substrate.

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
Cornelis, V	2010			WO 2010069588 A1	CAPLUS
Foscante Raymond E	1981			US 4250074 A	CAPLUS
Gen Electric	2007			WO 2007067203 A1	CAPLUS
Harding, T	2011			WO 2011069663 A2	CAPLUS
Savin Ronald Richard	1990			EP 0385880 A2	CAPLUS
Standke Burkhard	2010			US 20100159144 A1	

IT 1431293-40-1, Aluminum 0-0.1, boron 0-0.1, carbon 0.2-0.5,
 chromium 0-1, iron 92-99, manganese 0.5-3, molybdenum 0-0.5, niobium
 0-0.1, phosphorus 0-0.1, silicon 0.1-2.5, titanium 0-0.2, vanadium 0-0.1
 RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM
 (Technical or engineered material use); PROC (Process); USES (Uses)
 (antiscale and anticorrosion hybrid coatings for
 steel substrates)

RN 1431293-40-1 CAPLUS

CN Iron alloy, base, Fe 92-99, Mn 0.5-3, Si 0.1-2.5, Cr 0-1, C 0.2-0.5, Mo
 0-0.5, Ti 0-0.2, Al 0-0.1, B 0-0.1, Nb 0-0.1, P 0-0.1, V 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	92 - 99	7439-89-6
Mn	0.5 - 3	7439-96-5

Si	0.1	-	2.5	7440-21-3
Cr	0	-	1	7440-47-3
C	0.2	-	0.5	7440-44-0
Mo	0	-	0.5	7439-98-7
Ti	0	-	0.2	7440-32-6
Al	0	-	0.1	7429-90-5
B	0	-	0.1	7440-42-8
Nb	0	-	0.1	7440-03-1
P	0	-	0.1	7723-14-0
V	0	-	0.1	7440-62-2

IPCI C21D0001-68 [I]; C23C0018-02 [I]; C09D0007-12 [I]; C09D0005-10 [I];
C09D0201-10 [I]; C09D0175-04 [I]; C09D0183-04 [I]
IPCR C21D0001-68 [I]; C09D0005-10 [I]; C09D0007-12 [I]; C09D0175-04 [I];
C09D0183-04 [I]; C09D0201-10 [I]; C23C0018-02 [I]
CC 55-6 (Ferrous Metals and Alloys)
ST antiscaling anticorrosion hybrid coating steel
IT Anticorrosive coating materials
Antiscaling coating materials
Binders
(antiscaling and anticorrosion hybrid coatings for
steel substrates)
IT Epoxy resins
Organic compounds
Silanes
RL: NUU (Other use, unclassified); USES (Uses)
(antiscaling and anticorrosion hybrid coatings for
steel substrates)
IT Polyurethanes
RL: NUU (Other use, unclassified); USES (Uses)
(polyester-; antiscaling and anticorrosion hybrid coatings for
steel substrates)
IT Polyesters
RL: NUU (Other use, unclassified); USES (Uses)
(polyurethane-; antiscaling and anticorrosion hybrid coatings
for steel substrates)
IT 108-78-1, 1,3,5-Triazine-2,4,6-triamine, uses 661-20-1, Isocyanate
10344-93-1, Acrylate, uses
RL: NUU (Other use, unclassified); USES (Uses)
(antiscaling and anticorrosion hybrid coatings for
steel substrates)
IT 1273096-81-3, Aluminum alloy 1431293-40-1, Aluminum 0-0.1,
boron 0-0.1, carbon 0.2-0.5, chromium 0-1, iron 92-99, manganese 0.5-3,
molybdenum 0-0.5, niobium 0-0.1, phosphorus 0-0.1, silicon 0.1-2.5,
titanium 0-0.2, vanadium 0-0.1
RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM
(Technical or engineered material use); PROC (Process); USES (Uses)
(antiscaling and anticorrosion hybrid coatings for
steel substrates)
OS.CITING REF COUNT: 1 THERE ARE 1 CAPLUS RECORDS THAT CITE THIS RECORD
(1 CITINGS)

L13 ANSWER 52 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN
ACCESSION NUMBER: 2013:640308 CAPLUS Full-text
DOCUMENT NUMBER: 158:593876
TITLE: High-strength hot-dip galvanized steel sheet with
excellent plating adhesion and formability and its
manufacture
INVENTOR(S): Okamoto, Isamu; Oka, Masaharu; Wakabayashi, Chisato;
Azuma, Masafumi
PATENT ASSIGNEE(S): Nippon Steel & Sumitomo Metal Corporation, Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 24 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:
PATENT NO. KIND DATE APPLICATION NO. DATE
JP 2013076137 A 20130425 JP 2011-217619 20110930
JP 5953693 B2 20160720

PRIORITY APPLN. INFO.:

JP 2011-217619

20110930

AB The galvanized ~~steel~~ sheet has a ~~steel~~ substrate contg. C 0.05-0.4, Si 0.01-3.0, Mn 0.1-3.0, P ≤0.04, S ≤0.05, N ≤0.01, Al 0.01-2.0, and Si + Al >0.5 wt.% while having microstructure contg. ≥40 vol.% of ferrite main phase, ≥8 vol.% of retained austenite, 3 kinds of martensite defined by using C content and hardness, and 10-0 vol.% of pearlite, (1) a hot-dip galvanized ~~layer~~ contg. <7 wt.% Fe and residual amts. of Zn and Al or (2) a hot-dip galvanized ~~layer~~ contg. 7-15 wt.% Fe and residual amts. of Zn and Al on the substrate, and tensile strength ≥980 MPa. The galvanized ~~steel~~ sheet is manufd. by heating a cast slab at ≥1100° directly or after cooling, final hot-rolling at ≥Ar3 transformation point, winding at ≤700°, pickling, cold-rolling at draft 40-70%, annealing at 730-900°, primary-cooling to 600-750° at rate 0.1-20°/s while satisfying (A) annealing temp. ≥730 and <800°, (B) primary cooling stopping temp. ≥600 and <700°, and/or (C) primary cooling av. rate 0.1-5.0°/s, cooling to ≤450° at rate ≥20°/s, holding at 350-450° for ≥120 s, cooling, grinding the surface ~~layer~~ in thickness ≥0.1 μm for removal, preplating with 0.2-2.0 g/m² of Ni, heating at rate ≥10°/s to [(galvanizing bath temp.) - 40]° to [(galvanizing bath temp.) + 50]°, galvanizing, and optionally heat-alloying at 470-600° for 10-40 s.

IT 1430730-21-4D, Ca(0.0005-0.01%) Mg(0.0005-0.01%) rare earth metal(0.0005-0.01%)
 RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (substrate; high-strength hot-dip galvanized ~~steel~~ sheet with excellent plating adhesion and formability and its manuf.)

RN 1430730-21-4 CAPLUS

CN Iron alloy, base, Fe 80-99, Mn 0.1-3, Cr 0-3, Cu 0-3, Ni 0-3, Si 0-3, Al 0-2, Mo 0-1, V 0-0.5, C 0-0.4, Nb 0-0.3, Ti 0-0.3, B 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
=====+=====+=====		
Fe	80 - 99	7439-89-6
Mn	0.1 - 3	7439-96-5
Cr	0 - 3	7440-47-3
Cu	0 - 3	7440-50-8
Ni	0 - 3	7440-02-0
Si	0 - 3	7440-21-3
Al	0 - 2	7429-90-5
Mo	0 - 1	7439-98-7
V	0 - 0.5	7440-62-2
C	0 - 0.4	7440-44-0
Nb	0 - 0.3	7440-03-1
Ti	0 - 0.3	7440-32-6
B	0 - 0.1	7440-42-8

IPCI C22C0038-00 [I]; C22C0038-60 [I]; C21D0009-46 [I]; C23C0002-06 [I];
 C23C0002-28 [I]; C23C0002-40 [I]; C22C0038-00 [I]; C22C0038-60 [I];
 C21D0009-46 [I]; C23C0002-06 [I]; C23C0002-28 [I]; C23C0002-40 [I];

IPCR C22C0038-00 [I]; C21D0009-46 [I]; C22C0038-60 [I]; C23C0002-06 [I];
 C23C0002-28 [I]; C23C0002-40 [I]

CC 55-6 (Ferrous Metals and Alloys)

ST hot dip galvanized ~~steel~~ sheet manuf plating adhesion formability

IT Annealing

Cold rolling

Cooling

Galvannealing

Grinding (machining)

Hot rolling

Hot-dip galvanizing

(high-strength hot-dip galvanized ~~steel~~ sheet with excellent plating adhesion and formability and its manuf.)

IT Rare earth metals

RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)

(trace in alloy, substrate; high-strength hot-dip galvanized ~~steel~~ sheet with excellent plating adhesion and formability and its manuf.)

IT 1431127-89-7
 RL: TEM (Technical or engineered material use); USES (Uses)
 (galvanized layer; high-strength hot-dip galvanized
 steel sheet with excellent plating adhesion and formability and
 its manuf.)

IT 1430730-23-6
 RL: TEM (Technical or engineered material use); USES (Uses)
 (galvannealed layer; high-strength hot-dip galvanized
 steel sheet with excellent plating adhesion and formability and
 its manuf.)

IT 7440-02-0, Nickel, uses
 RL: TEM (Technical or engineered material use); USES (Uses)
 (precoating with; high-strength hot-dip galvanized steel
 sheet with excellent plating adhesion and formability and its manuf.)

IT 12244-31-4, Austenite, uses
 RL: TEM (Technical or engineered material use); USES (Uses)
 (retained, steel substrate microstructure component;
 high-strength hot-dip galvanized steel sheet with excellent
 plating adhesion and formability and its manuf.)

IT 12173-93-2, Martensite, uses 12427-24-6, Ferrite (ferrous metal
 component) 12427-27-9, Pearlite
 RL: TEM (Technical or engineered material use); USES (Uses)
 (steel substrate microstructure component; high-strength
 hot-dip galvanized steel sheet with excellent plating
 adhesion and formability and its manuf.)

IT 7439-95-4D, Magnesium, trace in alloy 7440-70-2D, Calcium, trace in
 alloy 1430730-20-3 1430730-21-4D, Ca(0.0005-0.01%)
 Mg(0.0005-0.01%) rare earth metal(0.0005-0.01%)
 RL: PEP (Physical, engineering or chemical process); TEM (Technical or
 engineered material use); PROC (Process); USES (Uses)
 (substrate; high-strength hot-dip galvanized steel sheet with
 excellent plating adhesion and formability and its manuf.)

OS.CITING REF COUNT: 1 THERE ARE 1 CAPLUS RECORDS THAT CITE THIS RECORD
 (1 CITINGS)

L13 ANSWER 53 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2013:637081 CAPLUS Full-text
 DOCUMENT NUMBER: 158:608421
 TITLE: Hot-dip galvanized steel sheet with high tensile
 strength and excellent formability and its manufacture
 INVENTOR(S): Wakabayashi, Chisato; Azuma, Masafumi; Okamoto, Riki;
 Fujita, Nobuhiro; Takahashi, Manabu
 PATENT ASSIGNEE(S): Nippon Steel & Sumitomo Metal Corporation, Japan
 SOURCE: Jpn. Kokai Tokkyo Koho, 21 pp.
 CODEN: JKXXAF
 DOCUMENT TYPE: Patent
 LANGUAGE: Japanese
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2013076148	A	20130425	JP 2011-217995	20110930
JP 5699889	B2	20150415		

PRIORITY APPLN. INFO.: JP 2011-217995 20110930

AB The galvanized steel sheet has a steel substrate contg. C 0.05-0.4, Si
 0.01-3.0, Mn 0.1-3.0, P ≤0.04, S ≤0.05, N ≤0.01, Al
 0.01-2.0, and Si + Al >0.5 wt.% while having microstructure contg.
 ≥40 vol.% total of main phase consisting of ≥1 kind of
 martensite selected from 3 kinds defined by using C content including
 cementite and hardness and bainite, ≥8 vol.% of austenite,
 ≤10 vol.% of pearlite, and a residual amt. of ferrite, (1) a
 hot-dip galvanized layer contg. <7 wt.% Fe and residual amts. of Zn and
 Al or (2) a hot-dip galvannealed layer contg. 7-15 wt.% Fe and residual
 amts. of Zn and Al on the substrate, and tensile strength ≥980 MPa.
 The galvanized steel sheet is manufd. by heating a cast slab at
 ≥1200° directly or after cooling, final hot-rolling at
 ≥Ar3 transformation point, winding at ≤700°,
 pickling, cold-rolling at draft 40-70%, annealing at 730-900°,
 primary-cooling to 650-750° at rate 0.1-50°/s, cooling to
 ≤450° at rate ≥20°/s, holding at
 350-450° for ≥120 s, cooling, pickling, grinding the surface

layer in thickness $\geq 0.1 \mu\text{m}$ for removal, preplating with 0.2-2.0 g/m² of Ni, heating at rate $\geq 10^\circ/\text{s}$ to [(galvanizing bath temp.) - 40]° to [(galvanizing bath temp.) + 50]°, galvanizing by dipping in a bath flowing at flow rate 10-50 m/min, and optionally heat-alloying at 470-600° for 10-40 s. The galvanized sheet shows good ductility and hole-expanding property.

IT 1431057-05-4B, Ca(0.0005-0.01%) Mg(0.0005-0.01%) rare earth metal(0.0005-0.01%)
 RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (substrate; hot-dip galvanized ~~steel~~ sheet with high tensile strength and excellent formability and its manuf.)

RN 1431057-05-4 CAPLUS

CN Iron alloy, base, Fe 86-100, Mn 0.1-3, Si 0-3, Al 0-2, Cr 0-1, Cu 0-1, Mo 0-1, Ni 0-1, V 0-0.5, C 0-0.4, Nb 0-0.3, Ti 0-0.3, B 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
=====+=====+=====		
Fe	86 - 100	7439-89-6
Mn	0.1 - 3	7439-96-5
Si	0 - 3	7440-21-3
Al	0 - 2	7429-90-5
Cr	0 - 1	7440-47-3
Cu	0 - 1	7440-50-8
Mo	0 - 1	7439-98-7
Ni	0 - 1	7440-02-0
V	0 - 0.5	7440-62-2
C	0 - 0.4	7440-44-0
Nb	0 - 0.3	7440-03-1
Ti	0 - 0.3	7440-32-6
B	0 - 0.1	7440-42-8

IPCI C22C0038-00 [I]; C22C0038-06 [I]; C22C0038-58 [I]; C21D0009-46 [I]; C22C0018-00 [I]; B21B0003-00 [I]; C23C0002-06 [I]; C23C0002-40 [I]; C23C0002-02 [I]; C23C0002-28 [I]; C22C0038-00 [I]; C22C0038-60 [I]; C21D0009-46 [I]; C22C0018-00 [I]; B21B0003-00 [I]; C23C0002-06 [I]; C23C0002-40 [I]; C23C0002-02 [I]; C23C0002-28 [I]

IPCR C22C0038-00 [I]; B21B0003-00 [I]; C21D0009-46 [I]; C22C0018-00 [I]; C22C0038-06 [I]; C22C0038-58 [I]; C23C0002-02 [I]; C23C0002-06 [I]; C23C0002-28 [I]; C23C0002-40 [I]; C22C0038-60 [I]

CC 55-6 (Ferrous Metals and Alloys)

ST hot dip galvanized ~~steel~~ sheet manuf tensile strength formability

IT Annealing
 Cold rolling
 Cooling
 Galvannealing
 Grinding (machining)
 Hot rolling
 Hot-dip galvanizing
 Pickling
 (hot-dip galvanized ~~steel~~ sheet with high tensile strength and excellent formability and its manuf.)

IT Recrystallization
 (texture; hot-dip galvanized ~~steel~~ sheet with high tensile strength and excellent formability and its manuf.)

IT Rare earth metals
 RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (trace in alloy, substrate; hot-dip galvanized ~~steel~~ sheet with high tensile strength and excellent formability and its manuf.)

IT 1431127-89-7, (Aluminum + zinc) 93-100, iron 0-7
 RL: TEM (Technical or engineered material use); USES (Uses)
 (galvanized ~~layer~~; hot-dip galvanized ~~steel~~ sheet with high tensile strength and excellent formability and its manuf.)

IT 1430730-23-6, (Aluminum + zinc) 85-93, iron 7-15
 RL: TEM (Technical or engineered material use); USES (Uses)
 (galvannealed ~~layer~~; hot-dip galvanized ~~steel~~ sheet with high tensile strength and excellent formability and its manuf.)

IT 7440-02-0, Nickel, uses
 RL: TEM (Technical or engineered material use); USES (Uses)
 (precoating with; hot-dip galvanized ~~steel~~ sheet with high

tensile strength and excellent formability and its manuf.)

IT 12169-32-3, Cementite 12173-93-2, Martensite, uses 12244-31-4, Austenite, uses 12427-23-5, Bainite 12427-24-6, Ferrite (ferrous metal component) 12427-27-9, Pearlite

RL: TEM (Technical or engineered material use); USES (Uses)
(~~steel~~ substrate microstructure component; hot-dip galvanized ~~steel~~ sheet with high tensile strength and excellent formability and its manuf.)

IT 7439-95-4D, Magnesium, trace in alloy 7440-70-2D, Calcium, trace in alloy 1428932-65-3 1431057-05-4D, Ca(0.0005-0.01%) Mg(0.0005-0.01%) rare earth metal(0.0005-0.01%)

RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(substrate; hot-dip galvanized ~~steel~~ sheet with high tensile strength and excellent formability and its manuf.)

OS.CITING REF COUNT: 2 THERE ARE 2 CAPLUS RECORDS THAT CITE THIS RECORD (2 CITINGS)

L13 ANSWER 54 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2013:515313 CAPLUS Full-text
DOCUMENT NUMBER: 158:510556
TITLE: ~~Steel~~ sheet having hot-dip galvanized ~~layer~~ and exhibiting superior plating wettability and plating adhesion, and production method therefor
INVENTOR(S): Fujita, Soshi; Yamanaka, Shintaro; Sato, Koichi
PATENT ASSIGNEE(S): Nippon Steel & Sumitomo Metal Corporation, Japan
SOURCE: PCT Int. Appl., 66pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2013047804	A1	20130404	WO 2012-JP75189	20120928
CA 2848949	A1	20130404	CA 2012-2848949	20120928
CA 2848949	C	20160920		
KR 2014053322	A	20140507	KR 2014-7006759	20120928
KR 1624810	B1	20160526		
CN 103827342	A	20140528	CN 2012-80047145	20120928
CN 103827342	B	20160622		
MX 2014003789	A	20140710	MX 2014-3789	20120928
MX 359228	B	20180920		
EP 2762601	A1	20140806	EP 2012-835446	20120928
EP 2762601	B1	20180530		
TW I465581	B	20141221	TW 2012-135905	20120928
JP 5648741	B2	20150107	JP 2013-514485	20120928
RU 2584060	C2	20160520	RU 2014-117496	20120928
BR 112014007509	A2	20170404	BR 2014-112014007509	20120928
ES 2680649	T3	20180910	ES 2012-835446	20120928
IN 2014DN02028	A	20150313	IN 2014-DN2028	20140318
US 20140234656	A1	20140821	US 2014-14346618	20140321
US 9752221	B2	20170905		
ZA 2014002254	A	20150826	ZA 2014-2254	20140326
JP 2015038245	A	20150226	JP 2014-173185	20140827
JP 5907221	B2	20160426		

PRIORITY APPLN. INFO.:
JP 2011-217144 A 20110930
JP 2013-514485 A3 20120928
WO 2012-JP75189 W 20120928

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB Provided are a ~~steel~~ sheet that has a hot-dip galvanized ~~layer~~ and that exhibits superior plating wettability and plating adhesion, and a prodn. method therefor. A ~~steel~~ sheet contg. readily oxidizable elements including Si and Mn is used as a base material. The hot-dip galvanized ~~steel~~ sheet has a hot-dip galvanized ~~layer~~ (A) on the surface of the ~~steel~~ sheet and is characterized by having a (B) ~~layer~~ that is directly under the surface of and inside of the ~~steel~~ sheet. The (B) ~~layer~~ has a thickness of 0.001 μ m to 0.5 μ m. By mass, the (B) ~~layer~~ contains 50 mass% or more of unoxidized Fe, less than 50 mass% total of one or more oxides of Fe, Si, Mn, P, S, and/or Al, and contains unoxidized C, Si, Mn, P, S, and/or Al in the following quantities: less

than 0.05 mass% of C; less than 0.1 mass% of Si; less than 0.5 mass% of Mn; less than 0.001 mass% of P; less than 0.001 mass% of S; and less than 0.005 mass% of Al. The ~~steel~~ sheet has a compn. contg. C 0.05-0.50, Si 0.1-3.0, Mn 0.5-5.0, P 0.001-0.5, S 0.001-0.03, Al 0.005-1.0, and balance Fe and inevitable impurities.

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
=====	=====	=====	=====	=====	=====
NKK Corp	2001			JP 2001200352 A	CAPLUS
Nippon Steel Corp	2001			JP 2001226742 A	CAPLUS
Nippon Steel Corp	2003			CN 101125473 A	CAPLUS
Nippon Steel Corp	2003			EP 1504134 A	CAPLUS
Nippon Steel Corp	2003			CN 1639375 A	CAPLUS
Nippon Steel Corp	2003			WO 2002101112 A2	CAPLUS
Nippon Steel Corp	2003			AU 2002304255 A	CAPLUS
Nippon Steel Corp	2003			JP 2003171752 A	CAPLUS
Nippon Steel Corp	2003			US 20040202889 A1	CAPLUS
Nippon Steel Corp	2003			KR 20070026882 A	
Nippon Steel Corp	2003			KR 20070026883 A	
Nippon Steel Corp	2003			US 20080035247 A1	CAPLUS
Nippon Steel Corp	2003			US 20090272467 A1	CAPLUS
Nippon Steel Corp	2003			BR 210265 A	
Nippon Steel Corp	2003			CA 2449604 A1	CAPLUS
Nippon Steel Corp	2003			TW 573021 B	CAPLUS
Nippon Steel Corp	2003			DE 60220191 D	
Nippon Steel Corp	2003			DE 60220191 T	

IT 1428957-53-2

RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(manuf. of hot-dip galvanized ~~steel~~ sheet by annealing cold rolled ~~steel~~ sheet in H-contg. atm. before galvanizing)

RN 1428957-53-2 CAPLUS

CN Iron alloy, base, Fe 78-99, Mn 0.5-5, Si 0.1-3, Al 0-1, B 0-1, Ca 0-1, Cr 0-1, Cu 0-1, misch metal 0-1, Mo 0-1, Nb 0-1, Ni 0-1, Ti 0-1, V 0-1, W 0-1, Zr 0-1, C 0-0.5, P 0-0.5 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
=====	=====	=====
Fe	78 - 99	7439-89-6
Mn	0.5 - 5	7439-96-5
Si	0.1 - 3	7440-21-3
Al	0 - 1	7429-90-5
B	0 - 1	7440-42-8
Ca	0 - 1	7440-70-2
Cr	0 - 1	7440-47-3
Cu	0 - 1	7440-50-8
Misch metal	0 - 1	8049-20-5
Mo	0 - 1	7439-98-7
Nb	0 - 1	7440-03-1
Ni	0 - 1	7440-02-0
Ti	0 - 1	7440-32-6
V	0 - 1	7440-62-2
W	0 - 1	7440-33-7
Zr	0 - 1	7440-67-7
C	0 - 0.5	7440-44-0
P	0 - 0.5	7723-14-0

IPCI C23C0002-06 [I]; C22C0018-00 [I]; C22C0038-00 [I]; C22C0038-06 [I];
C22C0038-58 [I]; C23C0002-02 [I]; C23C0002-40 [I]

IPCR C23C0002-06 [I]; C22C0018-00 [I]; C22C0038-00 [I]; C22C0038-06 [I];
C22C0038-58 [I]; C23C0002-02 [I]; C23C0002-40 [I]

CC 55-6 (Ferrous Metals and Alloys)

Section cross-reference(s): 56

ST hot dip galvanization ~~steel~~ sheet pretreatment annealing hydrogen atm

IT Water vapor

(annealing in atm. contg.; manuf. of hot-dip galvanized ~~steel~~ sheet by annealing cold rolled ~~steel~~ sheet in H-contg. atm. before galvanizing)

IT Annealing

(in H-contg. atm.; manuf. of hot-dip galvanized ~~steel~~ sheet

by annealing cold rolled ~~steel~~ sheet in H-contg. atm. before galvanizing)

IT Cold rolling
Hot rolling
Hot-dip galvanizing
(manuf. of hot-dip galvanized ~~steel~~ sheet by annealing cold rolled ~~steel~~ sheet in H-contg. atm. before galvanizing)

IT Controlled atmospheres
(reducing, annealing in; manuf. of hot-dip galvanized ~~steel~~ sheet by annealing cold rolled ~~steel~~ sheet in H-contg. atm. before galvanizing)

IT 1333-74-0, Hydrogen, uses 7727-37-9, Nitrogen, uses 7732-18-5, Water, uses
RL: NUU (Other use, unclassified); USES (Uses)
(annealing in atm. contg.; manuf. of hot-dip galvanized ~~steel~~ sheet by annealing cold rolled ~~steel~~ sheet in H-contg. atm. before galvanizing)

IT 1428957-52-1 ~~1428957-53-2~~
RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(manuf. of hot-dip galvanized ~~steel~~ sheet by annealing cold rolled ~~steel~~ sheet in H-contg. atm. before galvanizing)

OS.CITING REF COUNT: 2 THERE ARE 2 CAPLUS RECORDS THAT CITE THIS RECORD
(2 CITINGS)

L13 ANSWER 55 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2013:11896 CAPLUS Full-text
DOCUMENT NUMBER: 158:137246
TITLE: Heat-treated hardened ~~steel~~ with excellent impact performance, and method for manufacturing heat-treated hardened type component using the same
INVENTOR(S): Nam, Seung-Man; Im, Hee-Joong; Lee, Seung-Ha; Kim, Dong-Eun; Lee, Bo-Ryong; Kim, Young-Jin; Moon, Man-Been
PATENT ASSIGNEE(S): Hyundai Hysco, S. Korea
SOURCE: PCT Int. Appl., 21pp.; Chemical Indexing Equivalent to 156:209484 (KR)
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: Korean
FAMILY ACC. NUM. COUNT: 2
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2013002441	A1	20130103	WO 2011-KR4785	20110630
KR 1108838	B1	20120131	KR 2011-64159	20110630
CN 103534372	A	20140122	CN 2011-80070743	20110630
CN 103534372	B	20160210		
EP 2728027	A1	20140507	EP 2011-868749	20110630
EP 2728027	B1	20190116		
US 20140083574	A1	20140327	US 2013-14115516	20131104
US 20160281190	A1	20160929	US 2016-15173200	20160603
PRIORITY APPLN. INFO.:			KR 2011-64159	A 20110630
			WO 2011-KR4785	W 20110630
			US 2013-14115516	A3 20131104

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB The title heat-treated hardened ~~steel~~ contains (by wt.%) C 0.12-0.8, Cr 0.01-2, Mo <0.2, B 0.0005-0.08, Sb <1.0, at least one of Ti and Nb <0.2, Si, Mn, Al and Ni satisfying one of content formulas i to iii (content formula i: Si 0.5-3, Mn 1-10 and Al 0.05-2; content formula ii: Si 0.5-3, Mn 1-10, Al <0.1 and Ni 0.01-8; content formula iii: Si 0.5-3, Mn 1-10, Al 0.1-2.5 and Ni 0.01-8), and Fe and other unavoidable impurities as balance. The heat-treated hardened ~~steel~~ has improved impact performance, tensile strength ≥ 1000 MPa, yield strength ≥ 800 MPa and elongation $\geq 10\%$. The heat-treated hardened ~~steel~~ has optionally a coating layer of Al-Si, Zn and oxidn.-resistant materials.

RETABE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
Hyundai Hysco	2011			KR 101033767 B1	

Jfe Steel Kk	2005			JP 2005126817 A	CAPLUS
Jfe Steel Kk	2005			JP 2005126817 A	CAPLUS
Jfe Steel Kk	2005			JP 2005126818 A	CAPLUS
Nippon Steel Corp	2002			JP 2002294397 A	CAPLUS

IT 1356391-47-3 1356391-49-5 1356391-50-8
 RL: PEP (Physical, engineering or chemical process); PRP (Properties);
 PROC (Process)
 (heat-treated hardened steel with excellent impact
 performance, and method for manufg. heat-treated hardened type
 component using the same)

RN 1356391-47-3 CAPLUS
 CN Iron alloy, base, Fe 80-98,Mn 1-10,Si 0.5-3,Al 0-2,Cr 0-2,Sb 0-1,C
 0.1-0.8,Mo 0-0.2,Nb 0-0.2,Ti 0-0.2,B 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
=====+=====+=====		
Fe	80 - 98	7439-89-6
Mn	1 - 10	7439-96-5
Si	0.5 - 3	7440-21-3
Al	0 - 2	7429-90-5
Cr	0 - 2	7440-47-3
Sb	0 - 1	7440-36-0
C	0.1 - 0.8	7440-44-0
Mo	0 - 0.2	7439-98-7
Nb	0 - 0.2	7440-03-1
Ti	0 - 0.2	7440-32-6
B	0 - 0.1	7440-42-8

RN 1356391-49-5 CAPLUS
 CN Iron alloy, base, Fe 74-98,Mn 1-10,Ni 0-8,Si 0.5-3,Cr 0-2,Sb 0-1,C
 0.1-0.8,Mo 0-0.2,Nb 0-0.2,Ti 0-0.2,Al 0-0.1,B 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
=====+=====+=====		
Fe	74 - 98	7439-89-6
Mn	1 - 10	7439-96-5
Ni	0 - 8	7440-02-0
Si	0.5 - 3	7440-21-3
Cr	0 - 2	7440-47-3
Sb	0 - 1	7440-36-0
C	0.1 - 0.8	7440-44-0
Mo	0 - 0.2	7439-98-7
Nb	0 - 0.2	7440-03-1
Ti	0 - 0.2	7440-32-6
Al	0 - 0.1	7429-90-5
B	0 - 0.1	7440-42-8

RN 1356391-50-8 CAPLUS
 CN Iron alloy, base, Fe 72-98,Mn 1-10,Ni 0-8,Si 0.5-3,Al 0.1-2.5,Cr 0-2,Sb
 0-1,C 0.1-0.8,Mo 0-0.2,Nb 0-0.2,Ti 0-0.2,B 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
=====+=====+=====		
Fe	72 - 98	7439-89-6
Mn	1 - 10	7439-96-5
Ni	0 - 8	7440-02-0
Si	0.5 - 3	7440-21-3
Al	0.1 - 2.5	7429-90-5
Cr	0 - 2	7440-47-3
Sb	0 - 1	7440-36-0
C	0.1 - 0.8	7440-44-0
Mo	0 - 0.2	7439-98-7
Nb	0 - 0.2	7440-03-1
Ti	0 - 0.2	7440-32-6
B	0 - 0.1	7440-42-8

IPCI C22C0038-00 [I]; C21D0009-46 [I]; C22C0038-58 [I]; C21D0008-00 [I];
 C23C0002-04 [I]
 IPCR C22C0038-00 [I]; C21D0008-00 [I]; C21D0009-46 [I]; C22C0038-58 [I];

CC C23C0002-04 [I]
 55-3 (Ferrous Metals and Alloys)
 ST thermally hardened ~~steel~~ impact resistance strength
 IT Elongation, mechanical
 Galvanizing
 Heat treatment
 Tensile strength
 Yield strength
 (heat-treated hardened ~~steel~~ with excellent impact performance, and method for manufg. heat-treated hardened type component using the same)
 IT 1356391-47-3 1356391-49-5 1356391-50-8
 RL: PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)
 (heat-treated hardened ~~steel~~ with excellent impact performance, and method for manufg. heat-treated hardened type component using the same)
 IT 7440-66-6, Zinc, uses 11099-22-2
 RL: TEM (Technical or engineered material use); USES (Uses)
 (heat-treated hardened ~~steel~~ with excellent impact performance, and method for manufg. heat-treated hardened type component using the same)

L13 ANSWER 56 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2012:665719 CAPLUS Full-text

DOCUMENT NUMBER: 156:594034

TITLE: Method for manufacturing automobile part having different local strengths using heat-treatment hardening ~~steel~~ plate
 INVENTOR(S): Nam, Seung-Man; Chae, Su-Hong; Kwon, Min-Suck; Kim, Hyo-Sub; Im, Hee-Joong; Lee, Bo-Ryong; Moon, Man-Been

PATENT ASSIGNEE(S): Hyundai Hysco, S. Korea
 SOURCE: PCT Int. Appl., 19pp.
 CODEN: PIXXD2

DOCUMENT TYPE: Patent
 LANGUAGE: Korean

FAMILY ACC. NUM. COUNT: 2
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2012060496	A1	20120510	WO 2010-KR7829	20101108
KR 1033767	B1	20110509	KR 2010-108528	20101103
CN 102712962	A	20121003	CN 2010-80038066	20101108
CN 102712962	B	20170524		
JP 2013501631	T	20130117	JP 2012-541934	20101108
JP 5509337	B2	20140604		
EP 2636759	A1	20130911	EP 2010-855727	20101108
EP 2636759	B1	20190605		
US 20120216920	A1	20120830	US 2012-13390537	20120215
US 20150167111	A1	20150618	US 2015-14630390	20150224
PRIORITY APPLN. INFO.:			KR 2010-108528	A 20101103
			WO 2010-KR7829	W 20101108
			US 2012-13390537	A3 20120215

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB The present invention relates to a method for manufg. automobile parts having different local strengths, and more specifically, to a method for manufg. automobile parts using a heat-treatment hardened ~~steel~~ having different local thicknesses. The present invention provides a method for manufg. automobile parts comprising: a blank sheet prepn. step for prepg. blank sheets using a heat-treatment hardening ~~steel~~ plate having different thicknesses, and a heat-treatment hardening ~~steel~~ plate having different materials, according to the strength required; a blank conjugate forming step for forming a blank conjugate by connecting the blank sheets using laser welding; a cold molding step for cold press molding the blank conjugates; and a heat-treatment hardening step for heating the cold-molded part to above AC3 temp., then resolving mold retention stress by quenching the part when constrained in a metal mold, and enhancing the strength thereby.

RETABLER

Referenced Author (RAU)	Year (RKY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
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=====+=====+=====+=====+=====+=====
Aisin Takaoka Ltd      |2004 |      |      |JP 2004058082 A      |CAPLUS
Hyundai Hysco          |2009 |      |      |KR 100902857 B1     |
Sumitomo Metal Ind Ltd |2007 |      |      |JP 2007154257 A      |CAPLUS
Voestalpine Automotive |2006 |      |      |WO 2006015849 A2     |CAPLUS
IT 1374118-68-9
  RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM
  (Technical or engineered material use); PROC (Process); USES (Uses)
  (method for manufg. automobile part having different local strengths
  using heat-treatment hardening steel plate)
RN 1374118-68-9 CAPLUS
CN Iron alloy, base, Fe 94-99,Mn 0.5-3,Cr 0-1,C 0.2-0.5,Si 0.2-0.5,Ti
  0-0.2,Al 0-0.1,B 0-0.1,P 0-0.1,S 0-0.1 (CA INDEX NAME)

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Component	Component Percent	Component Registry Number
Fe	94 - 99	7439-89-6
Mn	0.5 - 3	7439-96-5
Cr	0 - 1	7440-47-3
C	0.2 - 0.5	7440-44-0
Si	0.2 - 0.5	7440-21-3
Ti	0 - 0.2	7440-32-6
Al	0 - 0.1	7429-90-5
B	0 - 0.1	7440-42-8
P	0 - 0.1	7723-14-0
S	0 - 0.1	7704-34-9

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IPCI C21D0008-02 [I]; C21D0001-00 [I]; B21D0022-00 [I]; B23K0026-20 [I]
IPCR C21D0008-02 [I]; B21D0022-00 [I]; B23K0026-20 [I]; C21D0001-00 [I]
CC 55-5 (Ferrous Metals and Alloys)
ST steel heat treatment welding molding hardening zinc coating automobile
IT Automobile parts
  Coating materials
  Cold-press molding
  Hardening (mechanical)
  Heat treatment
  Laser welding
  Quenching (cooling)
  (method for manufg. automobile part having different local strengths
  using heat-treatment hardening steel plate)
IT Stress, mechanical
  (residual; method for manufg. automobile part having different local
  strengths using heat-treatment hardening steel plate)
IT 7429-90-5, Aluminum, processes 7440-66-6, Zinc, processes 11133-86-1
  RL: PEP (Physical, engineering or chemical process); TEM (Technical or
  engineered material use); PROC (Process); USES (Uses)
  (coating; method for manufg. automobile part having different
  local strengths using heat-treatment hardening steel plate)
IT 7439-98-7, Molybdenum, uses 7440-02-0, Nickel, uses 7440-03-1,
  Niobium, uses 7440-36-0, Antimony, uses 7440-48-4, Cobalt, uses
  7440-50-8, Copper, uses
  RL: MOA (Modifier or additive use); USES (Uses)
  (method for manufg. automobile part having different local strengths
  using heat-treatment hardening steel plate)
IT 1297459-46-1, processes 1297459-50-7, processes 1374118-68-9
  1374118-70-3, processes 1374118-73-6
  RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM
  (Technical or engineered material use); PROC (Process); USES (Uses)
  (method for manufg. automobile part having different local strengths
  using heat-treatment hardening steel plate)

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L13 ANSWER 57 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN
ACCESSION NUMBER: 2012:340397 CAPLUS Full-text
DOCUMENT NUMBER: 156:316277
TITLE: Method for manufacture coated steel parts by hot
  forming
INVENTOR(S): Verloop, Willem Cornelis; Genderen, Marc Jacco Van;
  Tol, Ronald Theodoor Van; Hensen, Guido Cornelis;
  Loiseaux, Jenny
PATENT ASSIGNEE(S): Tata Steel IJmuiden BV, Neth.

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SOURCE: PCT Int. Appl., 15 pp.
 CODEN: PIXXD2
 DOCUMENT TYPE: Patent
 LANGUAGE: English
 FAMILY ACC. NUM. COUNT: 2
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2012028224	A1	20120308	WO 2011-EP3601	20110719
CA 2809187	A1	20120308	CA 2011-2809187	20110719
CN 103108964	A	20130515	CN 2011-80041783	20110719
CN 103108964	B	20150617		
EP 2611945	A1	20130710	EP 2011-734020	20110719
EP 2611945	B1	20180228		
KR 2013099042	A	20130905	KR 2013-7006164	20110719
JP 2013542315	T	20131121	JP 2013-525155	20110719
BR 112013004952	A2	20160816	BR 2013-112013004952	20110719
ES 2663005	T3	20180410	ES 2011-734020	20110719
US 9127329	B2	20150908	US 2013-13818041	20130220
US 20130153094	A1	20130620		
MX 2013002063	A	20130405	MX 2013-2063	20130221
IN 2013CN02333	A	20160603	IN 2013-CN2333	20130325
PRIORITY APPLN. INFO.:			EP 2010-9041	A 20100831
			WO 2011-EP3601	W 20110719

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB The invention relates to a method for manufg. a coated part having high mech. properties using hot forming techniques. The method comprises the following steps: providing an annealed steel strip or blank or pre-shaped part that was coated with a metal or alloy before the annealing; cutting a blank from the strip before or after the annealing; optionally forming a pre-shaped part from the blank; heating the blank or pre-shaped part to a temp. of 500° at an av. heating rate of 16°/s or more; further heating the blank or pre-shaped part to a temp. between 700 and 1000°; hot forming the blank or pre-shaped part into a hot formed part; hardening the hot formed part. The steel has the following compn., wt.%: C 0.1-0.5, Mn 0.5-3.0, Si 0.1-0.5, Cr <1.0, Ti <0.2, Al <0.1, P <0.1, S <0.05, B 0.0005-0.08, optionally Nb and V <0.1 each, and Fe - the balance. The coating is a zinc alloy comprising Al and Mg 1.0-5.0 wt.% each. The invention also relates to a method for manufg. a coated steel strip, blank or pre-shaped part, and to a coated steel strip, blank, or part and a hot formed part.

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
Cornelis, V	2010			WO 2010069588 A1	CAPLUS
Kazuh, K	2010			WO 2010005121 A1	CAPLUS
Thyssenkrupp Steel Ag	2009			DE 102008022400 A1	CAPLUS
Voestalpine Stahl GmbH	2010			EP 2177641 A1	CAPLUS
Volks	2010			WO 2010085983 A1	CAPLUS

IT 1360605-36-2

RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (method for manuf. coated steel parts by hot forming)

RN 1360605-36-2 CAPLUS

CN Iron alloy, base, Fe 94-99, Mn 0.5-3, Cr 0-1, C 0.1-0.5, Si 0.1-0.5, Ti 0-0.2, Al 0-0.1, B 0-0.1, Nb 0-0.1, P 0-0.1, V 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	94 - 99	7439-89-6
Mn	0.5 - 3	7439-96-5
Cr	0 - 1	7440-47-3
C	0.1 - 0.5	7440-44-0
Si	0.1 - 0.5	7440-21-3
Ti	0 - 0.2	7440-32-6
Al	0 - 0.1	7429-90-5
B	0 - 0.1	7440-42-8
Nb	0 - 0.1	7440-03-1
P	0 - 0.1	7723-14-0

IPCI C21D0008-04 [I]; C21D0009-46 [I]; C22C0038-02 [I]; C22C0038-04 [I];
 C21D0001-673 [I]; C21D0009-48 [I]
 IPCR C21D0008-04 [I]; C21D0001-673 [I]; C21D0009-46 [I]; C21D0009-48 [I];
 C22C0038-02 [I]; C22C0038-04 [I]
 CC 55-3 (Ferrous Metals and Alloys)
 ST steel strip coating hot deformation
 IT Plastic deformation
 (hot; method for manuf. coated steel parts by hot forming)
 IT 1360605-37-3
 RL: TEM (Technical or engineered material use); USES (Uses)
 (coating; method for manuf. coated steel parts by hot forming)
 IT 1360605-36-2
 RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (method for manuf. coated steel parts by hot forming)
 OS.CITING REF COUNT: 1 THERE ARE 1 CAPLUS RECORDS THAT CITE THIS RECORD
 (1 CITINGS)

L13 ANSWER 58 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN
 ACCESSION NUMBER: 2012:296418 CAPLUS Full-text
 DOCUMENT NUMBER: 156:290294
 TITLE: Steel sheet for hot pressing, its manufacturing method, and hot-pressed material
 INVENTOR(S): Nakajima, Seiji; Nakamaru, Hiroki
 PATENT ASSIGNEE(S): JFE Steel Corp., Japan
 SOURCE: Jpn. Kokai Tokkyo Koho, 10pp.
 CODEN: JKXXAF

DOCUMENT TYPE: Patent
 LANGUAGE: Japanese
 FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2012041610	A	20120301	JP 2010-184840	20100820
JP 5672849	B2	20150218		

PRIORITY APPLN. INFO.: JP 2010-184840 20100820

AB The steel sheet for hot pressing has an Al-Fe alloy coating layer contg. Fe 25-90%, Si 25-90%, and the balance of Al and inevitable impurities at an amt. of 10-200 g/m2 per one side of the steel sheet, and it is obtained from a steel sheet contg. C 0.15-0.5, Si 0.05-2.0, Mn 0.5-3, P ≤0.1, S ≤0.05, Al ≤0.1 and N ≤0.01% by hot-dipping in an Al system bath to form the Al-Fe alloy layer and then hot-dip coated with an Al layer. The steel sheet is heated to Ac3 to 1000°C and hot pressed.

IT 1356847-15-8
 RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (steel sheet for hot pressing, its manufg. method, and hot-pressed material)

RN 1356847-15-8 CAPLUS

CN Iron alloy, base, Fe 93-99, Mn 0.5-3, Si 0-2, Cr 0-1, C 0.2-0.5, Ti 0-0.2, Al 0-0.1, B 0-0.1, P 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	93 - 99	7439-89-6
Mn	0.5 - 3	7439-96-5
Si	0 - 2	7440-21-3
Cr	0 - 1	7440-47-3
C	0.2 - 0.5	7440-44-0
Ti	0 - 0.2	7440-32-6
Al	0 - 0.1	7429-90-5
B	0 - 0.1	7440-42-8
P	0 - 0.1	7723-14-0

IPCI C23C0002-12 [I]; C22C0038-60 [I]; C22C0038-00 [I]; C22C0021-00 [I];
C23C0002-20 [I]; C23C0002-28 [I]; C23C0002-12 [I]; C22C0038-60 [I];
C22C0038-00 [I]; C22C0021-00 [I]; C23C0002-20 [I]; C23C0002-28 [I]
IPCR C23C0002-12 [I]; C22C0021-00 [I]; C22C0038-00 [I]; C22C0038-60 [I];
C23C0002-20 [I]; C23C0002-28 [I]
CC 55-3 (Ferrous Metals and Alloys)
ST steel sheet aluminum iron alloy coating hot pressing
IT Hot-dip coating process
Hot-press sintering
(steel sheet for hot pressing, its manufg. method, and
hot-pressed material)
IT 1359940-94-5 1359940-95-6
RL: TEM (Technical or engineered material use); USES (Uses)
(coating; steel sheet for hot pressing, its manufg.
method, and hot-pressed material)
IT 1299468-35-1 1356847-15-8
RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM
(Technical or engineered material use); PROC (Process); USES (Uses)
(steel sheet for hot pressing, its manufg. method, and
hot-pressed material)
IT 7429-90-5, Aluminum, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(steel sheet for hot pressing, its manufg. method, and
hot-pressed material)
OS.CITING REF COUNT: 3 THERE ARE 3 CAPLUS RECORDS THAT CITE THIS RECORD
(3 CITINGS)

L13 ANSWER 59 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2012:274720 CAPLUS Full-text

DOCUMENT NUMBER: 156:290355

TITLE: Method for manufacturing steel product with
different strength using laser heat treatment

INVENTOR(S): Lim, Hui Jung; Nam, Seung Man; Lee, Bo Ryong; Kim,
Gyeong Bo; Jung, Yeon Il

PATENT ASSIGNEE(S): Hyundai Hysco Co., Ltd., S. Korea

SOURCE: Repub. Korea, 10pp.

CODEN: KRXXFC

DOCUMENT TYPE: Patent

LANGUAGE: Korean

FAMILY ACC. NUM. COUNT: 2

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
KR 1119173	B1	20120222	KR 2011-100174	20110930
WO 2013047939	A1	20130404	WO 2011-KR7703	20111017
CN 103842527	A	20140604	CN 2011-80073901	20111017
EP 2762577	A1	20140806	EP 2011-873399	20111017
EP 2762577	B1	20160427		
JP 2014534334	T	20141218	JP 2014-533173	20111017
JP 5898772	B2	20160406		
US 20140227553	A1	20140814	US 2014-14343955	20140310
US 20150211086	A1	20150730	US 2015-14683933	20150410
PRIORITY APPLN. INFO.:			KR 2011-100174	A 20110930
			WO 2011-KR7703	W 20111017
			US 2014-14343955	A3 20140310

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB The title method comprises: (1) prep. material composed of, by wt.%, C
0.1-0.5, Si 0.1-0.5, Mn 0.5-3.0, P <0.1, S <0.05, Cr 0.01-1.0, Al <0.1, Ti
<0.2, B 0.0005-0.08, and Fe and unavoidable impurities as balance, (2)
forming the material into a preset shape to obtain a formed body, and (3)
performing laser heat treatment for the part needing high strength on the
formed body to locally strengthen the high-strength part. In the method,
it is possible to perform local strengthening using laser heat treatment.

IT 1358890-23-9
RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM
(Technical or engineered material use); PROC (Process); USES (Uses)
(method for manufg. steel product with different strength
using laser heat treatment)

RN 1358890-23-9 CAPLUS

CN Iron alloy, base, Fe 94-99, Mn 0.5-3, Cr 0-1, C 0.1-0.5, Si 0.1-0.5, Ti
0-0.2, Al 0-0.1, B 0-0.1, P 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
=====+=====+=====		
Fe	94 - 99	7439-89-6
Mn	0.5 - 3	7439-96-5
Cr	0 - 1	7440-47-3
C	0.1 - 0.5	7440-44-0
Si	0.1 - 0.5	7440-21-3
Ti	0 - 0.2	7440-32-6
Al	0 - 0.1	7429-90-5
B	0 - 0.1	7440-42-8
P	0 - 0.1	7723-14-0

IPCI C21D0001-09 [I]; C22C0038-38 [I]; C23C0002-04 [I]

IPCR C21D0001-09 [I]; C22C0038-38 [I]; C23C0002-04 [I]

CC 55-12 (Ferrous Metals and Alloys)

ST ~~steel~~ molding laser heat treatment mech property

IT Heat treatment

(laser; method for manufg. ~~steel~~ product with different strength using laser heat treatment)

IT Lasers

Mechanical properties

Molding

(method for manufg. ~~steel~~ product with different strength using laser heat treatment)

IT 7429-90-5, Aluminum, processes 7440-66-6, Zinc, processes 11133-86-1 12635-57-3

RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)

(~~coating~~; method for manufg. ~~steel~~ product with different strength using laser heat treatment)

IT 1358890-23-9

RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)

(method for manufg. ~~steel~~ product with different strength using laser heat treatment)

L13 ANSWER 60 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2012:198116 CAPLUS Full-text

DOCUMENT NUMBER: 156:236353

TITLE: ~~Steel~~ sheet for hot stamping, and process for manufacturing hot-stamped ~~steel~~ products using

~~steel~~ sheet for hot stamping

INVENTOR(S): Nakajima, Seiji; Miyoshi, Tatsuya; Nakamaru, Hiroki

PATENT ASSIGNEE(S): JFE Steel Corporation, Japan

SOURCE: PCT Int. Appl., 23pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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WO 2012018014	A1	20120209	WO 2011-JP67680	20110802
JP 4883240	B1	20120222	JP 2011-157378	20110719
JP 2012233247	A	20121129		
CA 2806263	A1	20120209	CA 2011-2806263	20110802
CA 2806263	C	20140325		
AU 2011286715	A1	20130214	AU 2011-286715	20110802
AU 2011286715	B2	20131205		
CN 103038398	A	20130410	CN 2011-80037013	20110802
CN 103038398	B	20141203		
KR 2013045898	A	20130506	KR 2013-7001759	20110802
KR 1361605	B1	20140211		
EP 2602359	A1	20130612	EP 2011-814639	20110802
EP 2602359	B1	20181010		
ZA 2013000566	A	20140326	ZA 2013-566	20110802
RU 2520847	C1	20140627	RU 2013-104193	20110802
MY 154711	A	20150715	MY 2013-333	20110802
BR 112013002586	A2	20160607	BR 2013-112013002586	20110802

BR 112013002586	B1	20201027		
TW I451004	B	20140901	TW 2011-127564	20110803
US 20130122322	A1	20130516	US 2013-13813328	20130130
US 9023488	B2	20150505		
IN 2013KN00256	A	20130705	IN 2013-KN256	20130130
IN 292658	B	20180209		
MX 2013001343	A	20130322	MX 2013-1343	20130201
PRIORITY APPLN. INFO.:			JP 2010-174957	A 20100804
			JP 2011-553	A 20110105
			JP 2011-91633	A 20110418
			JP 2011-157378	A 20110719
			WO 2011-JP67680	W 20110802

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB The purpose of the present invention is to provide a ~~steel~~ sheet which is to be hot-stamped and which can yield hot-stamped products with excellent pitting corrosion resistance and a process for manufg. hot-stamped ~~steel~~ products using the ~~steel~~ sheet. A ~~steel~~ sheet for hot stamping, characterized by bearing, successively on the surface of a substrate ~~steel~~ sheet, a plating layer (I) which contains at least 60% by mass of Ni, with the balance consisting of Zn and unavoidable impurities, and which has a plating wt. of 0.01 to 5 g/m2, and a plating layer (II) which contains 10 to 25% by mass of Ni, with the balance consisting of Zn and unavoidable impurities, and which has a plating wt. of 10 to 90 g/m2.

RETABLER

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
Kobe Steel Ltd	1995			JP 07166371 A	CAPLUS
Sumitomo Metal Industri	1999			JP 11-350198 A	CAPLUS
Sumitomo Metal Industri	2003			CN 101144162 A	CAPLUS
Sumitomo Metal Industri	2003			EP 1439240 A1	CAPLUS
Sumitomo Metal Industri	2003			CN 1575348 A	CAPLUS
Sumitomo Metal Industri	2003			WO 2003035922 A1	
Sumitomo Metal Industri	2003			JP 2003129209 A	CAPLUS
Sumitomo Metal Industri	2003			JP 200373774 A	
Sumitomo Metal Industri	2003			US 20040166360 A1	CAPLUS
Sumitomo Metal Industri	2003			US 20050252262 A1	
Sumitomo Metal Industri	2003			KR 20060090309 A	
Sumitomo Metal Industri	2003			AT 468416 T	CAPLUS
Sumitomo Metal Industri	2003			DE 60236447 D	
United Technologies Cor	2004			SG 134989 A	CAPLUS
United Technologies Cor	2004			EP 1405934 A2	CAPLUS
United Technologies Cor	2004			CN 1497065 A	CAPLUS
United Technologies Cor	2004			KR 20040026618 A	
United Technologies Cor	2004			US 20040058189 A1	CAPLUS
United Technologies Cor	2004			JP 2004115914 A	CAPLUS
United Technologies Cor	2004			US 20050058848 A1	CAPLUS
United Technologies Cor	2004			CA 2441718 A	CAPLUS
United Technologies Cor	2004			CA 2441718 A1	CAPLUS
United Technologies Cor	2004			TW 276707 B	
United Technologies Cor	2004			BR 304193 A	
United Technologies Cor	2004			AT 397683 T	CAPLUS
United Technologies Cor	2004			DE 60321435 D	

IT 1356847-15-8

RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(~~steel~~ sheet for hot stamping, and process for manufg.
hot-stamped ~~steel~~ products using ~~steel~~ sheet for
hot stamping)

RN 1356847-15-8 CAPLUS

CN Iron alloy, base, Fe 93-99, Mn 0.5-3, Si 0-2, Cr 0-1, C 0.2-0.5, Ti 0-0.2, Al 0-0.1, B 0-0.1, P 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	93 - 99	7439-89-6
Mn	0.5 - 3	7439-96-5
Si	0 - 2	7440-21-3
Cr	0 - 1	7440-47-3
C	0.2 - 0.5	7440-44-0

Ti	0	-	0.2	7440-32-6
Al	0	-	0.1	7429-90-5
B	0	-	0.1	7440-42-8
P	0	-	0.1	7723-14-0

IPCI C25D0005-26 [I]; B21D0022-20 [I]; C22C0018-00 [I]; C22C0019-03 [I];
C22C0038-00 [I]; C22C0038-60 [I]
IPCR C25D0005-26 [I]; B21D0022-20 [I]; C22C0018-00 [I]; C22C0019-03 [I];
C22C0038-00 [I]; C22C0038-60 [I]
CC 55-6 (Ferrous Metals and Alloys)
Section cross-reference(s): 72
ST hot stamping ~~steel~~ sheet nickel zinc alloy electrodeposition
IT Metalworking
(stamping; ~~steel~~ sheet for hot stamping, and process for
manufg. hot-stamped ~~steel~~ products using ~~steel~~
sheet for hot stamping)
IT Electrodeposition
Pitting corrosion
(~~steel~~ sheet for hot stamping, and process for manufg.
hot-stamped ~~steel~~ products using ~~steel~~ sheet for
hot stamping)
IT Polysiloxanes
RL: TEM (Technical or engineered material use); USES (Uses)
(~~steel~~ sheet for hot stamping, and process for manufg.
hot-stamped ~~steel~~ products using ~~steel~~ sheet for
hot stamping)
IT 7440-02-0, Nickel, uses 238084-01-0
RL: TEM (Technical or engineered material use); USES (Uses)
(~~coating~~; ~~steel~~ sheet for hot stamping, and process
for manufg. hot-stamped ~~steel~~ products using ~~steel~~
sheet for hot stamping)
IT 7631-86-9, Colloidal silica, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(colloidal; ~~steel~~ sheet for hot stamping, and process for
manufg. hot-stamped ~~steel~~ products using ~~steel~~
sheet for hot stamping)
IT 1299468-35-1 1356847-15-8
RL: PEP (Physical, engineering or chemical process); TEM (Technical or
engineered material use); PROC (Process); USES (Uses)
(~~steel~~ sheet for hot stamping, and process for manufg.
hot-stamped ~~steel~~ products using ~~steel~~ sheet for
hot stamping)
IT 3227-63-2, Zirconium acetate 11138-49-1, Sodium aluminate 12627-14-4,
Lithium silicate 39302-37-9, Lithium titanate
RL: TEM (Technical or engineered material use); USES (Uses)
(~~steel~~ sheet for hot stamping, and process for manufg.
hot-stamped ~~steel~~ products using ~~steel~~ sheet for
hot stamping)
OS.CITING REF COUNT: 5 THERE ARE 5 CAPLUS RECORDS THAT CITE THIS RECORD
(5 CITINGS)

L13 ANSWER 61 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN
ACCESSION NUMBER: 2012:169521 CAPLUS Full-text
DOCUMENT NUMBER: 156:209484
TITLE: Heat-treated hardened ~~steel~~ with excellent impact
performance, and method for manufacturing heat-treated
hardened type component using the same
INVENTOR(S): Nam, Seung Man; Lim, Hui Jung; Lee, Seung Ha; Kim,
Dong Eun; Lee, Bo Ryong; Kim, Yeong Jin; Moon, Man Bin
PATENT ASSIGNEE(S): Hyundai Hysco Co., Ltd., S. Korea
SOURCE: Repub. Korea, 14pp.; Chemical Indexing Equivalent to
158:137246 (WO)
CODEN: KRXXFC
DOCUMENT TYPE: Patent
LANGUAGE: Korean
FAMILY ACC. NUM. COUNT: 2
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
KR 1108838	B1	20120131	KR 2011-64159	20110630
WO 2013002441	A1	20130103	WO 2011-KR4785	20110630

CN 103534372	A	20140122	CN 2011-80070743	20110630
CN 103534372	B	20160210		
EP 2728027	A1	20140507	EP 2011-868749	20110630
EP 2728027	B1	20190116		
US 20140083574	A1	20140327	US 2013-14115516	20131104
US 20160281190	A1	20160929	US 2016-15173200	20160603
PRIORITY APPLN. INFO.:			KR 2011-64159	A 20110630
			WO 2011-KR4785	W 20110630
			US 2013-14115516	A3 20131104

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB The title heat-treated hardened ~~steel~~ contains (by wt.%) C 0.12-0.8, Cr 0.01-2, Mo <0.2, B 0.0005-0.08, Sb <1.0, at least one of Ti and Nb <0.2, Si, Mn, Al and Ni satisfying one of content formulas i to iii (content formula i: Si 0.5-3, Mn 1-10 and Al 0.05-2; content formula ii: Si 0.5-3, Mn 1-10, Al <0.1 and Ni 0.01-8; content formula iii: Si 0.5-3, Mn 1-10, Al 0.1-2.5 and Ni 0.01-8), and Fe and other unavoidable impurities as balance. The heat-treated hardened ~~steel~~ has improved impact performance, tensile strength ≥ 1000 MPa, yield strength ≥ 800 MPa and elongation $\geq 10\%$. The heat-treated hardened ~~steel~~ has optionally a coating layer of Al-Si, Zn and oxidn.-resistant materials.

IT 1356391-47-3 1356391-49-5 1356391-50-8
 RL: PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)
 (heat-treated hardened ~~steel~~ with excellent impact performance, and method for manufg. heat-treated hardened type component using the same)

RN 1356391-47-3 CAPLUS

CN Iron alloy, base, Fe 80-98, Mn 1-10, Si 0.5-3, Al 0-2, Cr 0-2, Sb 0-1, C 0.1-0.8, Mo 0-0.2, Nb 0-0.2, Ti 0-0.2, B 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	80 - 98	7439-89-6
Mn	1 - 10	7439-96-5
Si	0.5 - 3	7440-21-3
Al	0 - 2	7429-90-5
Cr	0 - 2	7440-47-3
Sb	0 - 1	7440-36-0
C	0.1 - 0.8	7440-44-0
Mo	0 - 0.2	7439-98-7
Nb	0 - 0.2	7440-03-1
Ti	0 - 0.2	7440-32-6
B	0 - 0.1	7440-42-8

RN 1356391-49-5 CAPLUS

CN Iron alloy, base, Fe 74-98, Mn 1-10, Ni 0-8, Si 0.5-3, Cr 0-2, Sb 0-1, C 0.1-0.8, Mo 0-0.2, Nb 0-0.2, Ti 0-0.2, Al 0-0.1, B 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	74 - 98	7439-89-6
Mn	1 - 10	7439-96-5
Ni	0 - 8	7440-02-0
Si	0.5 - 3	7440-21-3
Cr	0 - 2	7440-47-3
Sb	0 - 1	7440-36-0
C	0.1 - 0.8	7440-44-0
Mo	0 - 0.2	7439-98-7
Nb	0 - 0.2	7440-03-1
Ti	0 - 0.2	7440-32-6
Al	0 - 0.1	7429-90-5
B	0 - 0.1	7440-42-8

RN 1356391-50-8 CAPLUS

CN Iron alloy, base, Fe 72-98, Mn 1-10, Ni 0-8, Si 0.5-3, Al 0.1-2.5, Cr 0-2, Sb 0-1, C 0.1-0.8, Mo 0-0.2, Nb 0-0.2, Ti 0-0.2, B 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	72 - 98	7439-89-6
Mn	1 - 10	7439-96-5
Ni	0 - 8	7440-02-0
Si	0.5 - 3	7440-21-3
Cr	0 - 2	7440-47-3
Sb	0 - 1	7440-36-0
C	0.1 - 0.8	7440-44-0
Mo	0 - 0.2	7439-98-7
Nb	0 - 0.2	7440-03-1
Ti	0 - 0.2	7440-32-6
Al	0 - 0.1	7429-90-5
B	0 - 0.1	7440-42-8

Fe	72	-	98	7439-89-6
Mn	1	-	10	7439-96-5
Ni	0	-	8	7440-02-0
Si	0.5	-	3	7440-21-3
Al	0.1	-	2.5	7429-90-5
Cr	0	-	2	7440-47-3
Sb	0	-	1	7440-36-0
C	0.1	-	0.8	7440-44-0
Mo	0	-	0.2	7439-98-7
Nb	0	-	0.2	7440-03-1
Ti	0	-	0.2	7440-32-6
B	0	-	0.1	7440-42-8

IPCI C22C0038-00 [I]; C21D0009-46 [I]; C21D0008-00 [I]; C23C0002-04 [I]
 IPCR C22C0038-00 [I]; C21D0008-00 [I]; C21D0009-46 [I]; C23C0002-04 [I]
 CC 55-3 (Ferrous Metals and Alloys)
 ST thermally hardened steel impact resistance strength
 IT Elongation, mechanical
 Galvanizing
 Heat treatment
 Tensile strength
 Yield strength
 (heat-treated hardened steel with excellent impact performance, and method for manufg. heat-treated hardened type component using the same)
 IT 1356391-47-3 1356391-49-5 1356391-50-8
 RL: PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)
 (heat-treated hardened steel with excellent impact performance, and method for manufg. heat-treated hardened type component using the same)
 IT 7440-66-6, Zinc, uses 11099-22-2
 RL: TEM (Technical or engineered material use); USES (Uses)
 (heat-treated hardened steel with excellent impact performance, and method for manufg. heat-treated hardened type component using the same)

L13 ANSWER 62 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2010:880522 CAPLUS Full-text
 DOCUMENT NUMBER: 153:180874
 TITLE: Process for manufacture of high tensile strength hot-dip galvanized steel sheet with uniform galvanized coating

INVENTOR(S): Yamanaka, Shintaro
 PATENT ASSIGNEE(S): Nippon Steel Corp., Japan
 SOURCE: Jpn. Kokai Tokkyo Koho, 11pp.
 CODEN: JKXXAF

DOCUMENT TYPE: Patent
 LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2010156029	A	20100715	JP 2009-199	20090105
JP 5594559	B2	20140924		

PRIORITY APPLN. INFO.: JP 2009-199 20090105

AB The base steel comprises C 0.001-0.3, Si 0.5-2.0, Mn 1.0-3.0, P 0.002-0.2, S 0.001-0.03, Al 0.005-1 wt.%, and balance Fe. The manufg. process includes continuous hot-dip galvanization. When a steel sheet is put into plating bath, the sheet temp. is 100-180° higher than the plating bath temp. The plating bath temp. is kept 440-470°. Optionally the base steel contains total 0.05-1.0 wt.% Ti, Nb, B, Cr, and/or Mo. The galvanized steel sheet has uniform galvanized coating and good appearance.

IT 1234653-91-8
 RL: TEM (Technical or engineered material use); USES (Uses)
 (base steel; manuf. of high tensile strength hot-dip galvanized steel sheet with uniform galvanized coating)

RN 1234653-91-8 CAPLUS

CN Iron alloy, base, Fe 92-98, Mn 1-3, Si 0.5-2, Al 0-1, B 0-1, Cr 0-1, Mo 0-1, Nb

0-1,Ti 0-1,C 0-0.3,P 0-0.2 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	92 - 98	7439-89-6
Mn	1 - 3	7439-96-5
Si	0.5 - 2	7440-21-3
Al	0 - 1	7429-90-5
B	0 - 1	7440-42-8
Cr	0 - 1	7440-47-3
Mo	0 - 1	7439-98-7
Nb	0 - 1	7440-03-1
Ti	0 - 1	7440-32-6
C	0 - 0.3	7440-44-0
P	0 - 0.2	7723-14-0

IPCI C23C0002-06 [I]; C23C0002-40 [I]; C22C0038-00 [I]; C22C0038-06 [I];
C22C0038-38 [I]; C21D0009-46 [I]; C23C0002-06 [I]; C23C0002-40 [I];
C22C0038-00 [I]; C22C0038-06 [I]; C22C0038-38 [I]; C21D0009-46 [I]
IPCR C23C0002-06 [I]; C21D0009-46 [I]; C22C0038-00 [I]; C22C0038-06 [I];
C22C0038-38 [I]; C23C0002-40 [I]
CC 55-6 (Ferrous Metals and Alloys)
Section cross-reference(s): 56
ST high tensile strength hot dip galvanized steel
IT Hot-dip galvanizing
(continuous; manuf. of high tensile strength hot-dip galvanized
steel sheet with uniform galvanized coating)
IT Galvanized steel
RL: TEM (Technical or engineered material use); USES (Uses)
(hot-dip; manuf. of high tensile strength hot-dip galvanized
steel sheet with uniform galvanized coating)
IT 12697-71-1, uses 57923-89-4 144920-07-0, uses 797752-03-5, uses
1234653-91-8 1234653-92-9, uses 1234653-94-1, uses
1234653-96-3 1234653-97-4, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(base steel; manuf. of high tensile strength hot-dip
galvanized steel sheet with uniform galvanized
coating)

L13 ANSWER 63 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2010:267926 CAPLUS Full-text

DOCUMENT NUMBER: 152:316673

TITLE: Aluminum-containing copper alloy-coated steel
member and its manufacture by thermal diffusion of
aluminum

INVENTOR(S): Fujii, Takahiro; Tadano, Masayoshi; Hiraoka, Masashi;
Izumi, Keiji

PATENT ASSIGNEE(S): Nisshin Steel Co., Ltd., Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 9pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2010047791	A	20100304	JP 2008-211413	20080820
JP 5561920	B2	20140730		

PRIORITY APPLN. INFO.: JP 2008-211413 20080820

AB The steel member has a Cu alloy coating layer with thickness 0.5-100
µm and Al content 1-15 wt.%. The coating layer may have compn. of
Al 1-15, Ni ≤7, Fe ≤6, Cr ≤2, Mn ≤2 wt.%, and
balance Cu at the center of the thickness. The manufg. process includes
plating a steel substrate contg. 1-20 wt.% Al with Cu and heating at
600-1050° in nonoxidizing atm. for diffusion of Al from the
substrate to the Cu plating layer. The Cu plating layer may be formed
on a Ni undercoating layer by electrodeposition. The coating layer
has good adhesion to the substrate. Al-contg. Cu alloy-coated steel
members can be manufd. at a low cost and they have excellent resistance to
oxidn., corrosion, and wear.

IT 1213779-75-9
 RL: PEP (Physical, engineering or chemical process); PROC (Process)
 (substrate before diffusion; manuf. of Al-contg. Cu alloy-coated steel members by thermal diffusion of Al from steel substrate to Cu plating layer)

RN 1213779-75-9 CAPLUS

CN Iron alloy, base, Fe 0-99,Cr 0-35,Ni 0-24,Al 1-20,Cu 0-6,Mn 0-5,Mo 0-5,Si 0-3,B 0-1,C 0-1,Nb 0-1,Ti 0-1,V 0-1,N 0-0.5,Ca 0-0.1,Mg 0-0.1,misch metal 0-0.1,P 0-0.1,Y 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
=====+=====+=====		
Fe	0 - 99	7439-89-6
Cr	0 - 35	7440-47-3
Ni	0 - 24	7440-02-0
Al	1 - 20	7429-90-5
Cu	0 - 6	7440-50-8
Mn	0 - 5	7439-96-5
Mo	0 - 5	7439-98-7
Si	0 - 3	7440-21-3
B	0 - 1	7440-42-8
C	0 - 1	7440-44-0
Nb	0 - 1	7440-03-1
Ti	0 - 1	7440-32-6
V	0 - 1	7440-62-2
N	0 - 0.5	17778-88-0
Ca	0 - 0.1	7440-70-2
Mg	0 - 0.1	7439-95-4
Misch metal	0 - 0.1	8049-20-5
P	0 - 0.1	7723-14-0
Y	0 - 0.1	7440-65-5

IPCI C23C0010-28 [I]; C22C0009-01 [I]; C22C0009-06 [I]; C22C0009-00 [I];
 C22C0009-05 [I]; C22C0038-00 [I]; C22C0038-58 [I]; C21D0009-46 [I];
 C22C0038-06 [I]; C23C0010-28 [I]; C22C0009-01 [I]; C22C0009-06 [I];
 C22C0009-00 [I]; C22C0009-05 [I]; C22C0038-00 [I]; C22C0038-58 [I];
 C21D0009-46 [I]; C22C0038-06 [I]; C25D0005-26 [I]; C25D0005-50 [I]

IPCR C23C0010-28 [I]; C21D0009-46 [I]; C22C0009-00 [I]; C22C0009-01 [I];
 C22C0009-05 [I]; C22C0009-06 [I]; C22C0038-00 [I]; C22C0038-06 [I];
 C22C0038-58 [I]; C25D0005-26 [I]; C25D0005-50 [I]

CC 55-6 (Ferrous Metals and Alloys)

Section cross-reference(s): 56

ST aluminum copper alloy coated steel manuf diffusion

IT Coating materials

(abrasion-resistant; manuf. of Al-contg. Cu alloy-coated steel members by thermal diffusion of Al from steel substrate to Cu plating layer)

IT Abrasion-resistant materials

(coatings; manuf. of Al-contg. Cu alloy-coated steel members by thermal diffusion of Al from steel substrate to Cu plating layer)

IT Anticorrosive coating materials

Thermal diffusion

(manuf. of Al-contg. Cu alloy-coated steel members by thermal diffusion of Al from steel substrate to Cu plating layer)

IT Chemically resistant coating materials

(oxidation-resistant; manuf. of Al-contg. Cu alloy-coated steel members by thermal diffusion of Al from steel substrate to Cu plating layer)

IT 1213779-71-5P

RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(coating; manuf. of Al-contg. Cu alloy-coated steel members by thermal diffusion of Al from steel substrate to Cu plating layer)

IT 1213779-73-7 1213779-74-8

RL: MSC (Miscellaneous)

(coating; manuf. of Al-contg. Cu alloy-coated steel members by thermal diffusion of Al from steel substrate to Cu plating layer)

IT 7440-50-8, Copper, processes
 RL: PEP (Physical, engineering or chemical process); PROC (Process)
 (plating layer; manuf. of Al-contg. Cu alloy-coated
 steel members by thermal diffusion of Al from steel
 substrate to Cu plating layer)

IT 12597-69-2, Steel, uses
 RL: TEM (Technical or engineered material use); USES (Uses)
 (substrate after diffusion; manuf. of Al-contg. Cu alloy-coated
 steel members by thermal diffusion of Al from steel
 substrate to Cu plating layer)

IT 1197343-32-0 1213779-75-9 1213779-76-0 1213779-77-1
 RL: PEP (Physical, engineering or chemical process); PROC (Process)
 (substrate before diffusion; manuf. of Al-contg. Cu alloy-
 coated steel members by thermal diffusion of Al from
 steel substrate to Cu plating layer)

IT 7440-02-0, Nickel, uses
 RL: TEM (Technical or engineered material use); USES (Uses)
 (undercoating layer; manuf. of Al-contg. Cu alloy-
 coated steel members by thermal diffusion of Al from
 steel substrate to Cu plating layer)

OS.CITING REF COUNT: 1 THERE ARE 1 CAPLUS RECORDS THAT CITE THIS RECORD
 (1 CITINGS)

L13 ANSWER 64 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2009:1460891 CAPLUS Full-text
 DOCUMENT NUMBER: 151:574971
 TITLE: Composite with a ballistic protective effect
 INVENTOR(S): Becker, Jens-Ulrik; Hofmann, Harald; Hoeckling,
 Christian; Kern, Andreas; Schriever, Udo; Tamler,
 Horst Walter; Tschersich, Hans-Joachim
 PATENT ASSIGNEE(S): ThyssenKrupp Steel Europe A.-G., Germany
 SOURCE: Eur. Pat. Appl., 18pp.
 CODEN: EPXXDW
 DOCUMENT TYPE: Patent
 LANGUAGE: German
 FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
EP 2123447	A1	20091125	EP 2008-103856	20080507
EP 2123447	B1	20181226		
ES 2709433	T3	20190416	ES 2008-103856	20080507
US 20120174752	A1	20120712	US 2009-436415	20090506
US 8545993	B2	20131001		

PRIORITY APPLN. INFO.: EP 2008-103856 A 20080507

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB The composite with a ballistic protective effect contains a 1st outer
 layer made of an alloy steel and ≥ 1 2nd layer made of an
 alloy steel which is arranged below the 1st layer. The 1st alloy
 steel contains C 0.06-1.05, Si 0.05-1.65, Mn 0.3-2.65, Al 0.015-1.55, Cr
 ≤ 1.2 , Ti ≤ 0.13 , Mo ≤ 0.7 , Nb ≤ 0.1 , B
 ≤ 0.005 , P ≤ 0.08 , S ≤ 0.01 , Ni ≤ 4.0 , and V
 $\leq 0.5\%$. The 2nd alloy steel contains C ≤ 1.0 , Si
 ≤ 8.0 , Mn 0.05-30.0, Al ≤ 10.0 , Cr ≤ 10.0 , Ti
 ≤ 0.5 , Nb ≤ 0.5 , B ≤ 0.1 , V ≤ 0.5 , Mo ≤ 5.0 ,
 P ≤ 0.1 , S ≤ 0.03 , N ≤ 0.3 , Ni ≤ 8.0 , Cu
 ≤ 3.0 , and Sn $\leq 0.04\%$. The 2nd layer has a higher
 elongation than that of the 1st layer. Typically, the composite is
 produced by roll plating. The composite has enhanced ballistic
 properties; decreased wall thicknesses of parts are required. The
 composite is esp. suitable for motor vehicles and structural parts.

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
Allegheny Ludlum Corp	1996			EP 0731332 A	CAPLUS
Boehler & Co Ag Geb	1976			GB 1444063 A	CAPLUS
Creusot Loire	1992			EP 0509854 A	CAPLUS
Grell Karl-Ludwig	1995			US 5418074 A	CAPLUS
Junius Hans-Toni	2003			US 20030029530 A1	CAPLUS
Leger Jacques	1993			US 5213905 A	CAPLUS

Liebowitz, B	1948			US 2438759 A	
Nippon Steel Corp	1994			JP 06093370 A	CAPLUS
Pircher Hans	1987			US 4645720 A	CAPLUS
Thyssenkrupp Steel Ag	2006			DE 102005006606 B3	
Voest Alpine Ag	1983			AT 372113 B	
Voest Alpine Ag	1987			EP 0247020 A	CAPLUS

IT 1196665-70-9

RL: TEM (Technical or engineered material use); USES (Uses)
(in prodn. of composite with ballistic protective effect)

RN 1196665-70-9 CAPLUS

CN Iron alloy, base, Fe 23-100, Mn 0-30, Al 0-10, Cr 0-10, Ni 0-8, Si 0-8, Mo 0-5, Cu 0-3, C 0-1, Nb 0-0.5, Ti 0-0.5, V 0-0.5, N 0-0.3, B 0-0.1, P 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	23 - 100	7439-89-6
Mn	0 - 30	7439-96-5
Al	0 - 10	7429-90-5
Cr	0 - 10	7440-47-3
Ni	0 - 8	7440-02-0
Si	0 - 8	7440-21-3
Mo	0 - 5	7439-98-7
Cu	0 - 3	7440-50-8
C	0 - 1	7440-44-0
Nb	0 - 0.5	7440-03-1
Ti	0 - 0.5	7440-32-6
V	0 - 0.5	7440-62-2
N	0 - 0.3	17778-88-0
B	0 - 0.1	7440-42-8
P	0 - 0.1	7723-14-0

IPCI B32B0015-01 [I]; C21D0009-42 [I]; F41H0005-04 [I]

IPCR B32B0015-01 [I]; C21D0009-42 [I]; F41H0005-04 [I]

CC 55-4 (Ferrous Metals and Alloys)

ST ~~steel~~ laminated composite

IT 1196665-67-4 1196665-70-9 1196665-73-2, uses 1196665-75-4

1196665-77-6 1196665-79-8

RL: TEM (Technical or engineered material use); USES (Uses)
(in prodn. of composite with ballistic protective effect)

OS.CITING REF COUNT: 8 THERE ARE 8 CAPLUS RECORDS THAT CITE THIS RECORD
(8 CITINGS)

L13 ANSWER 65 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2009:887390 CAPLUS Full-text

DOCUMENT NUMBER: 151:202847

TITLE: Method for manufacturing stamped ~~coated steel~~ products

INVENTOR(S): Drillet, Pascal; Spehner, Dominique; Kefferstein, Ronald

PATENT ASSIGNEE(S): ArcelorMittal France, Fr.

SOURCE: PCT Int. Appl., 27pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 2

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2009090555	A1	20090723	WO 2009-IB322	20090112
WO 2009090443	A1	20090723	WO 2008-IB79	20080115
CA 2713685	A1	20090723	CA 2009-2713685	20090112
CA 2713685	C	20120320		
KR 2010112602	A	20101019	KR 2010-7017170	20090112
EP 2242863	A1	20101027	EP 2009-701846	20090112
EP 2242863	B1	20140108		
CN 101910426	A	20101208	CN 2009-80102269	20090112
JP 2011512455	T	20110421	JP 2010-542705	20090112
JP 6146941	B2	20170614		
KR 2013008657	A	20130122	KR 2013-7000047	20090112
KR 1508861	B1	20150407		

RU 2499847	C2	20131127	RU 2010-134002	20090112
ES 2448551	T3	20140314	ES 2009-701846	20090112
BR 2009007223	A2	20150714	BR 2009-7223	20090112
BR 2009007223	B1	20170606		
MX 2010007428	A	20100903	MX 2010-7428	20100705
IN 2010CN04187	A	20110107	IN 2010-CN4187	20100706
IN 289869	B	20171201		

PRIORITY APPLN. INFO.:

WO 2008-IB79	A	20080115
KR 2010-7017170	A3	20090112
WO 2009-IB322	W	20090112

AB The invention relates to a process for making a hot stamped coated steel sheet product. The methods comprises the steps of pre-coating a steel strip or sheet by aluminum or aluminum-iron-silicon alloy, cutting said pre-coated strip to obtain a pre-coated steel blank, heating the blank in a furnace preheated to a temp. and during a time defined by diagram according to thickness, at a heating rate Vc of 4-12°/s between 20 and 700° and at a heating rate Vc' of 1.5 and 6°/s between 500 and 700°, to obtain a heated blank. Further steps include transferring said heated blank to a die, hot stamping, cooling at a mean rate Vr of at least 30°/s between the exit of the heated blank from the furnace and down to 400°.

RETABALE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
Kefferstein Ronald	2001			US 20010042393 A1	
Lorraine Laminage	2000			EP 0971044 A	CAPLUS
Nissan Motor	2004			EP 1380666 A	CAPLUS
Usinor	2003			FR 2833504 A	CAPLUS

IT 1173986-65-6

RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(method for manufg. stamped coated steel products)

RN 1173986-65-6 CAPLUS

CN Iron alloy, base, Fe 94-99, Mn 0.5-3, Cr 0-1, C 0.2-0.5, Si 0.1-0.5, Ti 0-0.2, Al 0-0.1, B 0-0.1, Cu 0-0.1, Ni 0-0.1, P 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	94 - 99	7439-89-6
Mn	0.5 - 3	7439-96-5
Cr	0 - 1	7440-47-3
C	0.2 - 0.5	7440-44-0
Si	0.1 - 0.5	7440-21-3
Ti	0 - 0.2	7440-32-6
Al	0 - 0.1	7429-90-5
B	0 - 0.1	7440-42-8
Cu	0 - 0.1	7440-50-8
Ni	0 - 0.1	7440-02-0
P	0 - 0.1	7723-14-0

IPCI C21D0008-02 [I]; C22C0038-32 [I]; C22C0038-38 [I]; B21D0053-26 [I]; C23C0002-12 [I]

IPCR C21D0008-02 [I]; B21D0053-26 [I]; C22C0038-32 [I]; C22C0038-38 [I]; C23C0002-12 [I]

CC 55-11 (Ferrous Metals and Alloys)

ST steel aluminum coating hot stamping

IT Hot-dip coating process

(method for manufg. stamped coated steel products)

IT Metalworking

(stamping, hot; method for manufg. stamped coated steel products)

IT 1173986-72-5

RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(interdiffusion layer; method for manufg. stamped coated steel products)

IT 1173986-68-9

RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(intermediate and superficial layer; method for manufg.)

IT stamped coated steel products)
 1173986-67-8 1173986-76-9
 RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (intermediate layer; method for manufg. stamped coated steel products)
 IT 1173986-70-3 1173986-74-7
 RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (intermetallic layer; method for manufg. stamped coated steel products)
 IT 952598-91-3 1058743-89-7
 RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (main coating; method for manufg. stamped coated steel products)
 IT 1173986-65-6 1173986-66-7, processes
 RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (method for manufg. stamped coated steel products)
 IT 1173986-77-0
 RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (superficial layer; method for manufg. stamped coated steel products)

L13 ANSWER 66 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2009:887389 CAPLUS Full-text
 DOCUMENT NUMBER: 151:202846
 TITLE: Method for manufacturing stamped coated steel products
 INVENTOR(S): Drillet, Pascal; Spehner, Dominique; Kefferstein, Ronald
 PATENT ASSIGNEE(S): ArcelorMittal France, Fr.
 SOURCE: PCT Int. Appl., 27pp.
 CODEN: PIXXD2
 DOCUMENT TYPE: Patent
 LANGUAGE: English
 FAMILY ACC. NUM. COUNT: 2
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2009090443	A1	20090723	WO 2008-IB79	20080115
CA 2713685	A1	20090723	CA 2009-2713685	20090112
CA 2713685	C	20120320		
WO 2009090555	A1	20090723	WO 2009-IB322	20090112
KR 2010112602	A	20101019	KR 2010-7017170	20090112
EP 2242863	A1	20101027	EP 2009-701846	20090112
EP 2242863	B1	20140108		
CN 101910426	A	20101208	CN 2009-80102269	20090112
JP 2011512455	T	20110421	JP 2010-542705	20090112
JP 6146941	B2	20170614		
KR 2013008657	A	20130122	KR 2013-7000047	20090112
KR 1508861	B1	20150407		
RU 2499847	C2	20131127	RU 2010-134002	20090112
ES 2448551	T3	20140314	ES 2009-701846	20090112
CN 104651590	A	20150527	CN 2014-10799052	20090112
BR 2009007223	A2	20150714	BR 2009-7223	20090112
BR 2009007223	B1	20170606		
ZA 2010004497	A	20110330	ZA 2010-4497	20100625
MX 2010007428	A	20100903	MX 2010-7428	20100705
IN 2010CN04187	A	20110107	IN 2010-CN4187	20100706
IN 289869	B	20171201		
US 20110006491	A1	20110113	US 2010-834162	20100712
US 8733142	B2	20140527		
US 8066829	B2	20111129	US 2011-13118077	20110527
US 20120064362	A1	20120315	US 2011-13301403	20111121
US 8440323	B2	20130514		
JP 2017159364	A	20170914	JP 2017-40554	20170303
JP 6588047	B2	20191009		
PRIORITY APPLN. INFO.:			WO 2008-IB79	A 20080115
			CN 2009-80102269	A3 20090112

JP 2010-542705 A3 20090112
KR 2010-7017170 A3 20090112
WO 2009-IB322 W 20090112
US 2010-834162 A1 20100712

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB The invention relates to a process for making a hot stamped coated steel sheet product. The methods comprises the steps of pre-coating a steel strip or sheet by aluminum or aluminum-iron-silicon alloy, cutting said pre-coated strip to obtain a pre-coated steel blank, heating the blank in a furnace preheated to a temp. and during a time defined by diagram according to thickness, at a heating rate Vc of 4-12°/s between 20 and 700° and at a heating rate Vc' of 1.5 and 6°/s between 500 and 700°, to obtain a heated blank. Further steps include transferring said heated blank to a die, hot stamping, cooling at a mean rate Vr of at least 30°/s between the exit of the heated blank from the furnace and down to 400°.

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
Kefferstein Ronald	2001			US 20010042393 A1	
Lorraine Laminage	2000			EP 0971044 A	CAPLUS
Nissan Motor	2004			EP 1380666 A	CAPLUS
Usinor	2003			FR 2833504 A	CAPLUS

IT 1173986-65-6
RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(method for manufg. stamped coated steel products)

RN 1173986-65-6 CAPLUS

CN Iron alloy, base, Fe 94-99, Mn 0.5-3, Cr 0-1, C 0.2-0.5, Si 0.1-0.5, Ti 0-0.2, Al 0-0.1, B 0-0.1, Cu 0-0.1, Ni 0-0.1, P 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	94 - 99	7439-89-6
Mn	0.5 - 3	7439-96-5
Cr	0 - 1	7440-47-3
C	0.2 - 0.5	7440-44-0
Si	0.1 - 0.5	7440-21-3
Ti	0 - 0.2	7440-32-6
Al	0 - 0.1	7429-90-5
B	0 - 0.1	7440-42-8
Cu	0 - 0.1	7440-50-8
Ni	0 - 0.1	7440-02-0
P	0 - 0.1	7723-14-0

IPCI C21D0008-02 [I]; C22C0038-32 [I]; C22C0038-38 [I]; B21D0053-26 [I]; C23C0002-12 [I]

IPCR C21D0008-02 [I]; B21D0053-26 [I]; C22C0038-32 [I]; C22C0038-38 [I]; C23C0002-12 [I]

CC 55-11 (Ferrous Metals and Alloys)

ST steel aluminum coating hot stamping

IT Hot-dip coating process
(method for manufg. stamped coated steel products)

IT Metalworking
(stamping, hot; method for manufg. stamped coated steel products)

IT 1173986-67-8 1173986-72-5
RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(interdiffusion layer; method for manufg. stamped coated steel products)

IT 1173986-68-9
RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(intermediate and superficial layers; method for manufg. stamped coated steel products)

IT 1173986-74-7
RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(intermediate layer; method for manufg. stamped

coated steel products)
IT 1173986-70-3 1173986-76-9
RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(intermetallic layer; method for manufg. stamped coated steel products)
IT 952598-91-3 1058743-89-7
RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(main coating; method for manufg. stamped coated steel products)
IT 1173986-65-6 1173986-66-7, processes
RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(method for manufg. stamped coated steel products)
IT 1173986-77-0
RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(superficial layer; method for manufg. stamped coated steel products)
OS.CITING REF COUNT: 6 THERE ARE 6 CAPLUS RECORDS THAT CITE THIS RECORD
(6 CITINGS)

L13 ANSWER 67 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN
ACCESSION NUMBER: 2008:556603 CAPLUS Full-text
DOCUMENT NUMBER: 148:521251
TITLE: Coated steel strips, methods of making the same, methods of using the same, stamping blanks prepared from the same, stamped products prepared from the same, and articles of manufacture which contain such a stamped product
INVENTOR(S): Drillet, Pascal; Spehner, Dominique; Kefferstein, Ronald
PATENT ASSIGNEE(S): Arcelor France, Fr.
SOURCE: PCT Int. Appl., 43 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 2
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2008053273	A1	20080508	WO 2006-IB4019	20061030
CA 2668393	A1	20080508	CA 2006-2668393	20061030
CA 2668393	C	20130813		
EP 2086755	A1	20090812	EP 2006-842403	20061030
EP 2086755	B1	20171129		
KR 2009086970	A	20090814	KR 2009-7008891	20061030
KR 1327648	B1	20131112		
CN 101583486	A	20091118	CN 2006-80056246	20061030
CN 101583486	B	20140827		
JP 2010508438	T	20100318	JP 2009-533969	20061030
JP 5334854	B2	20131106		
RU 2395593	C1	20100727	RU 2009-114832	20061030
BR 2006022071	A2	20140527	BR 2006-22071	20061030
EP 3290199	A1	20180307	EP 2017-192410	20061030
EP 3290199	B1	20190821		
EP 3290200	A1	20180307	EP 2017-192418	20061030
EP 3587104	A1	20200101	EP 2019-185736	20061030
EP 3587105	A1	20200101	EP 2019-185743	20061030
ES 2754621	T3	20200420	ES 2017-192410	20061030
ZA 2009002611	A	20101027	ZA 2009-2611	20090416
MX 2009004453	A	20090511	MX 2009-4453	20090424
IN 2009CN02275	A	20100319	IN 2009-CN2275	20090424
IN 324293	B	20191108		
US 20110165436	A1	20110707	US 2011-447777	20110318
US 20130029172	A1	20130131	US 2012-13621015	20120915
US 9708683	B2	20170718		
US 20170260603	A1	20170914	US 2017-15606770	20170526
US 10550447	B2	20200204		
US 20190271055	A1	20190905	US 2019-16413774	20190516

US 10590507	B2	20200317		
US 20190271056	A1	20190905	US 2019-16413799	20190516
US 20190271057	A1	20190905	US 2019-16413825	20190516
US 20190271058	A1	20190905	US 2019-16414022	20190516
US 10597747	B2	20200324		
US 20190276912	A1	20190912	US 2019-16413729	20190516
US 10577674	B2	20200303		

PRIORITY APPLN. INFO.:

EP 2006-842403	A3	20061030
EP 2017-192410	A3	20061030
WO 2006-IB4019	W	20061030
US 2011-447777	A3	20110318
US 2012-13621015	A1	20120915
US 2017-15606770	A1	20170526

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB Coated steel having a well defined and uniform thickness is useful and advantageous for prep. products by hot stamping. Products prep. by hot stamping such a steel are particularly advantageous when subjected to a subsequent spot welding step.

RETABLe

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
Arcelor France	2006			WO 2006097593 A	CAPLUS
Armco Inc	1990			EP 0356783 A2	CAPLUS
Bhp Steel Jla Pty Ltd	2003			EP 1336666 A	CAPLUS
Laurent Jean-Pierre	2001			US 6296805 B1	CAPLUS
Lorraine Laminage	1995			FR 2720079 A1	CAPLUS
Lorraine Laminage	1998			FR 2758571 A1	CAPLUS
Lorraine Laminage	2000			EP 1013785 A1	CAPLUS

IT 1022915-01-0

RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(aluminum coated steel strips stamping blanks and articles of manuf. which contain such a stamped product)

RN 1022915-01-0 CAPLUS

CN Iron alloy, base, Fe 94-99, Mn 0.5-3, Cr 0-1, C 0.2-0.5, Si 0.1-0.5, Ti 0-0.2, Al 0-0.1, B 0-0.1, P 0-0.1 (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	94 - 99	7439-89-6
Mn	0.5 - 3	7439-96-5
Cr	0 - 1	7440-47-3
C	0.2 - 0.5	7440-44-0
Si	0.1 - 0.5	7440-21-3
Ti	0 - 0.2	7440-32-6
Al	0 - 0.1	7429-90-5
B	0 - 0.1	7440-42-8
P	0 - 0.1	7723-14-0

IPCI B32B0015-00 [I]; C21D0009-46 [I]

IPCR B32B0015-00 [I]; C21D0009-46 [I]

CC 55-11 (Ferrous Metals and Alloys)

ST aluminum coated steel strip stamping article spot welding

IT Metalworking

(stamping; aluminum coated steel strips stamping blanks and articles of manuf. which contain such a stamped product)

IT 7429-90-5, Aluminum, uses 952598-91-3, Aluminum 87-90, iron 2-4, silicon 8-11

RL: NUU (Other use, unclassified); USES (Uses)

(aluminum coated steel strips stamping blanks and articles of manuf. which contain such a stamped product)

IT 1022915-01-0

RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(aluminum coated steel strips stamping blanks and articles of manuf. which contain such a stamped product)

OS.CITING REF COUNT: 7 THERE ARE 7 CAPLUS RECORDS THAT CITE THIS RECORD
(7 CITINGS)

ACCESSION NUMBER: 2006:322586 CAPLUS Full-text
 DOCUMENT NUMBER: 144:354988
 TITLE: Oxidation-resistant units and oxidation-resistant coating materials for turbines
 INVENTOR(S): Yasutomi, Yoshiyuki; Kitaoka, Satoshi; Matsudaira, Tsuneaki; Kawashima, Naoki; Wada, Masashi; Sugita, Yuji; Kagitani, Yukio; Nakajo, Koji
 PATENT ASSIGNEE(S): Fine Ceramics Center, Japan; Chubu Electric Power Co., Inc.
 SOURCE: Jpn. Kokai Tokkyo Koho, 17 pp.
 CODEN: JKXXAF
 DOCUMENT TYPE: Patent
 LANGUAGE: Japanese
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2006089796	A	20060406	JP 2004-275373	20040922
JP 4542857	B2	20100915		

PRIORITY APPLN. INFO.: JP 2004-275373 20040922

AB The title unit is equipped with a structure body contg. an electron conducting region (R1) placed at oxidizing atm. side and an oxide layer placed at the oxidizing atm. side of R1, and a means for collecting neg. charge to R1. The region R1 may contain electron-conducting materials chosen from Ti, Ta, W, Ir, Pt-type alloys, heat-resistant ~~steel~~ contg. C 0-1, Si 0-3, Mn 0-2, Cr 0-30, Ni 0-50, Mo 0-10, W 0-8, Nb 0-5, Ti 0-5, Al 0-2, B 0-0.2, N 0-0.2, V 0-1, Cu 0-5, Zr 0-0.3 wt.%, Fe-based superalloys, Fe-Ni-Co-Cr alloys contg. C 0-0.5, Si 0-2, Mn 0-5, Cr 0-30, Ni 0-50, Co 0-50, Mo 0-10, W 0-8, Nb 0-5, Ti 0-5, Al 0-1, B 0-0.1, N 0-0.2, V 0-5, and Cu 0-5 wt.%, Co-based superalloys contg. C 0-1, Si 0-2, Mn 0-2, Ni 0-30, Cr 0-30, Mo 0-8, W 0-20, Nb 0-5, Ta 0-10, Ti 0-5, Al 0-0.5, Fe 0-5, B 0-0.5, Zr 0-2 wt.%, MCrAlR alloys (M = Ni, Co, and/or Fe; R = rare earth metals), TiC, TiN, TaC, TaN, LaCrO₃, and LaCoO₃. The unit provides high oxidn. resistance by ion blocking effects and elec. repulsion.

IT 881036-95-9 881036-96-0 881036-97-1
 RL: TEM (Technical or engineered material use); USES (Uses)
 (substrate; oxidn.-resistant units and coating materials
 having oxide surface for turbines)

RN 881036-95-9 CAPLUS

CN Iron alloy, base, Fe 0-100, Ni 0-50, Cr 0-30, Mo 0-10, W 0-8, Cu 0-5, Nb 0-5, Ti 0-5, Si 0-3, Al 0-2, Mn 0-2, C 0-1, V 0-1, Zr 0-0.3, B 0-0.2, N 0-0.2 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	0 - 100	7439-89-6
Ni	0 - 50	7440-02-0
Cr	0 - 30	7440-47-3
Mo	0 - 10	7439-98-7
W	0 - 8	7440-33-7
Cu	0 - 5	7440-50-8
Nb	0 - 5	7440-03-1
Ti	0 - 5	7440-32-6
Si	0 - 3	7440-21-3
Al	0 - 2	7429-90-5
Mn	0 - 2	7439-96-5
C	0 - 1	7440-44-0
V	0 - 1	7440-62-2
Zr	0 - 0.3	7440-67-7
B	0 - 0.2	7440-42-8
N	0 - 0.2	17778-88-0

RN 881036-96-0 CAPLUS

CN Iron alloy, base, Fe 0-100, Co 0-50, Ni 0-50, Cr 0-30, Mo 0-10, W 0-8, Cu 0-5, Mn 0-5, Nb 0-5, Ti 0-5, V 0-5, Si 0-2, Al 0-1, C 0-0.5, N 0-0.2, B 0-0.1 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	0 - 100	7439-89-6
Ni	0 - 50	7440-02-0
Cr	0 - 30	7440-47-3
Mo	0 - 10	7439-98-7
W	0 - 8	7440-33-7
Cu	0 - 5	7440-50-8
Nb	0 - 5	7440-03-1
Ti	0 - 5	7440-32-6
Si	0 - 3	7440-21-3
Al	0 - 2	7429-90-5
Mn	0 - 2	7439-96-5
C	0 - 1	7440-44-0
V	0 - 1	7440-62-2
Zr	0 - 0.3	7440-67-7
B	0 - 0.2	7440-42-8
N	0 - 0.2	17778-88-0

Fe	0	-	100	7439-89-6
Co	0	-	50	7440-48-4
Ni	0	-	50	7440-02-0
Cr	0	-	30	7440-47-3
Mo	0	-	10	7439-98-7
W	0	-	8	7440-33-7
Cu	0	-	5	7440-50-8
Mn	0	-	5	7439-96-5
Nb	0	-	5	7440-03-1
Ti	0	-	5	7440-32-6
V	0	-	5	7440-62-2
Si	0	-	2	7440-21-3
Al	0	-	1	7429-90-5
C	0	-	0.5	7440-44-0
N	0	-	0.2	17778-88-0
B	0	-	0.1	7440-42-8

RN 881036-97-1 CAPLUS

CN Cobalt alloy, base, Co 0-100, Cr 0-30, Ni 0-30, W 0-20, Ta 0-10, Mo 0-8, Fe 0-5, Nb 0-5, Ti 0-5, Mn 0-2, Si 0-2, Zr 0-2, C 0-1, Al 0-0.5, B 0-0.5 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
=====+=====+=====		
Co	0 - 100	7440-48-4
Cr	0 - 30	7440-47-3
Ni	0 - 30	7440-02-0
W	0 - 20	7440-33-7
Ta	0 - 10	7440-25-7
Mo	0 - 8	7439-98-7
Fe	0 - 5	7439-89-6
Nb	0 - 5	7440-03-1
Ti	0 - 5	7440-32-6
Mn	0 - 2	7439-96-5
Si	0 - 2	7440-21-3
Zr	0 - 2	7440-67-7
C	0 - 1	7440-44-0
Al	0 - 0.5	7429-90-5
B	0 - 0.5	7440-42-8

IPCI C23C0030-00 [I]; C22C0019-05 [I]; C22C0019-07 [I]; C22C0038-00 [I];
C22C0038-58 [I]; C23F0013-00 [I]; F01D0005-28 [I]; F01D0025-00 [I];
F02C0007-00 [I]; C23C0030-00 [I]; C22C0019-05 [I]; C22C0019-07 [I];
C22C0038-00 [I]; C22C0038-58 [I]; C23F0013-00 [I]; F01D0005-28 [I];
F01D0025-00 [I]; F02C0007-00 [I]
IPCR C23C0030-00 [I]; C22C0019-05 [I]; C22C0019-07 [I]; C22C0038-00 [I];
C22C0038-58 [I]; C23F0013-00 [I]; F01D0005-28 [I]; F01D0025-00 [I];
F02C0007-00 [I]

CC 56-10 (Nonferrous Metals and Alloys)

Section cross-reference(s): 55, 57

ST oxidn resistant oxide coating superalloy turbine

IT Turbines

(oxidn.-resistant units and coating materials having oxide surface for turbines)

IT Coating materials

(oxidn.-resistant; oxidn.-resistant units and coating materials having oxide surface for turbines)

IT Superalloys

RL: TEM (Technical or engineered material use); USES (Uses)
(substrate; oxidn.-resistant units and coating materials having oxide surface for turbines)

IT 7440-06-4, Platinum, uses

RL: TEM (Technical or engineered material use); USES (Uses)
(neg. charge collector; oxidn.-resistant units and coating materials having oxide surface for turbines)

IT 1306-38-3, Ceria, uses 1309-48-4, Magnesia, uses 1314-20-1, Thorium oxide (ThO2), uses 1314-23-4, Zirconia, uses 1314-36-9, Yttria, uses 1314-61-0, Tantalum pentoxide 1344-28-1, Alumina, uses 12003-65-5, Aluminum lanthanum oxide (AlLaO3) 12004-39-6, Aluminum titanium oxide (Al2TiO5) 12055-23-1, Hafnia 13463-67-7, Titania, uses 97330-34-2, Beryllium oxide (BeO2)

RL: TEM (Technical or engineered material use); USES (Uses)
(oxidn.-resistant units and coating materials having oxide
surface for turbines)

IT 7439-88-5, Iridium, uses 12016-86-3, Cobalt lanthanum oxide (CoLaO3)
12017-94-6, Chromium lanthanum oxide (CrLaO3) 12033-62-4, Tantalum
nitride (TaN) 12070-06-3, Tantalum carbide (TaC) 12070-08-5, Titanium
carbide (TiC) 25583-20-4, Titanium nitride (TiN) 73283-66-6, CoNiCrAlY
881036-95-9 881036-96-0 881036-97-1

RL: TEM (Technical or engineered material use); USES (Uses)
(substrate; oxidn.-resistant units and coating materials
having oxide surface for turbines)

OS.CITING REF COUNT: 1 THERE ARE 1 CAPLUS RECORDS THAT CITE THIS RECORD
(1 CITINGS)

L13 ANSWER 69 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2006:31898 CAPLUS Full-text

DOCUMENT NUMBER: 144:132328

TITLE: Annular concentrically twisted bead cord

INVENTOR(S): Sasabe, Hiroshi; Wakahara, Hitoshi; Okamoto, Kenichi

PATENT ASSIGNEE(S): Sumitomo(Sei) Steel Wire Corp., Japan; Sumitomo

Electric Tohichi Co. Ltd.

SOURCE: PCT Int. Appl., 29 pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2006004054	A1	20060112	WO 2005-JP12227	20050701
JP 2006062641	A	20060309	JP 2005-177763	20050617
JP 3779313	B2	20060524		
EP 1764238	A1	20070321	EP 2005-765284	20050701
EP 1764238	B1	20100414		
CN 101039811	A	20070919	CN 2005-80020724	20050701
CN 100572110	C	20091223		
EP 2213485	A1	20100804	EP 2009-13332	20050701
KR 2007043812	A	20070425	KR 2007-7002311	20070130
US 7735307	B2	20100615	US 2007-629490	20070712
PRIORITY APPLN. INFO.:			JP 2004-198329	A 20040705
			JP 2004-224303	A 20040730
			JP 2005-177631	A 20050617
			JP 2005-177763	A 20050617
			EP 2005-765284	A3 20050701
			WO 2005-JP12227	W 20050701

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB An annular concentrically twisted bead cord reduced in wt. and cost and improved in molding properties and annular core corrosive resistance. The annular core is formed of a medium carbon steel or an alloy steel obtained by suppressing carbon content and adding the proper amts. of specified elements thereto. The diam. (dc) of the annular core to the diam. (ds) of peripheral wires meets the requirement of the expression, $1.04 \leq dc/ds \leq 1.30$, and the peripheral wires with a coil diam. of 0.5 to 1.3 times the coil diam. of the annular core are used to provide the bead cord reduced in wt. and cost and improved in molding properties. Also, an Al-Zn alloy plating or a thick Zn plating layer is formed on the surface of the steel wire of the annular core or a stainless steel is used as the material of the annular core to increase the corrosive resistance of the annular core.

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
Fuji Seiko Kabushiki Ka	1989			JP 01-273707 A	
Fuji Seiko Kabushiki Ka	1992			JP 04-266506 A	
Kanai, H	1987			Microfilm of the spe	
Kobe Steel Ltd	1996			JP 08-188851 A	CAPLUS
Nippon Steel Corp	2001			JP 2001164337 A	CAPLUS
Nippon Steel Corp	2003			JP 2003129178 A	CAPLUS
Sumitomo Rubber Industr	2001			JP 2001301430 A	
Tokyo Rope Manufacturin	1993			JP 05-163686 A	

Toyo Tire And Rubber Co	1974			GB 1466114 A	
Toyo Tire And Rubber Co	1974			FR 2221290 A	
Toyo Tire And Rubber Co	1974			DE 2405127 A	
Toyo Tire And Rubber Co	1974			JP 49-102002 A	
Toyo Tire And Rubber Co	1975			JP 50-131201 A	

IT 873188-74-0

RL: NUU (Other use, unclassified); USES (Uses)
(annular concentrically twisted bead cord)

RN 873188-74-0 CAPLUS

CN Iron alloy, base, Fe 93-99, Mn 0.5-2, Si 0.3-2, Cr 0.2-2, C 0.1-0.3, Al 0-0.1, B 0-0.1, Mg 0-0.1, Nb 0-0.1, Ti 0-0.1, V 0-0.1 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	93 - 99	7439-89-6
Mn	0.5 - 2	7439-96-5
Si	0.3 - 2	7440-21-3
Cr	0.2 - 2	7440-47-3
C	0.1 - 0.3	7440-44-0
Al	0 - 0.1	7429-90-5
B	0 - 0.1	7440-42-8
Mg	0 - 0.1	7439-95-4
Nb	0 - 0.1	7440-03-1
Ti	0 - 0.1	7440-32-6
V	0 - 0.1	7440-62-2

IPCI B60C0015-04 [ICM,7]; B60C0009-00 [ICS,7]; C22C0038-00 [ICS,7]; C22C0038-18 [ICS,7]; C22C0038-54 [ICS,7]; D07B0001-06 [ICS,7]

CC 55-3 (Ferrous Metals and Alloys)

ST steel annular concentrically twisted bead cord aluminum zinc coating

IT Coating materials
Cords

(annular concentrically twisted bead cord)

IT 11107-04-3 11109-50-5 11121-90-7, Carbon steel, uses
12597-68-1, Stainless steel, uses 12597-69-2, Steel,
uses 12709-14-7, uses 12709-21-6, uses 37261-75-9, uses
39286-11-8, uses 873188-71-7, uses 873188-72-8, uses 873188-73-9,
uses 873188-74-0

RL: NUU (Other use, unclassified); USES (Uses)
(annular concentrically twisted bead cord)

IT 7440-66-6, Zinc, uses 11149-84-1

RL: NUU (Other use, unclassified); USES (Uses)
(coating; annular concentrically twisted bead cord)

OS.CITING REF COUNT: 4 THERE ARE 4 CAPLUS RECORDS THAT CITE THIS RECORD
(10 CITINGS)

L13 ANSWER 70 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2001:916938 CAPLUS Full-text

DOCUMENT NUMBER: 136:72669

TITLE: Acceleration of diffusion saturation processes in
nonisothermal thermochemical treatment

AUTHOR(S): Gyulikhandanov, E. L.; Khaidorov, A. D.

CORPORATE SOURCE: St. Petersburg State Technical University, St.
Petersburg, Russia

SOURCE: Metal Science and Heat Treatment (Translation of
Metallovedenie i Termicheskaya Obrabotka Metallov)
(2001), 43(5-6), 228-232

CODEN: MHTRAN; ISSN: 0026-0673

PUBLISHER: Kluwer Academic/Consultants Bureau

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Various of nonisothermal processes of carburizing, nitrocarburizing, and
nitriding were studied. The steels 20KhGNR, 40Kh, and 40KhMFA were
investigated. The diffusion satn. were performed by carburizing with an
additive of 5% NH3, high-temp. nitrocarburizing in a mixt. of 50% natural
gas and 50% NH3, and nitriding in NH3. In all the cases thermochem.
treatment (TCT) was not conducted by preliminary heat treatment. The
thickness of the diffusion layers and their structure and properties
were detd. The measurement of the diffusion layers involved in
low-temp. nitrocarburizing and nitriding was carried out by durometry. It

was assumed that the boundary between the layer and the core had a microhardness of 300 HV and exceeded somewhat the hardness of the core of the studied steels. The efficiency of nonisothermal and combined TCT multiplicity of the growth of the layer equal to the ratio of the effective thickness of the layers obtained in nonisothermal and isothermal regimes. Using combined regimes of thermochem. treatment that included thermocycling and isothermal stages, a substantial acceleration of the diffusion process was detected which increased considerably the thickness of the diffusion layer. A method was suggested that enabled to calc. the kinetics of nonisothermal processes of TCT according to the model of single-phase diffusion with the use of effective diffusivities.

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
Gyulikhandanov, E	1992		2	Metalloved Term Obra	
Shmykov, A	1991			Thermodynamics and K	

IT 37312-00-8, 20KhGMR

RL: PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)

(diffusion satn. processes in nonisothermal thermochem. treatment of steel)

RN 37312-00-8 CAPLUS

CN Iron alloy, base, Fe 95-97, Ni 0.80-1.10, Cr 0.70-1.10, Mn 0.70-1.00, Si 0.17-0.37, Cu 0-0.30, C 0.16-0.23, W 0-0.20, Mo 0-0.15, V 0-0.05, P 0-0.035, S 0-0.035, Ti 0-0.03, B 0.001 (20KhGMR) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	95 - 97	7439-89-6
Ni	0.80 - 1.10	7440-02-0
Cr	0.70 - 1.10	7440-47-3
Mn	0.70 - 1.00	7439-96-5
Si	0.17 - 0.37	7440-21-3
Cu	0 - 0.30	7440-50-8
C	0.16 - 0.23	7440-44-0
W	0 - 0.20	7440-33-7
Mo	0 - 0.15	7439-98-7
V	0 - 0.05	7440-62-2
P	0 - 0.035	7723-14-0
S	0 - 0.035	7704-34-9
Ti	0 - 0.03	7440-32-6
B	0.001	7440-42-8

CC 55-7 (Ferrous Metals and Alloys)

ST steel carburizing nitrocarburizing nitriding microstructure diffusion

IT Carbonitriding

Carburizing

Diffusion

Nitriding

(diffusion satn. processes in nonisothermal thermochem. treatment of steel)

IT Microstructure

(diffusion satn. processes in nonisothermal thermochem. treatment of steel in relation to)

IT 37312-00-8, 20KhGMR 39344-94-0, 40Kh, processes 64721-16-0, 40KhMFA

RL: PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)

(diffusion satn. processes in nonisothermal thermochem. treatment of steel)

IT 7664-41-7, Ammonia, uses

RL: NUU (Other use, unclassified); USES (Uses)

(diffusion satn. processes in nonisothermal thermochem. treatment of steel in relation to use of)

L13 ANSWER 71 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2000:113096 CAPLUS Full-text

DOCUMENT NUMBER: 132:230489

TITLE: Equipment for nitriding in pulsating current plasma

AUTHOR(S): Dostanko, A. P.; Bosyakov, M. N.; Bondarenko, S. V.;
Grunskii, D. I.; Zhuk, D. V.; Kukharev, S. A.;
Matusevich, P. A.; Savilov, A. V.
CORPORATE SOURCE: Beloruss. Gos. Univ. Inform. i Radioelektron., Minsk,
220027, Belarus
SOURCE: Elektronnaya Obrabotka Materialov (1999), (3), 66-69
CODEN: EOBFMA; ISSN: 0013-5739
PUBLISHER: Institut Prikladnoi Fiziki AN Respubliki Moldova
DOCUMENT TYPE: Journal
LANGUAGE: Russian

AB The characteristics of the installation for hardening ion nitriding
treatment in plasma of a pulsating current are adduced. The main
advantages of processing in pulsating plasma with ref. to constructional
and tool ~~steels~~ in comparison with gas nitriding are discussed. The
summary table for different types of processed details., marks of
~~steels~~, and characteristics of nitriding ~~layer~~ - depth and surface
hardness is adduced.

IT 12742-15-3, 20KhNR
RL: PEP (Physical, engineering or chemical process); PRP (Properties);
PROC (Process)
(equipment for nitriding in pulsating current plasma of ~~steels~~
and ~~coating~~ properties)

RN 12742-15-3 CAPLUS

CN Iron alloy, base, Fe 95-98, Ni 0.80-1.10, Cr 0.70-1.10, Mn 0.60-0.90, Si
0.17-0.37, Cu 0-0.30, C 0.16-0.23, W 0-0.20, Mo 0-0.15, V 0-0.05, P 0-0.035, S
0-0.035, Ti 0-0.03, B 0.001 (20KhNR) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
=====+=====	=====+=====	=====
Fe	95 - 98	7439-89-6
Ni	0.80 - 1.10	7440-02-0
Cr	0.70 - 1.10	7440-47-3
Mn	0.60 - 0.90	7439-96-5
Si	0.17 - 0.37	7440-21-3
Cu	0 - 0.30	7440-50-8
C	0.16 - 0.23	7440-44-0
W	0 - 0.20	7440-33-7
Mo	0 - 0.15	7439-98-7
V	0 - 0.05	7440-62-2
P	0 - 0.035	7723-14-0
S	0 - 0.035	7704-34-9
Ti	0 - 0.03	7440-32-6
B	0.001	7440-42-8

CC 76-11 (Electric Phenomena)
Section cross-reference(s): 55

ST equipment nitriding pulsating current plasma ~~steel~~

IT Apparatus
Coating materials
Hardness (mechanical)
Plasma nitriding
(equipment for nitriding in pulsating current plasma of ~~steels~~
and ~~coating~~ properties)

IT 7440-37-1, Argon, uses
RL: NUU (Other use, unclassified); USES (Uses)
(equipment for nitriding in pulsating current plasma of ~~steels~~
and ~~coating~~ properties)

IT 1333-74-0, Hydrogen, processes 7727-37-9, Nitrogen, processes
RL: PEP (Physical, engineering or chemical process); PROC (Process)
(equipment for nitriding in pulsating current plasma of ~~steels~~
and ~~coating~~ properties)

IT 12604-95-4, 38KhMYuA 12631-59-3, 40KhN2MA 12681-03-7, 20KhN3A
12718-23-9, 18KhGT 12725-23-4, R6M5 12731-80-5, 38KhMA, properties
12741-57-0, 4Kh5MFS 12741-70-7, Kh 12 12741-98-9, 25KhGT 12742-00-6,
Kh12M 12742-05-1, 40KhN 12742-15-3, 20KhNR 12742-29-9,
4Kh5V2FS 12773-74-9, 35KhGSA 12784-22-4, 12Kh2N4A 37203-00-2,
4Kh4VMFS 37245-26-4, 30Kh13 37268-90-9, ~~Steel~~ 45, properties
37311-99-2, 40KhGNM 37323-42-5, 30KhGT 37323-91-4, 5KhNM 37329-39-8,
20Kh, properties 37329-44-5, R9K10 37360-28-4, 3Kh2V8 39344-94-0,
40Kh, properties 50947-86-9, 40Kh9S2 54790-83-9, 55Kh20G9AN4
61431-72-9, 15KhGN2TA 67540-49-2, 3Kh3M3F 68445-91-0, 20KhGNMTA

72026-34-7, 15KhF, properties 83653-82-1, 5KhNMF
 RL: PEP (Physical, engineering or chemical process); PRP (Properties);
 PROC (Process)
 (equipment for nitriding in pulsating current plasma of steels
 and coating properties)

L13 ANSWER 72 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 2000:34644 CAPLUS Full-text
 DOCUMENT NUMBER: 132:96225
 TITLE: Coated hot-rolled and cold-rolled steel sheet with
 high strength and corrosion resistance after heat
 treatment
 INVENTOR(S): Laurent, Jean-Pierre; Devroc, Jacques; Hennechart,
 Jean-Paul; Spehner, Dominique; Laminage, Lorraine
 PATENT ASSIGNEE(S): Sollac, Fr.
 SOURCE: Eur. Pat. Appl., 7 pp.
 CODEN: EPXXDW
 DOCUMENT TYPE: Patent
 LANGUAGE: French
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
EP 971044	A1	20000112	EP 1999-401690	19990707
EP 971044	B1	20030514		
FR 2780984	A1	20000114	FR 1998-8793	19980709
FR 2780984	B1	20010622		
CA 2276911	A1	20000109	CA 1999-2276911	19990707
CA 2276911	C	20090505		
AT 240419	T	20030515	AT 1999-401690	19990707
PT 971044	E	20030829	PT 1999-401690	19990707
ES 2196740	T3	20031216	ES 1999-401690	19990707
BR 9902712	A	20000308	BR 1999-2712	19990708
JP 2000038640	A	20000208	JP 1999-195664	19990709
JP 3931251	B2	20070613		
US 6296805	B1	20011002	US 1999-350100	19990709
US 44153	E1	20130416	US 2011-13205126	20110808
US 44940	E1	20140610	US 2013-13863100	20130415
PRIORITY APPLN. INFO.:			FR 1998-8793	A 19980709
			US 1999-350100	E 19990709
			US 2011-13205126	A1 20110808

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB A hot-rolled and cold-rolled steel sheet contg. C 0.15-0.5, Mn 0.5-3, Si
 0.1-0.5, Cr 0.01-1, Ti ≤0.2, Al ≤0.1, P ≤0.1, S
 ≤0.05, and B 0.0005-0.08% is coated in a molten Al bath, heated
 at 5-600°/s, and annealed above 750°. The coated sheet
 has a high strength, shock-, fatigue-, abrasion-, wear-, and corrosion
 resistance, and adhesion to paints and adhesives.

RETABLER

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
Anon	1989			JP 01176056 A	CAPLUS
Anon	1989			FR 2625227 A	CAPLUS
Anon	1990			JP 02263954 A	CAPLUS
Anon	1993			JP 05247588 A	CAPLUS
Anon	1993			GB 2261879 A	CAPLUS
Anon	1993			FR 2684392 A	CAPLUS
Anon	1993			DE 4143270 A	CAPLUS
Anon	1993			US 5178688 A	CAPLUS
Anon	1994			JP 06179944 A	CAPLUS
Anon	1994			JP 6093375 A	
Anon	1994			KR 9402139 B	
Anon	1995			IT 1252862 B	
Anon	1995			JP 7062212 B	
Anon	1996			JP 2034275 C	
Anon	1997			JP 2686755 B	

IT 254455-64-6

RL: TEM (Technical or engineered material use); USES (Uses)
 (aluminum-coated hot-rolled and cold-rolled steel
 sheet with high strength and corrosion resistance)

RN 254455-64-6 CAPLUS
 CN Iron alloy, base, Fe 95-99, Mn 0.5-3, Cr 0-1, C 0.2-0.5, Si 0.1-0.5, Ti
 0-0.2, Al 0-0.1, B 0-0.1, P 0-0.1 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	95 - 99	7439-89-6
Mn	0.5 - 3	7439-96-5
Cr	0 - 1	7440-47-3
C	0.2 - 0.5	7440-44-0
Si	0.1 - 0.5	7440-21-3
Ti	0 - 0.2	7440-32-6
Al	0 - 0.1	7429-90-5
B	0 - 0.1	7440-42-8
P	0 - 0.1	7723-14-0

IPCI C22C0038-32 [ICM,6]
 IPCR C23C0002-12 [I]; C21D0008-02 [I]; C22C0038-00 [I]; C22C0038-32 [I];
 C22C0038-38 [I]; C23C0002-28 [I]; C23C0030-00 [I]
 CC 55-3 (Ferrous Metals and Alloys)
 ST aluminum coated steel sheet
 IT Coating process
 (hot-dipping; of hot-rolled and cold-rolled steel sheet with
 aluminum alloy)
 IT 110107-84-1, uses 254455-64-6
 RL: TEM (Technical or engineered material use); USES (Uses)
 (aluminum-coated hot-rolled and cold-rolled steel
 sheet with high strength and corrosion resistance)
 IT 37296-00-7 254455-65-7
 RL: PEP (Physical, engineering or chemical process); PROC (Process)
 (coating of hot-rolled and cold-rolled steel sheet
 with)
 OS.CITING REF COUNT: 16 THERE ARE 16 CAPLUS RECORDS THAT CITE THIS
 RECORD (19 CITINGS)

L13 ANSWER 73 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN
 ACCESSION NUMBER: 1999:474181 CAPLUS Full-text
 DOCUMENT NUMBER: 131:274752
 TITLE: Effect of electrode drying conditions and preheating
 temperature on cold cracking in welded joints of
 low-alloy high-resistance coated-electrode
 electric-arc steels
 AUTHOR(S): da Silva, Paulo Guedes; Maciel, Theophilo Moura
 CORPORATE SOURCE: Centro de Ciencias e Tecnologia, Universidade Federal
 da Paraiba - UFPB, Brazil
 SOURCE: Congresso Anual - Associacao Brasileira de Metalurgia
 e Materiais (1998), Volume Date 1997, 52nd(II
 Congresso Internacional de Tecnologia Metalurgica e de
 Materiais), 4358-4368
 CODEN: CAAMEU
 PUBLISHER: Associacao Brasileira de Metalurgia e Materiais
 DOCUMENT TYPE: Journal; (computer optical disk)
 LANGUAGE: Portuguese
 AB The effects of the electrode moisture level and of the cooling rate on the
 cold cracking of welded joints of HSLA steels was evaluated. The
 shielded metal arc Welding process was employed. The weld deposits were
 made with AWS E 12018-G electrode, using the SAR 120 T (ASTM 514 B) as
 steel base metal. The cooling rate was varied by varying the
 pre-heating temp. and the moisture level was varied by varying the
 electrode redried time. The results obtained indicated a significative
 redn. on the cracks with the increase of the pre-heating temp. and with
 the increases of the redried times, without signification changes at the
 weld metal microstructure and hardness. The absence of cracks was found
 for welds deposited with pre-heating above 180 °C and with
 electrodes redried for 2 h at 240 °C.
 IT 52346-86-8, ASTM A514B, processes
 RL: PEP (Physical, engineering or chemical process); PRP (Properties);
 PROC (Process)
 (effect of electrode drying conditions and preheating temp. on cold
 cracking in welded joints of low-alloy steel using

high-resistance coated-electrode elec.-arc welding fillers)
 RN 52346-86-8 CAPLUS
 CN Steel, (UNS K11630) (CA INDEX NAME)

Component	Component Percent		Component Registry Number
Fe	97	- 98	7439-89-6
Mn	0.70	- 1.00	7439-96-5
Cr	0.40	- 0.65	7440-47-3
Si	0.20	- 0.35	7440-21-3
Mo	0.15	- 0.25	7439-98-7
C	0.12	- 0.21	7440-44-0
V	0.03	- 0.08	7440-62-2
S	0	- 0.04	7704-34-9
P	0	- 0.035	7723-14-0
Ti	0.01	- 0.03	7440-32-6
B	0.0005	- 0.005	7440-42-8

CC 55-9 (Ferrous Metals and Alloys)
 ST steel weld cracking electrode drying preheating
 IT Drying Humidity
 (effect of electrode drying conditions and preheating temp. on cold cracking in welded joints of low-alloy steel using high-resistance coated-electrode elec.-arc welding fillers)
 IT Welding of metals
 (electrodes; effect of electrode drying conditions and preheating temp. on cold cracking in welded joints of low-alloy steel using high-resistance coated-electrode elec.-arc welding fillers)
 IT Welding of metals
 (shielded metal arc; effect of electrode drying conditions and preheating temp. on cold cracking in welded joints of low-alloy steel using high-resistance coated-electrode elec.-arc welding fillers)
 IT 52346-86-8, ASTM A514B, processes
 RL: PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)
 (effect of electrode drying conditions and preheating temp. on cold cracking in welded joints of low-alloy steel using high-resistance coated-electrode elec.-arc welding fillers)
 IT 12597-69-2, Steel, processes
 RL: PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)
 (welded; effect of electrode drying conditions and preheating temp. on cold cracking in welded joints of low-alloy steel using high-resistance coated-electrode elec.-arc welding fillers)
 IT 154804-42-9, AWS E12018G
 RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (welding electrode; effect of electrode drying conditions and preheating temp. on cold cracking in welded joints of low-alloy steel using high-resistance coated-electrode elec.-arc welding fillers)

L13 ANSWER 74 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN
 ACCESSION NUMBER: 1997:607427 CAPLUS Full-text
 DOCUMENT NUMBER: 127:296559
 ORIGINAL REFERENCE NO.: 127:57923a,57926a
 TITLE: Nondestructive testing of carburizing
 AUTHOR(S): Bochenin, V. I.; Burnakov, K. K.
 CORPORATE SOURCE: Kurgan. Gos. S-kh. Akad. im. Mal'tseva, Kurgan, Russia
 SOURCE: Vestnik Mashinostroeniya (1997), (3), 31-33
 CODEN: VMASAV; ISSN: 0042-4633
 PUBLISHER: Mashinostroenie
 DOCUMENT TYPE: Journal
 LANGUAGE: Russian

AB A nondestructive testing technique is developed for the detn. of the depth of a carburized layer. It consists in γ -quantum narrow-beam examn. of a controlled medium material and detn. of the degree of photon absorption in different layers of the product surface, the C amt. being

detected based on the γ -phase content. The results of exptl. testing conducted on three different ~~steels~~ showed a little discrepancy between the new technique and conventionally used chem. anal.

IT 37312-00-8, 20KhGMR
RL: PEP (Physical, engineering or chemical process); RCT (Reactant); PROC (Process); RACT (Reactant or reagent)
(nondestructive testing of carburized ~~layer~~ depth in ~~steel~~ carburizing)
RN 37312-00-8 CAPLUS
CN Iron alloy, base, Fe 95-97, Ni 0.80-1.10, Cr 0.70-1.10, Mn 0.70-1.00, Si 0.17-0.37, Cu 0-0.30, C 0.16-0.23, W 0-0.20, Mo 0-0.15, V 0-0.05, P 0-0.035, S 0-0.035, Ti 0-0.03, B 0.001 (20KhGMR) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	95 - 97	7439-89-6
Ni	0.80 - 1.10	7440-02-0
Cr	0.70 - 1.10	7440-47-3
Mn	0.70 - 1.00	7439-96-5
Si	0.17 - 0.37	7440-21-3
Cu	0 - 0.30	7440-50-8
C	0.16 - 0.23	7440-44-0
W	0 - 0.20	7440-33-7
Mo	0 - 0.15	7439-98-7
V	0 - 0.05	7440-62-2
P	0 - 0.035	7723-14-0
S	0 - 0.035	7704-34-9
Ti	0 - 0.03	7440-32-6
B	0.001	7440-42-8

CC 55-7 (Ferrous Metals and Alloys)
Section cross-reference(s): 79
ST ~~steel~~ carburization carbon distribution nondestructive testing
IT Carburizing
(nondestructive testing of carburized ~~layer~~ depth in ~~steel~~ carburizing)
IT Testing of materials
(nondestructive; nondestructive testing of carburized ~~layer~~ depth in ~~steel~~ carburizing)
IT 12742-08-4, 20Kh2N4A 12742-21-1, 18Kh2N4VA 37312-00-8, 20KhGMR
RL: PEP (Physical, engineering or chemical process); RCT (Reactant); PROC (Process); RACT (Reactant or reagent)
(nondestructive testing of carburized ~~layer~~ depth in ~~steel~~ carburizing)

L13 ANSWER 75 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN
ACCESSION NUMBER: 1991:147833 CAPLUS Full-text
DOCUMENT NUMBER: 114:147833
ORIGINAL REFERENCE NO.: 114:24995a, 24998a
TITLE: Development of technology for electrospark hardening of ~~steel~~ steam turbine parts
AUTHOR(S): Skoblo, T. S.; Sidenko, V. N.; Tripolko, V. K.; Rudyuk, A. S.
CORPORATE SOURCE: USSR
SOURCE: Tyazheloe Mashinostroenie (1990), (7), 25-6
CODEN: TYMAEZ; ISSN: 1024-7106
DOCUMENT TYPE: Journal
LANGUAGE: Russian

AB The valves of steam turbine distributor made from 20Kh1M1F1TR were hardened by electrospark treatment using electrodes from 40Kh13, 1Kh18N10T, and KhN77TYuR. The max. increase of wear resistance was obtained for 1Kh18N10T electrode: the wear resistance increases 1.8-fold compared with that of nitrided parts. After holding in air at 540° for 1000 h, no corrosion was obsd. at the hardened surface; the hardness and depth of the ~~layer~~ were unaffected by the holding.
IT 37311-91-4, 20Kh1M1F1TR
RL: USES (Uses)
(steam turbine parts from, electrospark hardening of)
RN 37311-91-4 CAPLUS

CN Iron alloy, base, Fe 95-98,Cr 0.90-1.40,Mo 0.80-1.10,V 0.70-1.00,Mn 0-0.50,Si 0-0.37,Cu 0-0.30,Ni 0-0.30,C 0.17-0.24,Ti 0.05-0.12,P 0-0.030,S 0-0.030,B 0.005 (20Kh1M1F1TR) (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	95 - 98	7439-89-6
Cr	0.90 - 1.40	7440-47-3
Mo	0.80 - 1.10	7439-98-7
V	0.70 - 1.00	7440-62-2
Mn	0 - 0.50	7439-96-5
Si	0 - 0.37	7440-21-3
Cu	0 - 0.30	7440-50-8
Ni	0 - 0.30	7440-02-0
C	0.17 - 0.24	7440-44-0
Ti	0.05 - 0.12	7440-32-6
P	0 - 0.030	7723-14-0
S	0 - 0.030	7704-34-9
B	0.005	7440-42-8

CC 55-9 (Ferrous Metals and Alloys)
 Section cross-reference(s): 47
 ST electrospark hardening ~~steel~~ steam turbine; electrode electrospark
 hardening ~~steel~~ turbine
 IT Electric spark
 (hardening by, of high-temp. ~~steel~~ parts for steam turbines)
 IT Turbines
 (steam, parts, from pearlitic high-temp. ~~steel~~, electrospark
 hardening of, electrodes for)
 IT 12719-18-5, KhN77TYuR 39412-98-1, 40Kh13 54611-20-0, 1Kh18N10T
 RL: USES (Uses)
 (electrode, for electrospark hardening of steam turbine parts from
 pearlitic high-temp. ~~steel~~)
 IT 37311-91-4, 20Kh1M1F1TR
 RL: USES (Uses)
 (steam turbine parts from, electrospark hardening of)

L13 ANSWER 76 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 1990:518966 CAPLUS Full-text

DOCUMENT NUMBER: 113:118966

ORIGINAL REFERENCE NO.: 113:20121a,20124a

TITLE: Role of thermally hardened ~~layers~~ obtained by laser
 treatment in the wear resistance of contact pairs
 during fretting corrosion

AUTHOR(S): Dorozhkin, N. N.; Dubnyakov, V. N.; Kukin, S. F.;
 Pasakh, E. V.

CORPORATE SOURCE: PO Minsk. Trakt. Zavod, Minsk, USSR

SOURCE: Trenie i Iznos (1990), 11(2), 264-9

CODEN: TRIZD6; ISSN: 0202-4977

DOCUMENT TYPE: Journal

LANGUAGE: Russian

AB Fretting corrosion tests of ~~steel~~ 20KhNP and cast iron SCh20 after laser
 hardening showed that the wear intensity of the metastable surface
 structure of the ~~steel~~ is 1/5th and that of the gray iron is 1/3rd of
 the values obtained for nonhardened materials. Surface deformation during
 the frictional interaction facilitates phase transformation in the
 metastable structure ensuring an increase in ductility at high values of
 hardness, which results in an increase in the wear resistance of the
 laser-hardened ~~steel~~ and cast iron during fretting corrosion.

IT 12742-15-3
 RL: PEP (Physical, engineering or chemical process); PROC (Process)
 (laser hardening of, fretting corrosion in relation to)

RN 12742-15-3 CAPLUS

CN Iron alloy, base, Fe 95-98,Ni 0.80-1.10,Cr 0.70-1.10,Mn 0.60-0.90,Si 0.17-0.37,Cu 0-0.30,C 0.16-0.23,W 0-0.20,Mo 0-0.15,V 0-0.05,P 0-0.035,S 0-0.035,Ti 0-0.03,B 0.001 (20KhNR) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
=====+=====+=====		

Fe	95	-	98	7439-89-6
Ni	0.80	-	1.10	7440-02-0
Cr	0.70	-	1.10	7440-47-3
Mn	0.60	-	0.90	7439-96-5
Si	0.17	-	0.37	7440-21-3
Cu	0	-	0.30	7440-50-8
C	0.16	-	0.23	7440-44-0
W	0	-	0.20	7440-33-7
Mo	0	-	0.15	7439-98-7
V	0	-	0.05	7440-62-2
P	0	-	0.035	7723-14-0
S	0	-	0.035	7704-34-9
Ti	0	-	0.03	7440-32-6
B			0.001	7440-42-8

CC 55-10 (Ferrous Metals and Alloys)
 ST laser hardening ~~steel~~ fretting corrosion; cast iron laser hardening corrosion
 IT 12742-15-3 72645-39-7, Sch20
 RL: PEP (Physical, engineering or chemical process); PROC (Process)
 (laser hardening of, fretting corrosion in relation to)

L13 ANSWER 77 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 1987:71034 CAPLUS Full-text

DOCUMENT NUMBER: 106:71034

ORIGINAL REFERENCE NO.: 106:11649a,11652a

TITLE: A nondestructive measurement of residual bulk stresses in welded ~~steel~~ specimens by use of magnetically induced velocity changes for ultrasonic waves

AUTHOR(S): Kwun, Hegeon

CORPORATE SOURCE: Nondestr. Eval. Sci. Technol. Div., Southwest Res. Inst., San Antonio, TX, USA

SOURCE: Materials Evaluation (1986), 44(13), 1560-6
 CODEN: MAEVAD; ISSN: 0025-5327

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The distributions of residual bulk stresses in butt-welded ASTM A-588 [63849-06-9] ~~steel~~ and a T-shaped full-penetration-welded ASTM A514 [63747-69-3] ~~steel~~ were nondestructively measured by use of magnetically induced velocity changes (MIVC) for longitudinal and shear waves. The stress effects on MIVC obsd. under various uniaxial stress conditions were used to det. the residual bulk stresses. The results agree with stress values detd. by a layer-removal technique. The MIVC method may be developed to measure biaxial and triaxial stress states.

IT 52346-86-8, properties

RL: PRP (Properties)
 (residual stresses in welded, detn. by magnetically induced velocity changes for ultrasonic waves)

RN 52346-86-8 CAPLUS

CN Steel, (UNS K11630) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
=====+=====+=====		
Fe	97 - 98	7439-89-6
Mn	0.70 - 1.00	7439-96-5
Cr	0.40 - 0.65	7440-47-3
Si	0.20 - 0.35	7440-21-3
Mo	0.15 - 0.25	7439-98-7
C	0.12 - 0.21	7440-44-0
V	0.03 - 0.08	7440-62-2
S	0 - 0.04	7704-34-9
P	0 - 0.035	7723-14-0
Ti	0.01 - 0.03	7440-32-6
B	0.0005 - 0.005	7440-42-8

CC 55-9 (Ferrous Metals and Alloys)

IT Welds

(~~steel~~, residual bulk stresses in, detn. by magnetically induced velocity changes for ultrasonic waves)

IT 52346-86-8, properties 61299-90-9, properties

RL: PRP (Properties)
(residual stresses in welded, detn. by magnetically induced velocity
changes for ultrasonic waves)

IT 12597-69-2
RL: PEP (Physical, engineering or chemical process); PROC (Process)
(welds, ~~steel~~, residual bulk stresses in, detn. by
magnetically induced velocity changes for ultrasonic waves)

L13 ANSWER 78 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN
ACCESSION NUMBER: 1986:190490 CAPLUS Full-text
DOCUMENT NUMBER: 104:190490
ORIGINAL REFERENCE NO.: 104:30111a,30114a
TITLE: Structure and properties of a boronized layer of
carbon and low-alloy ~~steels~~ from high-frequency
current heating
AUTHOR(S): Zozulya, V. F.; Pavlyuchenko, A. A.; Legeida, V. N.
CORPORATE SOURCE: USSR
SOURCE: Vestn. Khar'k. Politekhn. In-ta (1985), (255), 42-4
From: Ref. Zh., Metall. 1986, Abstr. No. 2E285
DOCUMENT TYPE: Journal
LANGUAGE: Russian
AB Title only translated.
IT 37311-91-4
RL: PRP (Properties)
(structure of boronized layer in, high-frequency heating in
relation to)

RN 37311-91-4 CAPLUS
CN Iron alloy, base, Fe 95-98,Cr 0.90-1.40,Mo 0.80-1.10,V 0.70-1.00,Mn
0-0.50,Si 0-0.37,Cu 0-0.30,Ni 0-0.30,C 0.17-0.24,Ti 0.05-0.12,P 0-0.030,S
0-0.030,B 0.005 (20Kh1M1F1TR) (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
=====+=====		
Fe	95 - 98	7439-89-6
Cr	0.90 - 1.40	7440-47-3
Mo	0.80 - 1.10	7439-98-7
V	0.70 - 1.00	7440-62-2
Mn	0 - 0.50	7439-96-5
Si	0 - 0.37	7440-21-3
Cu	0 - 0.30	7440-50-8
Ni	0 - 0.30	7440-02-0
C	0.17 - 0.24	7440-44-0
Ti	0.05 - 0.12	7440-32-6
P	0 - 0.030	7723-14-0
S	0 - 0.030	7704-34-9
B	0.005	7440-42-8

CC 55-7 (Ferrous Metals and Alloys)
ST ~~steel~~ boronized layer structure; heating high frequency boronizing steel
IT Boronizing
(of ~~steel~~, carbon- and low-alloy, high-frequency heating
effect on diffusion layer structure in)

IT 12651-65-9, properties 12725-36-9, properties 37311-91-4
RL: PRP (Properties)
(structure of boronized layer in, high-frequency heating in
relation to)

L13 ANSWER 79 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN
ACCESSION NUMBER: 1986:113747 CAPLUS Full-text
DOCUMENT NUMBER: 104:113747
ORIGINAL REFERENCE NO.: 104:17971a,17974a
TITLE: Cavitation-resistant diffusion layers on low-alloy
steels
AUTHOR(S): Abacharaev, M. M.
CORPORATE SOURCE: Dagest. Politekh. Inst., Makhachkala, USSR
SOURCE: Zashchitnye Pokrytiya na Metallakh (1985), 19, 15-18
CODEN: ZPMEAC; ISSN: 0514-5864
DOCUMENT TYPE: Journal
LANGUAGE: Russian

AB A new criterion was developed for evaluation of the cavitation resistance of diffusion-coated low-alloy steels. The criterion was used in detn. of the cavitation resistance of quenched, Ti- and Mn-cemented, chromized, or chromized and cemented steels 20KhNR [12742-15-3], 40KhN [12742-05-1], and 38Kh2MYuA [12604-95-4]. The exptl. study and an anal. evaluation of steel cavitation resistance showed good coincidence using the criterion. The highest range of cavitation resistance was recorded for Cr + Mn-satd. steel 40KhN, Cr + Ti-satd. steel 20KhNR, and chromized steel 38Kh2MYuA.

IT 12742-15-3
RL: USES (Uses)
(cavitation-resistance of diffusion-satd., criterion for evaluation of)

RN 12742-15-3 CAPLUS

CN Iron alloy, base, Fe 95-98, Ni 0.80-1.10, Cr 0.70-1.10, Mn 0.60-0.90, Si 0.17-0.37, Cu 0-0.30, C 0.16-0.23, W 0-0.20, Mo 0-0.15, V 0-0.05, P 0-0.035, S 0-0.035, Ti 0-0.03, B 0.001 (20KhNR) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	95 - 98	7439-89-6
Ni	0.80 - 1.10	7440-02-0
Cr	0.70 - 1.10	7440-47-3
Mn	0.60 - 0.90	7439-96-5
Si	0.17 - 0.37	7440-21-3
Cu	0 - 0.30	7440-50-8
C	0.16 - 0.23	7440-44-0
W	0 - 0.20	7440-33-7
Mo	0 - 0.15	7439-98-7
V	0 - 0.05	7440-62-2
P	0 - 0.035	7723-14-0
S	0 - 0.035	7704-34-9
Ti	0 - 0.03	7440-32-6
B	0.001	7440-42-8

CC 55-7 (Ferrous Metals and Alloys)

ST steel diffusion coating cavitation resistance; criterion steel cavitation resistance evaluation; chromizing steel cavitation resistance; manganese cementation steel cavitation resistance; titanium cementation steel cavitation resistance

IT Chromizing
(of low-alloy steel, cavitation resistance by, criterion for evaluation of)

IT Cavitation
(resistance of low-alloy diffusion-satd. steel to, criterion for evaluation of)

IT 12604-95-4 12742-05-1 12742-15-3
RL: USES (Uses)
(cavitation-resistance of diffusion-satd., criterion for evaluation of)

IT 7439-96-5, reactions 7440-32-6, reactions
RL: RCT (Reactant); RACT (Reactant or reagent)
(cementation of low-alloyed steels with, cavitation resistance by, criterion for evaluation of)

L13 ANSWER 80 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 1985:581691 CAPLUS Full-text

DOCUMENT NUMBER: 103:181691

ORIGINAL REFERENCE NO.: 103:29223a,29226a

TITLE: Study of a dark constituent in carbonitridation layers

AUTHOR(S): Shapochkin, V. I.; Semenova, L. M.

CORPORATE SOURCE: VPO "VNIITMASH", Volgograd, USSR

SOURCE: Izvestiya Vysshikh Uchebnykh Zavedenii, Chernaya Metallurgiya (1985), (5), 125-9
CODEN: IVUMAX; ISSN: 0368-0797

DOCUMENT TYPE: Journal

LANGUAGE: Russian

AB Low-alloy steels such as 20Kh [37329-39-8], 40Kh [39344-94-0], 25KhGT [12741-98-9], 25KhGM [51433-85-3], etc., were carbonitrided to 0.9-1.1% C and 0.4-0.5% N content in a 0.05 mm-deep layer. A dark constituent of the carbonitrided layer was studied by metallog., electron microscopy, and physicochem. anal. Pptn. of irregular-shaped inclusions surrounded by

an easily etched zone, which usually crumbles during specimen prepn., was related to formation of the dark constituent.

IT 12742-15-3 37312-00-8 56995-50-7,

reactions

RL: USES (Uses)

(carbonitriding of, defect structure formation in)

RN 12742-15-3 CAPLUS

CN Iron alloy, base, Fe 95-98, Ni 0.80-1.10, Cr 0.70-1.10, Mn 0.60-0.90, Si 0.17-0.37, Cu 0-0.30, C 0.16-0.23, W 0-0.20, Mo 0-0.15, V 0-0.05, P 0-0.035, S 0-0.035, Ti 0-0.03, B 0.001 (20KhNR) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	95 - 98	7439-89-6
Ni	0.80 - 1.10	7440-02-0
Cr	0.70 - 1.10	7440-47-3
Mn	0.60 - 0.90	7439-96-5
Si	0.17 - 0.37	7440-21-3
Cu	0 - 0.30	7440-50-8
C	0.16 - 0.23	7440-44-0
W	0 - 0.20	7440-33-7
Mo	0 - 0.15	7439-98-7
V	0 - 0.05	7440-62-2
P	0 - 0.035	7723-14-0
S	0 - 0.035	7704-34-9
Ti	0 - 0.03	7440-32-6
B	0.001	7440-42-8

RN 37312-00-8 CAPLUS

CN Iron alloy, base, Fe 95-97, Ni 0.80-1.10, Cr 0.70-1.10, Mn 0.70-1.00, Si 0.17-0.37, Cu 0-0.30, C 0.16-0.23, W 0-0.20, Mo 0-0.15, V 0-0.05, P 0-0.035, S 0-0.035, Ti 0-0.03, B 0.001 (20KhGMR) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	95 - 97	7439-89-6
Ni	0.80 - 1.10	7440-02-0
Cr	0.70 - 1.10	7440-47-3
Mn	0.70 - 1.00	7439-96-5
Si	0.17 - 0.37	7440-21-3
Cu	0 - 0.30	7440-50-8
C	0.16 - 0.23	7440-44-0
W	0 - 0.20	7440-33-7
Mo	0 - 0.15	7439-98-7
V	0 - 0.05	7440-62-2
P	0 - 0.035	7723-14-0
S	0 - 0.035	7704-34-9
Ti	0 - 0.03	7440-32-6
B	0.001	7440-42-8

RN 56995-50-7 CAPLUS

CN Iron alloy, base, Fe 96-98, Cr 0.75-1.05, Mn 0.70-1.00, Si 0.17-0.37, Cu 0-0.30, Ni 0-0.30, C 0.18-0.24, W 0-0.20, Mo 0-0.15, V 0-0.05, P 0-0.035, S 0-0.035, Ti 0-0.03, B 0.001 (20KhGR) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	96 - 98	7439-89-6
Cr	0.75 - 1.05	7440-47-3
Mn	0.70 - 1.00	7439-96-5
Si	0.17 - 0.37	7440-21-3
Cu	0 - 0.30	7440-50-8
Ni	0 - 0.30	7440-02-0
C	0.18 - 0.24	7440-44-0
W	0 - 0.20	7440-33-7
Mo	0 - 0.15	7439-98-7
V	0 - 0.05	7440-62-2
P	0 - 0.035	7723-14-0
S	0 - 0.035	7704-34-9

Ti 0 - 0.03 7440-32-6
B 0.001 7440-42-8

CC 55-7 (Ferrous Metals and Alloys)
ST ~~steel~~ carbonitriding defect structure ppt
IT Carbonitridation and Cyanidation
(of low-alloy ~~steels~~, defect structure formation in)
IT 12681-03-7 12741-98-9, reactions 12742-08-4 12742-15-3
37312-00-8 37329-39-8, reactions 39344-94-0, reactions
51433-85-3, reactions 56995-50-7, reactions 66772-46-1
92049-05-3
RL: USES (Uses)
(carbonitriding of, defect structure formation in)

L13 ANSWER 81 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 1984:495400 CAPLUS Full-text

DOCUMENT NUMBER: 101:95400

ORIGINAL REFERENCE NO.: 101:14571a,14574a

TITLE: Thermochemical treatment of ~~steel~~ parts in
continuous furnaces with automatic control of carbon
potential

AUTHOR(S): Kirnos, I. V.; Klyshnikov, S. T.; Kukui, B. G.;
Lobachev, I. A.; Pegisheva, S. A.; Radzievskii, B. V.

CORPORATE SOURCE: VNIITMASH, USSR

SOURCE: Metallovedenie i Termicheskaya Obrabotka Metallov
(1984), (4), 24-8
CODEN: MTOMAX; ISSN: 0026-0819

DOCUMENT TYPE: Journal

LANGUAGE: Russian

AB A continuous furnace for ~~steel~~ carburization was developed. A math.
model was used for automatic control of the carburization process by
monitoring the C potential and moisture content of the furnace atm. Tests
were made on ~~steels~~ 20KhNR [12742-15-3] and 25KhGT [12741-98-9].
Good agreement of calcd. and exptl. data for C distribution in the
hardened layers, related to process parameters, was obtained.

IT 12742-15-3
RL: RCT (Reactant); RACT (Reactant or reagent)
(carburization of, in continuous furnace, control of, model for)

RN 12742-15-3 CAPLUS

CN Iron alloy, base, Fe 95-98, Ni 0.80-1.10, Cr 0.70-1.10, Mn 0.60-0.90, Si
0.17-0.37, Cu 0-0.30, C 0.16-0.23, W 0-0.20, Mo 0-0.15, V 0-0.05, P 0-0.035, S
0-0.035, Ti 0-0.03, B 0.001 (20KhNR) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
=====+=====		
Fe	95 - 98	7439-89-6
Ni	0.80 - 1.10	7440-02-0
Cr	0.70 - 1.10	7440-47-3
Mn	0.60 - 0.90	7439-96-5
Si	0.17 - 0.37	7440-21-3
Cu	0 - 0.30	7440-50-8
C	0.16 - 0.23	7440-44-0
W	0 - 0.20	7440-33-7
Mo	0 - 0.15	7439-98-7
V	0 - 0.05	7440-62-2
P	0 - 0.035	7723-14-0
S	0 - 0.035	7704-34-9
Ti	0 - 0.03	7440-32-6
B	0.001	7440-42-8

CC 55-7 (Ferrous Metals and Alloys)
ST ~~steel~~ carburization continuous furnace control; model ~~steel~~
carburization furnace control
IT Furnaces
(continuous, for ~~steel~~ carburization, control of, model for)
IT Controlled atmospheres
(in continuous furnace for ~~steel~~ carburization)
IT Process simulation, physicochemical
(of carburization of ~~steel~~ in continuous process)
IT Carburizing

(of steel, in continuous furnace, control of, model for)
 IT 12741-98-9, reactions 12742-15-3
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (carburization of, in continuous furnace, control of, model for)

L13 ANSWER 82 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN
 ACCESSION NUMBER: 1984:495398 CAPLUS Full-text
 DOCUMENT NUMBER: 101:95398
 ORIGINAL REFERENCE NO.: 101:14570h,14571a
 TITLE: Thermocyclic carbonitridation of gears
 AUTHOR(S): Bashnin, Yu. A.; Semenova, L. M.; Burenkova, O. S.;
 Borodova, I. A.; Ban'kovskii, A. I.
 CORPORATE SOURCE: VNIITMASH, USSR
 SOURCE: Metallovedenie i Termicheskaya Obrabotka Metallov
 (1984), (4), 14-15, 1 plate
 CODEN: MTOMAX; ISSN: 0026-0819
 DOCUMENT TYPE: Journal
 LANGUAGE: Russian

AB Tractor gears were made from steels 25KhGT [12741-98-9] and 20KhGMR
 [37312-00-8], and carbonitrided in a furnace with endothermic atm. using
 thermocycling (heating to 880° and cooling in controlled amt.).
 The effect of the thermocycling on contact-fatigue strength of hardened
 gears was studied in comparison with conventional thermochem. treatments
 (isothermal carbonitridation or carburization). It was found that
 thermocycle-treated steels had the same amt. of C and N in hardened
 layers, but had lower amt. of residual austenite, smaller martensite
 needles, and finer carbonitride particles. Durability of
 thermocycle-treated gears was 2.5 times that of conventionally treated
 ones.
 IT 37312-00-8
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (carbonitridation of, for tractor wear, thermocycling in, structure and
 mech. properties and wear resistance in relation to)
 RN 37312-00-8 CAPLUS
 CN Iron alloy, base, Fe 95-97, Ni 0.80-1.10, Cr 0.70-1.10, Mn 0.70-1.00, Si
 0.17-0.37, Cu 0-0.30, C 0.16-0.23, W 0-0.20, Mo 0-0.15, V 0-0.05, P 0-0.035, S
 0-0.035, Ti 0-0.03, B 0.001 (20KhGMR) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
=====+=====		
Fe	95 - 97	7439-89-6
Ni	0.80 - 1.10	7440-02-0
Cr	0.70 - 1.10	7440-47-3
Mn	0.70 - 1.00	7439-96-5
Si	0.17 - 0.37	7440-21-3
Cu	0 - 0.30	7440-50-8
C	0.16 - 0.23	7440-44-0
W	0 - 0.20	7440-33-7
Mo	0 - 0.15	7439-98-7
V	0 - 0.05	7440-62-2
P	0 - 0.035	7723-14-0
S	0 - 0.035	7704-34-9
Ti	0 - 0.03	7440-32-6
B	0.001	7440-42-8

CC 55-7 (Ferrous Metals and Alloys)
 IT Carbonitridation and Cyanidation
 (of steel, for tractor gears, thermocycling in, structure and
 mech. properties and wear resistance in relation to)
 IT Tractors
 (steel parts for, carbonitridation of, thermocycling in,
 structure and mech. properties and wear resistance in relation to)
 IT Gears
 (steel, for tractors, carbonitridation of, thermocycling in,
 structure and mech. properties and wear resistance in relation to)
 IT 12741-98-9, reactions 37312-00-8
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (carbonitridation of, for tractor wear, thermocycling in, structure and
 mech. properties and wear resistance in relation to)

L13 ANSWER 83 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 1983:526476 CAPLUS Full-text
DOCUMENT NUMBER: 99:126476
ORIGINAL REFERENCE NO.: 99:19427a,19430a
TITLE: Types of bainite in carburized layers of gears,
hardness and effective thickness of layers
containing bainite
AUTHOR(S): Susin, A. A.; Aleksandrov, B. I.; Val'ko, A. I.
CORPORATE SOURCE: USSR
SOURCE: Poverkh. Metody Uprochneniya Met. i Splavov v
Mashinostr. Materialy Seminara, M. (1983) 32-6
From: Ref. Zh., Metall. 1983, Abstr. No. 8I1029
DOCUMENT TYPE: Journal
LANGUAGE: Russian

AB Title only translated.

IT 12742-15-3

RL: USES (Uses)

(case carburization of gear, bainite morphol. in)

RN 12742-15-3 CAPLUS

CN Iron alloy, base, Fe 95-98, Ni 0.80-1.10, Cr 0.70-1.10, Mn 0.60-0.90, Si
0.17-0.37, Cu 0-0.30, C 0.16-0.23, W 0-0.20, Mo 0-0.15, V 0-0.05, P 0-0.035, S
0-0.035, Ti 0-0.03, B 0.001 (20KhNR) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	95 - 98	7439-89-6
Ni	0.80 - 1.10	7440-02-0
Cr	0.70 - 1.10	7440-47-3
Mn	0.60 - 0.90	7439-96-5
Si	0.17 - 0.37	7440-21-3
Cu	0 - 0.30	7440-50-8
C	0.16 - 0.23	7440-44-0
W	0 - 0.20	7440-33-7
Mo	0 - 0.15	7439-98-7
V	0 - 0.05	7440-62-2
P	0 - 0.035	7723-14-0
S	0 - 0.035	7704-34-9
Ti	0 - 0.03	7440-32-6
B	0.001	7440-42-8

CC 55-7 (Ferrous Metals and Alloys)

ST carburizing gear steel bainite

IT Carburizing

(of steel gears, for case hardening, bainite morphol. in)

IT Gears

(steel, case carburization of, bainite morphol. in)

IT 12742-15-3

RL: USES (Uses)

(case carburization of gear, bainite morphol. in)

IT 12427-23-5

RL: PRP (Properties)

(morphol. of, in case-carburized steel gears)

L13 ANSWER 84 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 1983:408990 CAPLUS Full-text
DOCUMENT NUMBER: 99:8990
ORIGINAL REFERENCE NO.: 99:1493a,1496a
TITLE: Ion nitriding behavior of several low alloy steels
AUTHOR(S): Robino, C. V.; Inal, O. T.
CORPORATE SOURCE: Dep. Metall. Mater. Eng., New Mexico Inst. Min.
Technol., Socorro, NM, 87801, USA
SOURCE: Materials Science and Engineering (1983), 59(1), 79-90
CODEN: MSCEAA; ISSN: 0025-5416
DIGITAL OBJECT ID: 10.1016/0025-5416(83)90090-3
DOCUMENT TYPE: Journal
LANGUAGE: English

AB The ion nitriding of several low-alloy steels, U.S. Steel T1 type A
[52346-86-8], AISI 4140 [12672-16-1], AISI 6150 [39370-53-1], and
Nitralloy 135M [61333-12-8], was examd. under varying process conditions

using microhardness-depth correlations, friction and wear measurements, and optical and transmission electron microscopy. The process variables included time (2-4 h) and temp. (400-600°). All 4 steels exhibited a diffusion layer case growth rate which was dependent on the square root of the exposure time. The highest nitrided hardnesses and lowest case depths were obsd. in the Nitralloy 135M steel while the lowest hardnesses and highest case depths in the T1 steel. The behaviors of the T1, AISI 4140, and 6150 steels were similar. The white layer thickness was independent of the material and increased with increasing time. Both the case depth and the white layer thickness increased strongly with temp. while the hardness decreased. Only slight differences arise in the bulk structure during nitriding. Nitriding produces platelet or disk ppts. approx. 5-20 nm across on {001} matrix planes. These platelets show a striated morphol. which is the result of strain within the matrix. Electron microscopy showed tempering to continue in the core region during nitriding. The wear resistance of the steels increased by factors of 3.7-8.5 by nitriding. The coeff. of friction increased in the nitrided samples.

IT 52346-86-8, reactions
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (ion nitridation of)
 RN 52346-86-8 CAPLUS
 CN Steel, (UNS K11630) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	97 - 98	7439-89-6
Mn	0.70 - 1.00	7439-96-5
Cr	0.40 - 0.65	7440-47-3
Si	0.20 - 0.35	7440-21-3
Mo	0.15 - 0.25	7439-98-7
C	0.12 - 0.21	7440-44-0
V	0.03 - 0.08	7440-62-2
S	0 - 0.04	7704-34-9
P	0 - 0.035	7723-14-0
Ti	0.01 - 0.03	7440-32-6
B	0.0005 - 0.005	7440-42-8

CC 55-7 (Ferrous Metals and Alloys)
 ST nitriding ion steel wear
 IT Plasma nitriding
 (of steels, low-alloy)
 IT 12672-16-1, reactions 39370-53-1, reactions 52346-86-8,
 reactions 61333-12-8
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (ion nitridation of)

OS.CITING REF COUNT: 27 THERE ARE 27 CAPLUS RECORDS THAT CITE THIS
 RECORD (27 CITINGS)

L13 ANSWER 85 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 1982:601438 CAPLUS Full-text

DOCUMENT NUMBER: 97:201438

ORIGINAL REFERENCE NO.: 97:33693a,33696a

TITLE: The use of controlled 20 and 40% hydrogen atmospheres
 in cementation and carbonitridation

AUTHOR(S): Tikhonov, A. K.; Sheindlin, B. E.; Chaikovskii, S. Z.;
 Krishtal, M. A.

CORPORATE SOURCE: Volgogr. Alum. Zavod, Volgograd, USSR

SOURCE: Metallovedenie i Termicheskaya Obrabotka Metallov
 (1982), (6), 30-3
 CODEN: MTOMAX; ISSN: 0026-0819

DOCUMENT TYPE: Journal

LANGUAGE: Russian

AB The effect of H concn. in controlled furnace atms. contg. 20 and 40% H on
 mech. properties and the rate of satn. of samples of Armco Fe and
 case-hardenable (18KhGT [12718-23-9], 30KhGT [37323-42-5], 20Kh3NA
 [12681-03-7], 20KhGNR [37312-00-8], and 19KhGN [37311-96-9]) and
 structural (45Kh [60999-09-9] and ShKh15 [12725-40-5]) steels and
 automobile parts of steel 16KhG [54342-41-5] during carburizing and
 carbonitriding was studied by reducing the atms. to a common C potential

and maintaining the latter through the entire expt. The thickness of the layer during carburizing of autoparts in the atms. with 20 and 40% H was 1.4 and 1.6 mm, resp., and in carburizing of steel samples 1.3 and 1.4 mm, resp. The impact toughness, strength, and breaking force during static bending test were higher in the 20% H atm. In carbonitridation, C content in the 20% H atm. was 0.1% higher than that at 40% H, and the rate of part satn. was practically the same. In the atm. with 20% H, heat losses through the furnace brickwork decreased by 25%.

IT 37312-00-8

RL: RCT (Reactant); RACT (Reactant or reagent)
(carburization and carbonitridation of case-hardenable, hydrogen in furnace controlled atms. for, mech. properties and satn. rate in relation to)

RN 37312-00-8 CAPLUS

CN Iron alloy, base, Fe 95-97, Ni 0.80-1.10, Cr 0.70-1.10, Mn 0.70-1.00, Si 0.17-0.37, Cu 0-0.30, C 0.16-0.23, W 0-0.20, Mo 0-0.15, V 0-0.05, P 0-0.035, S 0-0.035, Ti 0-0.03, B 0.001 (20KhGMR) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
=====+=====	=====+=====	=====
Fe	95 - 97	7439-89-6
Ni	0.80 - 1.10	7440-02-0
Cr	0.70 - 1.10	7440-47-3
Mn	0.70 - 1.00	7439-96-5
Si	0.17 - 0.37	7440-21-3
Cu	0 - 0.30	7440-50-8
C	0.16 - 0.23	7440-44-0
W	0 - 0.20	7440-33-7
Mo	0 - 0.15	7439-98-7
V	0 - 0.05	7440-62-2
P	0 - 0.035	7723-14-0
S	0 - 0.035	7704-34-9
Ti	0 - 0.03	7440-32-6
B	0.001	7440-42-8

CC 55-7 (Ferrous Metals and Alloys)

ST steel carburizing atm hydrogen; carbonitridation atm hydrogen steel;
Armco iron carbonitridation carburizing hydrogen

IT Controlled atmospheres
(endothermic, for carburization and carbonitridation of Armco iron and steels, hydrogen in, mech. properties and satn. rate in relation to)

IT Controlled atmospheres
(exothermic, for carburization and carbonitridation of Armco iron and steels, hydrogen in, mech. properties and satn. rate in relation to)

IT Carbonitridation and Cyanidation
Carburizing
(gas, of Armco iron and steels, hydrogen-contg. controlled atms. for, mech. properties and satn. rate in relation to)

IT 37311-96-9, reactions 37312-00-8 37323-42-5
RL: RCT (Reactant); RACT (Reactant or reagent)
(carburization and carbonitridation of case-hardenable, hydrogen in furnace controlled atms. for, mech. properties and satn. rate in relation to)

IT 1333-74-0, uses and miscellaneous
RL: USES (Uses)
(in carburization and carbonitridation atm. for Armco iron and case-hardenable and structural steels)

L13 ANSWER 86 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 1981:195784 CAPLUS Full-text

DOCUMENT NUMBER: 94:195784

ORIGINAL REFERENCE NO.: 94:32003a,32006a

TITLE: Prediction of the effective thickness of a case-hardened layer

AUTHOR(S): Gliner, R. E.; Kharkevich, N. I.

CORPORATE SOURCE: Gor'k. Avto. Zavod, Gorkiy, USSR

SOURCE: Avtomobil'naya Promyshlennost (1981), 46(1), 26-8
CODEN: AVPRA3; ISSN: 0005-2337

DOCUMENT TYPE: Journal
 LANGUAGE: Russian
 AB The carburization of hollow cylinders with wall thickness of 20 mm for ~~steels~~ 20Kh [37329-39-8], 27KhGR [58209-72-6], 20KhN2M [39411-21-7], 30KhMA [12672-15-0], and 18KhGT [12718-23-9] was done 7-14 h at 870-80° in endogas atm. with natural gas addns. The cylinders were then quenched in oil at 140°. Surface carburization was detd. in relation to C distribution in the carburized layer and hardness. Equation was developed for predicting the case depth.
 IT 58209-72-6, uses and miscellaneous
 RL: USES (Uses)
 (case depth of carburized)
 RN 58209-72-6 CAPLUS
 CN Iron alloy, base, Fe 96-98,Cr 0.70-1.00,Mn 0.70-1.00,Si 0.17-0.37,C 0.25-0.31,Cu 0-0.30,Ni 0-0.30,W 0-0.30,Mo 0-0.15,V 0-0.05,P 0-0.035,S 0-0.035,Ti 0-0.03,B 0.001 (27KhGR) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
=====+=====	=====+=====	=====
Fe	96 - 98	7439-89-6
Cr	0.70 - 1.00	7440-47-3
Mn	0.70 - 1.00	7439-96-5
Si	0.17 - 0.37	7440-21-3
C	0.25 - 0.31	7440-44-0
Cu	0 - 0.30	7440-50-8
Ni	0 - 0.30	7440-02-0
W	0 - 0.30	7440-33-7
Mo	0 - 0.15	7439-98-7
V	0 - 0.05	7440-62-2
P	0 - 0.035	7723-14-0
S	0 - 0.035	7704-34-9
Ti	0 - 0.03	7440-32-6
B	0.001	7440-42-8

CC 55-6 (Ferrous Metals and Alloys)
 ST ~~steel~~ cylinder carburizing
 IT Carburizing
 (case depth in, hardness of ~~steel~~ in relation to)
 IT 12672-15-0, uses and miscellaneous 12718-23-9, uses and miscellaneous
 37329-39-8, uses and miscellaneous 39411-21-7 58209-72-6,
 uses and miscellaneous 58209-73-7
 RL: USES (Uses)
 (case depth of carburized)

L13 ANSWER 87 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN
 ACCESSION NUMBER: 1980:412105 CAPLUS Full-text
 DOCUMENT NUMBER: 93:12105
 ORIGINAL REFERENCE NO.: 93:2075a,2078a
 TITLE: Interaction of titanium nitride with metallic melts
 AUTHOR(S): Gurevich, Yu. G.; Frage, N. R.
 CORPORATE SOURCE: Mashinostroït. Inst., Kurgan, USSR
 SOURCE: Tezisy Nauchn. Soobshch. Vses. Konf. Str. Svoistvam Met. Shlakovykh Rasplavov, 3rd (1978), Volume 2, 184-6. Akad. Nauk SSSR, Ural. Nauchn. Tsentr: Sverdlovsk, USSR.
 CODEN: 43GIAR

DOCUMENT TYPE: Conference
 LANGUAGE: Russian
 AB The kinetics of TiN dissoln. in Fe-O [12739-25-2], Fe-Ni [11148-11-1], ~~steel~~ ShKh15 [12725-40-5], 25KhGT [12741-98-9], and 20KhGMR [37312-00-8] were studied by using the rotating-specimen method. The TiN oxidn. rate in FeO in the 1st min was greatest and independent of time, in the 2nd min the rate decreased sharply, and after 2 min the TiN dissoln. ceased. TiN was ~~coated~~ with a dense oxide film. No TiN dissoln. occurred in Fe contg. <3% Ni. At >3% Ni TiN dissolved, and the Ti content in the melt increased. The Ti bonds increase in melts with increasing Ni concn. and decreased with stability of TiN in the melts.
 IT 37312-00-8
 RL: USES (Uses)
 (soln. kinetics in molten, of titanium nitride)

RN 37312-00-8 CAPLUS
 CN Iron alloy, base, Fe 95-97, Ni 0.80-1.10, Cr 0.70-1.10, Mn 0.70-1.00, Si 0.17-0.37, Cu 0-0.30, C 0.16-0.23, W 0-0.20, Mo 0-0.15, V 0-0.05, P 0-0.035, S 0-0.035, Ti 0-0.03, B 0.001 (20KhGNR) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	95 - 97	7439-89-6
Ni	0.80 - 1.10	7440-02-0
Cr	0.70 - 1.10	7440-47-3
Mn	0.70 - 1.00	7439-96-5
Si	0.17 - 0.37	7440-21-3
Cu	0 - 0.30	7440-50-8
C	0.16 - 0.23	7440-44-0
W	0 - 0.20	7440-33-7
Mo	0 - 0.15	7439-98-7
V	0 - 0.05	7440-62-2
P	0 - 0.035	7723-14-0
S	0 - 0.035	7704-34-9
Ti	0 - 0.03	7440-32-6
B	0.001	7440-42-8

CC 56-7 (Nonferrous Metals and Alloys)
 ST titanium nitride soln ~~steel~~; iron soln titanium nitride; oxygen soln titanium nitride; nickel soln titanium nitride
 IT 11148-11-1 12725-40-5 12739-25-2 12741-98-9, uses and miscellaneous 37312-00-8
 RL: USES (Uses)
 (soln. kinetics in molten, of titanium nitride)
 IT 25583-20-4
 RL: PRP (Properties)
 (soln. kinetics of, in iron and ~~steel~~ melts)

L13 ANSWER 88 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 1979:424887 CAPLUS Full-text

DOCUMENT NUMBER: 91:24887

ORIGINAL REFERENCE NO.: 91:4085a,4088a

TITLE: Diffusion saturation of ~~steels~~ with chromium

AUTHOR(S): Babushkin, B. V.; Makharov, D. M.

CORPORATE SOURCE: USSR

SOURCE: Metallurgiya (Minsk) (1978), 12, 92-3

CODEN: MTRGBV; ISSN: 0369-2450

DOCUMENT TYPE: Journal

LANGUAGE: Russian

AB Chromizing of ~~steels~~ 20KhNR [12742-15-3], 40KhN [12742-05-1], and 20Kh13 [37241-55-7] was carried out by aluminothermic redn. at 1050-1100° in a powder composed of Al₂O₃ 29.40, Cr₂O₃ 51.45, Al 17.15, and NH₄Cl 2%. The diffusion layer contained a carbide zone of (Cr,Fe)₂₃C₆ and (Cr,Fe)₇C₃ phases and a solid soln. zone of high-Cr ferrite. The total depth of the diffusion zone decreased and the depth of the carbide zone increased with increasing C content. The max. microhardness (>2000 kg/mm²) was obsd. for Cr carbides on ~~steel~~ 40KhN, and min. (~1350 kg/mm²) for Cr carbides on ~~steel~~ 20Kh13.

IT 12742-15-3
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (chromizing of, pack)

RN 12742-15-3 CAPLUS

CN Iron alloy, base, Fe 95-98, Ni 0.80-1.10, Cr 0.70-1.10, Mn 0.60-0.90, Si 0.17-0.37, Cu 0-0.30, C 0.16-0.23, W 0-0.20, Mo 0-0.15, V 0-0.05, P 0-0.035, S 0-0.035, Ti 0-0.03, B 0.001 (20KhNR) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	95 - 98	7439-89-6
Ni	0.80 - 1.10	7440-02-0
Cr	0.70 - 1.10	7440-47-3
Mn	0.60 - 0.90	7439-96-5
Si	0.17 - 0.37	7440-21-3
Cu	0 - 0.30	7440-50-8

C	0.16	-	0.23	7440-44-0
W	0	-	0.20	7440-33-7
Mo	0	-	0.15	7439-98-7
V	0	-	0.05	7440-62-2
P	0	-	0.035	7723-14-0
S	0	-	0.035	7704-34-9
Ti	0	-	0.03	7440-32-6
B			0.001	7440-42-8

CC 55-6 (Ferrous Metals and Alloys)
 ST chromizing pack ~~steel~~ structure
 IT Chromizing
 (pack, of ~~steels~~, carbide morphol. in)
 IT 12742-05-1 ~~13742-15-3~~ 37241-55-7
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (chromizing of, pack)
 IT 12012-72-5DP, solid soln. with chromium carbide (Cr₂₃C₆) 12075-40-0DP,
 solid soln. with iron carbide (Fe₇C₃) 12075-42-2DP, solid soln. with
 chromium carbide (Cr₇C₃) 12105-81-6DP, solid soln. with iron carbide
 (Fe₂₃C₆)
 RL: FORM (Formation, nonpreparative); PREP (Preparation)
 (formation of, in chromized ~~steel~~)

L13 ANSWER 89 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN
 ACCESSION NUMBER: 1978:567295 CAPLUS Full-text
 DOCUMENT NUMBER: 89:167295
 ORIGINAL REFERENCE NO.: 89:25893a,25896a
 TITLE: Stress corrosion susceptibility of highway bridge
 construction ~~steels~~ - phase IIB
 AUTHOR(S): Caton, R. G.; Guthrie, J. L.; Carter, C. S.
 CORPORATE SOURCE: Boeing Commmerc. Airplane Co., Seattle, WA, USA
 SOURCE: U. S. NTIS, PB Rep. (1976), PB-272493, 73 pp. Avail.:
 NTIS
 From: Gov. Rep. Announce. Index (U. S.) 1977, 77(25),
 135
 CODEN: XPERCA; ISSN: 0099-8583
 DOCUMENT TYPE: Report
 LANGUAGE: English

AB Eleven ~~steels~~ typically used in highway bridge construction were
 evaluated for stress corrosion resistance in various environments under
 tension. The effects of welding and 5% cold work were also investigated.
 Lab. tests were verified by exposure of specimens at selected locations in
 the United States. Both ASTM A325 [67954-12-5] and ASTM A490
 [67954-11-4] bolts were evaluated for stress corrosion resistance in
 similar environments. The effects of hot dip galvanizing and mech.
 galvanizing on the stress corrosion susceptibility were also detd.
 Suspension cable and prestressing wires were evaluated for stress
 corrosion resistance. The suspension cable wires were tested with no
 coating, and with hot dip galvanized and electrogalvanized coatings.
 IT ~~52346-86-8~~, properties
 RL: PRP (Properties)
 (stress-corrosion susceptibility of, for highway bridge construction)
 RN 52346-86-8 CAPLUS
 CN Steel, (UNS K11630) (CA INDEX NAME)

Component	Component Percent		Component Registry Number
=====+=====			
Fe	97	- 98	7439-89-6
Mn	0.70	- 1.00	7439-96-5
Cr	0.40	- 0.65	7440-47-3
Si	0.20	- 0.35	7440-21-3
Mo	0.15	- 0.25	7439-98-7
C	0.12	- 0.21	7440-44-0
V	0.03	- 0.08	7440-62-2
S	0	- 0.04	7704-34-9
P	0	- 0.035	7723-14-0
Ti	0.01	- 0.03	7440-32-6
B	0.0005	- 0.005	7440-42-8

CC 55-9 (Ferrous Metals and Alloys)

ST steel bridge construction stress corrosion; structural steel stress corrosion; galvanizing steel stress corrosion; weld steel stress corrosion; cold work steel stress corrosion

IT Galvanized iron and steel
RL: USES (Uses)
(for highway bridge construction)

IT Bridges
(for highways, structural steels for, stress-corrosion susceptibility of)

IT Welds
(in structural steels, in highway bridge construction)

IT Bolts
(structural steel, for highway bridge construction)

IT 12725-37-0, properties 12731-93-0, properties 12732-02-4, properties 12732-05-7, properties 52346-86-8, properties 58397-66-3, properties 63747-69-3, properties 63849-06-9, properties 67954-11-4, properties 67954-12-5, properties
RL: PRP (Properties)
(stress-corrosion susceptibility of, for highway bridge construction)

L13 ANSWER 90 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 1978:533594 CAPLUS Full-text

DOCUMENT NUMBER: 89:133594

ORIGINAL REFERENCE NO.: 89:20639a,20642a

TITLE: Effect of atmospheric corrosion on fatigue strength of steels and welded joints

AUTHOR(S): Gregor, Vladimir

CORPORATE SOURCE: Mater. Test. Lab., Weld. Res. Inst., Bratislava, Czech.

SOURCE: Zvaracské Spravy (1976), 26(4), 73-80

CODEN: ZVSPDI; ISSN: 0322-9785

DOCUMENT TYPE: Journal

LANGUAGE: English/Slovak

AB Fatigue strength of base metal and butt-welded joints was detd. in bending and cyclic tension for the low-alloy steel, grades 15217.1 [12742-62-0], 11523.1 [71497-79-5], 16224 [60707-55-3], and 16224 + 0.37% Cu. Effects of corrosion on fatigue strength were detd. for accelerated chamber corrosion (5-150 cycles at 35° in SO₂-contg. atm., with humidity and drying), and after 1-yr atm. exposure at a chem. plant. Corrosion rates were similar for all steels. The Cu-modified 16224 steel lost its surface corrosion layer after 30-50 cycles and developed a roughened surface, while the regular 16224 steel did not. Fatigue strength was rapidly decreased by corrosion exposure to ≤40 cycles, remaining nearly const. for longer cycling. Performance of 15217.1 steel was comparable to that of 11523.1 steel.

IT 60707-55-3

RL: PRP (Properties)

(fatigue and weld strength of, after corrosion)

RN 60707-55-3 CAPLUS

CN Iron alloy, base, Fe 95-97,Cr 0.70-1.00,Mn 0.70-1.00,Ni 0.70-1.00,Mo 0.30-0.50,Si 0.12-0.35,Cu 0-0.30,C 0.12-0.18,V 0.03-0.08,Ti 0-0.04,P 0-0.030,S 0-0.030,B 0.002-0.005 (CSN 16 224) (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	95 - 97	7439-89-6
Cr	0.70 - 1.00	7440-47-3
Mn	0.70 - 1.00	7439-96-5
Ni	0.70 - 1.00	7440-02-0
Mo	0.30 - 0.50	7439-98-7
Si	0.12 - 0.35	7440-21-3
Cu	0 - 0.30	7440-50-8
C	0.12 - 0.18	7440-44-0
V	0.03 - 0.08	7440-62-2
Ti	0 - 0.04	7440-32-6
P	0 - 0.030	7723-14-0
S	0 - 0.030	7704-34-9
B	0.002 - 0.005	7440-42-8

CC 55-9 (Ferrous Metals and Alloys)

ST corrosion fatigue low alloy steel; weld fatigue corrosion steel;
cyclic corrosion fatigue steel

IT Welding
(arc, of low-alloy steels, for fatigue and corrosion test)

IT Welds
(butt, in low-alloy steels, fatigue strength in relation to
atm. corrosion of)

IT 12742-62-0 60707-55-3 71497-79-5, properties
RL: PRP (Properties)
(fatigue and weld strength of, after corrosion)

IT 7440-50-8, uses and miscellaneous
RL: USES (Uses)
(in low-alloy steels, accelerated chamber corrosion in
relation to)

IT 64941-69-1 67661-29-4, uses and miscellaneous 67663-48-3, uses and
miscellaneous
RL: USES (Uses)
(welding electrodes, for low-alloy steels)

L13 ANSWER 91 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 1978:463151 CAPLUS Full-text

DOCUMENT NUMBER: 89:63151

ORIGINAL REFERENCE NO.: 89:9753a,9756a

TITLE: Determination of the chemical reaction rate constant
during the treatment of steel in an endothermic
atmosphere

AUTHOR(S): Gyulikhandanov, E. L.; Kislenkov, V. V.

CORPORATE SOURCE: Leningrad, USSR

SOURCE: Izvestiya Akademii Nauk SSSR, Metally (1978), (3),
189-91

CODEN: IZNMAQ; ISSN: 0568-5303

DOCUMENT TYPE: Journal

LANGUAGE: Russian

AB The high-temp. measurement of elec. resistivity change in steel foil
during carburization and decarburization were used to det. the temp.
dependence of the reaction const. between endothermic atms. of different
comps. and unalloyed γ -Fe. The reaction const. was related to the
thermodn. activity of C in alloyed austenite at 925°, i.e., the
carburization temp. The value is applicable to any alloy steel and with
the diffusion coeff. data is useful in detg. the C distribution through
the layer during carburization in the endothermic atm. Foils of Armco
Fe and carburizing steels 12KhN3A [12750-62-8], 18Kh2N4VA
[12742-21-1], 20KhGMR [37312-00-8], and 20Kh3MVF [37246-14-3] were
used in the measurements.

IT 37312-00-8
RL: RCT (Reactant); RACT (Reactant or reagent)
(carburization of, in endothermic atm.)

RN 37312-00-8 CAPLUS

CN Iron alloy, base, Fe 95-97, Ni 0.80-1.10, Cr 0.70-1.10, Mn 0.70-1.00, Si
0.17-0.37, Cu 0-0.30, C 0.16-0.23, W 0-0.20, Mo 0-0.15, V 0-0.05, P 0-0.035, S
0-0.035, Ti 0-0.03, B 0.001 (20KhGMR) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	95 - 97	7439-89-6
Ni	0.80 - 1.10	7440-02-0
Cr	0.70 - 1.10	7440-47-3
Mn	0.70 - 1.00	7439-96-5
Si	0.17 - 0.37	7440-21-3
Cu	0 - 0.30	7440-50-8
C	0.16 - 0.23	7440-44-0
W	0 - 0.20	7440-33-7
Mo	0 - 0.15	7439-98-7
V	0 - 0.05	7440-62-2
P	0 - 0.035	7723-14-0
S	0 - 0.035	7704-34-9
Ti	0 - 0.03	7440-32-6
B	0.001	7440-42-8

CC 55-6 (Ferrous Metals and Alloys)

ST ~~steel~~ carburization endothermic atm
 IT Carburizing
 (of iron and ~~steel~~ in endothermic atm.)
 IT 12742-21-1 12750-62-8 37246-14-3 37312-00-8
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (carburization of, in endothermic atm.)

L13 ANSWER 92 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN
 ACCESSION NUMBER: 1977:62593 CAPLUS Full-text
 DOCUMENT NUMBER: 86:62593
 ORIGINAL REFERENCE NO.: 86:9887a,9890a
 TITLE: Protection of parts in nonmuffle units from gaseous
 carbonitridation by chromium plating
 AUTHOR(S): Rotin, A. I.; Fishtein, B. M.; Shluger, M. A.
 CORPORATE SOURCE: Rostov.-na-Donu Nauchno-Issled. Inst. Tekhnol.
 Mashinostr., Rostov-on-Don, USSR
 SOURCE: Zashchita Metallov (1976), 12(6), 716-18
 CODEN: ZAMEA9; ISSN: 0044-1856
 DOCUMENT TYPE: Journal
 LANGUAGE: Russian

AB ~~Steel~~ plated with Cr from a bath contg. CrO3 350-400, H2SO4 1.9-2.0,
 Cr2O3 5-8, NaOH 40-60 g/L, at temp. 18-19° and c.d. 20-100 A/dm2
 and after previous anodic surface cleaning at c.d. 25-60 A/dm2 had no
 diffusion of C or N in it. The depth of the cabronitridated layer in
 the nonprotected surfaces of the ~~steel~~ was 0.9-1.1 mm after 12.5 h.
 IT 59738-82-8, reactions
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (carbonitridation of, chromium electroplate in prevention of)
 RN 59738-82-8 CAPLUS
 CN Steel, (20KhGNTR) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
=====+=====		
Fe	97 - 98	7439-89-6
Mn	0.80 - 1.00	7439-96-5
Cr	0.40 - 0.70	7440-47-3
Ni	0.40 - 0.70	7440-02-0
Si	0.17 - 0.37	7440-21-3
Cu	0 - 0.30	7440-50-8
C	0.18 - 0.24	7440-44-0
Ti	0.03 - 0.09	7440-32-6
P	0 - 0.035	7723-14-0
S	0 - 0.035	7704-34-9
B	0.001	7440-42-8

CC 72-6 (Electrochemistry)
 ST chromium electroplate ~~steel~~ carbonitridation
 IT Carbonitridation and Cyanidation
 (of ~~steel~~, chromium electroplating in prevention of)
 IT 12718-23-9, uses and miscellaneous 37329-39-8, uses and miscellaneous
 51258-45-8 59738-82-8, reactions
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (carbonitridation of, chromium electroplate in prevention of)
 IT 7440-47-3, uses and miscellaneous
 RL: PRP (Properties)
 (electroplating of, on ~~steel~~, for carbonitridation
 prevention)

L13 ANSWER 93 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN
 ACCESSION NUMBER: 1977:20628 CAPLUS Full-text
 DOCUMENT NUMBER: 86:20628
 ORIGINAL REFERENCE NO.: 86:3299a,3302a
 TITLE: Hardness of metals during strengthening by surface
 plastic deformation
 AUTHOR(S): Yankov, N. I.; Aleksandrov, B. I.; Yankov, I. I.
 CORPORATE SOURCE: Inst. Probl. Nadezhnosti Dolgovechnosti Mash., Minsk,
 USSR
 SOURCE: Vestsi Akademii Navuk BSSR, Seryya Fizika-Tekhnichnykh
 Navuk (1976), (3), 5-9

DOCUMENT TYPE:

Journal

LANGUAGE:

Russian

AB The stress-strain relation for Cu, Al, and ~~steels~~ was examd. A method was applied for calcg. the max. hardness of the surface layer during strengthening by surface plastic deformation. For ~~steels~~, the calcd. results agreed with exptl. data.

IT 59738-82-8, uses and miscellaneous

RL: PEP (Physical, engineering or chemical process); PROC (Process)
(hardening of, by surface plastic deformation)

RN 59738-82-8 CAPLUS

CN Steel, (20KhGNTR) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
=====+=====	=====+=====	=====
Fe	97 - 98	7439-89-6
Mn	0.80 - 1.00	7439-96-5
Cr	0.40 - 0.70	7440-47-3
Ni	0.40 - 0.70	7440-02-0
Si	0.17 - 0.37	7440-21-3
Cu	0 - 0.30	7440-50-8
C	0.18 - 0.24	7440-44-0
Ti	0.03 - 0.09	7440-32-6
P	0 - 0.035	7723-14-0
S	0 - 0.035	7704-34-9
B	0.001	7440-42-8

CC 56-7 (Nonferrous Metals and Alloys)

ST copper surface layer hardness; aluminum surface layer hardness;
steel surface layer hardness; surface plastic deformation metal

IT 7429-90-5, properties 7440-50-8, properties 11121-90-7, properties
12611-78-8 12725-40-5 12731-93-0, properties 12732-25-1 12742-05-1
12742-24-4 12742-30-2 12743-82-7, uses and miscellaneous 12750-62-8
37268-90-9, properties 37269-19-5, properties 39294-21-8
59738-82-8, uses and miscellaneous 61431-72-9

RL: PEP (Physical, engineering or chemical process); PROC (Process)
(hardening of, by surface plastic deformation)

L13 ANSWER 94 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 1976:546672 CAPLUS Full-text

DOCUMENT NUMBER: 85:146672

ORIGINAL REFERENCE NO.: 85:23487a,23490a

TITLE: Protecting parts from gas carburization and
carbonitriding by electroplating with chromium

AUTHOR(S): Rotin, A. I.; Fishtein, B. M.; Shluger, M. A.

CORPORATE SOURCE: Nauchno-Issled. Inst. Tsvetn. Metall., Rostov-on-Don,
USSR

SOURCE: Metallovedenie i Termicheskaya Obrabotka Metallov
(1976), (5), 49-50
CODEN: MTOMAX; ISSN: 0026-0819

DOCUMENT TYPE: Journal

LANGUAGE: Russian

AB Cylindrical specimens of 20Kh [37329-39-8], 18KhGT [12718-23-9], 12KhN3A [12750-62-8], and 20KhGNTR [59738-82-8] ~~steels~~ were electroplated with Cr. Then, specimens were carbonitrided at 870° in an atm. contg. CO 18-19, H 42-44, CH₄ 1-2, NH₃ 3%, and balance N and oil quenched from 830°. The carbonitrided layer depth was 0.9-1.1 mm on the surface of the uncoated specimens. A 5 μ thick Cr coating inhibited diffusion of C and N. During carbonitriding, a thin interlayer of Cr₂₃C₆ and Cr₇C₃ formed at the Cr-~~steel~~ interface. This carbide interlayer acted as a barrier to C diffusion.

IT 59738-82-8, reactions

RL: RCT (Reactant); RACT (Reactant or reagent)
(carburization and carbonitriding of, chromium electroplating for
stopoff in)

RN 59738-82-8 CAPLUS

CN Steel, (20KhGNTR) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
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=====+=====+=====
Fe          97      -   98          7439-89-6
Mn          0.80 -   1.00          7439-96-5
Cr          0.40 -   0.70          7440-47-3
Ni          0.40 -   0.70          7440-02-0
Si          0.17 -   0.37          7440-21-3
Cu          0      -   0.30          7440-50-8
C           0.18 -   0.24          7440-44-0
Ti          0.03 -   0.09          7440-32-6
P           0      -   0.035        7723-14-0
S           0      -   0.035        7704-34-9
B           0      -   0.001        7440-42-8

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CC  55-6 (Ferrous Metals and Alloys)
ST  chromium electroplating protection steel carbonitriding
IT  Carbonitridation and Cyanidation
    Carburization
      (of steel, chromium electroplate for stopoff in)
IT  12718-23-9, reactions 12750-62-8 37329-39-8, reactions
    59738-82-8, reactions
    RL: RCT (Reactant); RACT (Reactant or reagent)
      (carburization and carbonitriding of, chromium electroplating for
      stopoff in)
IT  7440-47-3, uses and miscellaneous
    RL: USES (Uses)
      (electroplating on steel, as stopoff for carburization and
      carbonitriding prevention)

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L13 ANSWER 95 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN
ACCESSION NUMBER: 1976:48042 CAPLUS Full-text
DOCUMENT NUMBER: 84:48042
ORIGINAL REFERENCE NO.: 84:7875a,7878a
TITLE: Diffusion saturation of steel by carbon and manganese
AUTHOR(S): Rishchev, I. A.; Shcherbakov, E. D.; Khudokormova, R.
           N.; Martynyuk, M. N.
CORPORATE SOURCE: USSR
SOURCE: Khim.-Term. Obrab. Met. Splavov, Tezisy Dokl. Vses.
        Nauchn. Konf., 2nd (1974), 122-3. Editor(s):
        Lyakhovich, L. S. Beloruss. Politekh. Inst.: Minsk,
        USSR.
        CODEN: 31GQAO
DOCUMENT TYPE: Conference
LANGUAGE: Russian

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AB  The simultaneous cementation of 8 C and low-alloy steels with C and Mn
    [7439-96-5] in powd. Bondyuzhsk carburizing agent or ferromanganese
    [12604-53-4] or their mixts. contg. Al2O3 and NH4Cl
    (ferromanganese-Al2O3-NH4Cl ratio 67:30:3) took place in metal crucibles
    with consumable covers at 1000° during 4, 6, and 8 hr. The
    diffusion layers of high-Mn austenite with finely dispersed carbide
    inclusions formed in mixts. contg. the carburizer 50-80, ferromanganese
    15-30, NH4Cl 1-2%, and the rest Al2O3, had wear resistances higher than
    that of G13 austenitic Mn steel.
IT  12742-15-3
    RL: USES (Uses)
      (carburization and manganese cementation of, with ferromanganese-contg.
      compns.)
RN  12742-15-3 CAPLUS
CN  Iron alloy, base, Fe 95-98, Ni 0.80-1.10, Cr 0.70-1.10, Mn 0.60-0.90, Si
    0.17-0.37, Cu 0-0.30, C 0.16-0.23, W 0-0.20, Mo 0-0.15, V 0-0.05, P 0-0.035, S
    0-0.035, Ti 0-0.03, B 0.001 (20KhNR) (CA INDEX NAME)

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Component          Component          Component
                   Percent            Registry Number
=====+=====+=====
Fe          95      -   98          7439-89-6
Ni          0.80 -   1.10          7440-02-0
Cr          0.70 -   1.10          7440-47-3
Mn          0.60 -   0.90          7439-96-5
Si          0.17 -   0.37          7440-21-3
Cu          0      -   0.30          7440-50-8
C           0.16 -   0.23          7440-44-0

```


W	0	-	0.20	7440-33-7
Mo	0	-	0.15	7439-98-7
V	0	-	0.05	7440-62-2
P	0	-	0.035	7723-14-0
S	0	-	0.035	7704-34-9
Ti	0	-	0.03	7440-32-6
B			0.001	7440-42-8

CC 55-6 (Ferrous Metals and Alloys)

ST ~~steel~~ cementation carbon manganese; carburization ~~steel~~
ferromanganese; ferromanganese cementation ~~steel~~

IT Cementation
(of ~~steel~~ with manganese, with ferromanganese-contg. mixts.)

IT Carburization
(of ~~steels~~, combined with manganese cementation, with
ferromanganese-contg. compns.)

IT 12725-33-6, uses and miscellaneous 12731-92-9, uses and miscellaneous
12742-15-3 12742-21-1 12743-82-7, uses and miscellaneous
12750-62-8 37268-90-9, uses and miscellaneous 73286-08-5, reactions
RL: USES (Uses)
(carburization and manganese cementation of, with ferromanganese-contg.
compns.)

IT 12604-53-4
RL: USES (Uses)
(cementation of ~~steels~~ with mixts. contg., for simultaneous
carburization and manganese cementation)

IT 7439-96-5, uses and miscellaneous
RL: USES (Uses)
(cementation with, combined with carburization, of carbon and low-alloy
~~steels~~)

L13 ANSWER 96 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 1975:483285 CAPLUS Full-text

DOCUMENT NUMBER: 83:83285

ORIGINAL REFERENCE NO.: 83:13051a,13054a

TITLE: Magnetic, electric, and mechanical properties of
20KhGR and 20KhGMR ~~steels~~ and their carburized layers

AUTHOR(S): Kuznetsov, I. A.; Somova, V. M.; Tsar'kova, T. P.;
Bashkirov, Yu. P.

CORPORATE SOURCE: USSR

SOURCE: Struktura i svoistva tverdykh tel (1973), (1), 164-84
From: Ref. Zh., Metall. 1974, Abstr. No. 7I547

DOCUMENT TYPE: Journal

LANGUAGE: Russian

AB Title only translated.

IT 37312-00-8 56995-50-7, properties

RL: USES (Uses)

(elec. and magnetic and mech. properties of carburized)

RN 37312-00-8 CAPLUS

CN Iron alloy, base, Fe 95-97, Ni 0.80-1.10, Cr 0.70-1.10, Mn 0.70-1.00, Si
0.17-0.37, Cu 0-0.30, C 0.16-0.23, W 0-0.20, Mo 0-0.15, V 0-0.05, P 0-0.035, S
0-0.035, Ti 0-0.03, B 0.001 (20KhGMR) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
=====+=====		
Fe	95 - 97	7439-89-6
Ni	0.80 - 1.10	7440-02-0
Cr	0.70 - 1.10	7440-47-3
Mn	0.70 - 1.00	7439-96-5
Si	0.17 - 0.37	7440-21-3
Cu	0 - 0.30	7440-50-8
C	0.16 - 0.23	7440-44-0
W	0 - 0.20	7440-33-7
Mo	0 - 0.15	7439-98-7
V	0 - 0.05	7440-62-2
P	0 - 0.035	7723-14-0
S	0 - 0.035	7704-34-9
Ti	0 - 0.03	7440-32-6
B	0.001	7440-42-8

RN 56995-50-7 CAPLUS
 CN Iron alloy, base, Fe 96-98,Cr 0.75-1.05,Mn 0.70-1.00,Si 0.17-0.37,Cu 0-0.30,Ni 0-0.30,C 0.18-0.24,W 0-0.20,Mo 0-0.15,V 0-0.05,P 0-0.035,S 0-0.035,Ti 0-0.03,B 0.001 (20KhGR) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	96 - 98	7439-89-6
Cr	0.75 - 1.05	7440-47-3
Mn	0.70 - 1.00	7439-96-5
Si	0.17 - 0.37	7440-21-3
Cu	0 - 0.30	7440-50-8
Ni	0 - 0.30	7440-02-0
C	0.18 - 0.24	7440-44-0
W	0 - 0.20	7440-33-7
Mo	0 - 0.15	7439-98-7
V	0 - 0.05	7440-62-2
P	0 - 0.035	7723-14-0
S	0 - 0.035	7704-34-9
Ti	0 - 0.03	7440-32-6
B	0.001	7440-42-8

CC 55-8 (Ferrous Metals and Alloys)
 Section cross-reference(s): 76, 77
 ST steel carburized property; magnetic property carburized steel; mech property carburized steel; elec property carburized steel
 IT Electric property
 Magnetic property and Magnetism
 (of carburized steel)
 IT 37312-00-8 56995-50-7, properties
 RL: USES (Uses)
 (elec. and magnetic and mech. properties of carburized)

L13 ANSWER 97 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN
 ACCESSION NUMBER: 1975:101616 CAPLUS Full-text
 DOCUMENT NUMBER: 82:101616
 ORIGINAL REFERENCE NO.: 82:16213a,16216a
 TITLE: Carburization in an electrothermal fluidized bed
 AUTHOR(S): Androshchuk, V. N.; Tsubanov, A. G.; Nikitin, V. S.
 CORPORATE SOURCE: USSR
 SOURCE: Sbornik Nauchnykh Trudov, Belorusskii Institut Mekhanizatsii Sel'skogo Khozyaistva (1972), 21, 195-7
 CODEN: SBMKAP; ISSN: 0370-8640
 DOCUMENT TYPE: Journal
 LANGUAGE: Russian

AB Carburization of 10-20 x 20-30 mm 20Kh, 20KhNR, and 18KhGT steel was accomplished in a Kryptol fluidized bed elec. furnace at 900-1000°. The carburization gas contained CO 20, CH4 3.8, H 13.5, CO2 1.2, and O 0.35%. A 1.25-mm carburized layer was obtained in 30 min. at 1000°.

IT 12742-15-3
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (carburization of, in fluidized bed)

RN 12742-15-3 CAPLUS
 CN Iron alloy, base, Fe 95-98,Ni 0.80-1.10,Cr 0.70-1.10,Mn 0.60-0.90,Si 0.17-0.37,Cu 0-0.30,C 0.16-0.23,W 0-0.20,Mo 0-0.15,V 0-0.05,P 0-0.035,S 0-0.035,Ti 0-0.03,B 0.001 (20KhNR) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	95 - 98	7439-89-6
Ni	0.80 - 1.10	7440-02-0
Cr	0.70 - 1.10	7440-47-3
Mn	0.60 - 0.90	7439-96-5
Si	0.17 - 0.37	7440-21-3
Cu	0 - 0.30	7440-50-8
C	0.16 - 0.23	7440-44-0
W	0 - 0.20	7440-33-7
Mo	0 - 0.15	7439-98-7

V	0	-	0.05	7440-62-2
P	0	-	0.035	7723-14-0
S	0	-	0.035	7704-34-9
Ti	0	-	0.03	7440-32-6
B			0.001	7440-42-8

CC 55-6 (Ferrous Metals and Alloys)
 ST carburization chromium steel; electrothermal fluidized bed carburizing
 IT Carburization
 (of steel, in fluidized bed)
 IT 12718-23-9, reactions 12742-15-3 37329-39-8, reactions
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (carburization of, in fluidized bed)

L13 ANSWER 98 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN
 ACCESSION NUMBER: 1974:405409 CAPLUS Full-text
 DOCUMENT NUMBER: 81:5409
 ORIGINAL REFERENCE NO.: 81:883a,886a
 TITLE: Thermophysical properties of steel scale at
 different temperatures
 AUTHOR(S): Severdenko, V. P.; Makushok, E. M.; Ravin, A. N.
 CORPORATE SOURCE: Fiz.-Tekh. Inst., Minsk, USSR
 SOURCE: Vestsi Akademii Navuk BSSR, Seryya Fizika-Tekhnichnykh
 Navuk (1974), (1), 33-7
 CODEN: VABFAF; ISSN: 0002-3566

DOCUMENT TYPE: Journal
 LANGUAGE: Russian
 AB The thermophys. properties (d. sp. heat, heat cond., and heat cond.
 coeff.) at 20-700° were detd. for the scale component oxides and
 for the scales on widely used forged and rolled 45, 25KhGT, 20KhNR, 40Kh,
 ShKh15, and Kh18N10T steels.
 IT 12742-15-3
 RL: USES (Uses)
 (thermophys., of scale coatings on)
 RN 12742-15-3 CAPLUS
 CN Iron alloy, base, Fe 95-98, Ni 0.80-1.10, Cr 0.70-1.10, Mn 0.60-0.90, Si
 0.17-0.37, Cu 0-0.30, C 0.16-0.23, W 0-0.20, Mo 0-0.15, V 0-0.05, P 0-0.035, S
 0-0.035, Ti 0-0.03, B 0.001 (20KhNR) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
=====+=====	=====+=====	=====
Fe	95 - 98	7439-89-6
Ni	0.80 - 1.10	7440-02-0
Cr	0.70 - 1.10	7440-47-3
Mn	0.60 - 0.90	7439-96-5
Si	0.17 - 0.37	7440-21-3
Cu	0 - 0.30	7440-50-8
C	0.16 - 0.23	7440-44-0
W	0 - 0.20	7440-33-7
Mo	0 - 0.15	7439-98-7
V	0 - 0.05	7440-62-2
P	0 - 0.035	7723-14-0
S	0 - 0.035	7704-34-9
Ti	0 - 0.03	7440-32-6
B	0.001	7440-42-8

CC 55-8 (Ferrous Metals and Alloys)
 ST thermophys property steel scale; oxide scale forged rolled steel;
 stainless steel scale; alloy low steel scale
 IT Heat capacity
 Thermal conductivity and conduction
 (of scale, on steel)
 IT Scale (coating)
 (thermophys. properties of, on steel)
 IT 1309-37-1, properties 1317-61-9 1345-25-1, properties
 RL: PRP (Properties)
 (thermophys., in scale on steel)
 IT 12611-78-8 12725-40-5 12741-98-9, properties 12742-15-3
 37268-90-9, properties 39344-94-0, properties
 RL: USES (Uses)

(thermophys., of scale coatings on)

L13 ANSWER 99 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 1974:29530 CAPLUS Full-text

DOCUMENT NUMBER: 80:29530

ORIGINAL REFERENCE NO.: 80:4865a,4868a

TITLE: Effect of chemicothermal treatment in hydrogen-containing atmospheres on static crack and brittle strengths of case-hardened steel

AUTHOR(S): Dukarevich, I. S.; Balter, M. A.

CORPORATE SOURCE: USSR

SOURCE: Vestnik Mashinostroeniya (1973), 53(8), 62-5

CODEN: VMASAV; ISSN: 0042-4633

DOCUMENT TYPE: Journal

LANGUAGE: Russian

AB Thermochem. treatment is developed in controlled gas atm. contg. H, which is readily adsorbed on the surface. The diffusion coeff. of H is 3-4 orders higher than the diffusion coeffs. of C and N in Fe, and therefore the depth of H-satd. zone is considerably greater than that of the case-hardened or carbonitrided layers. The effects of H satn. on static and brittle strength of steels, after various carburizing treatments in natural gas, carbonitridation in natural gas and ammonia, hardening of carburized steel with heating in endogas with or without addn. of natural gas were studied for the core and the diffusion-coated layer at a relative carburized layer depth 0.25-0.33. A decrease in strength and plasticity during static bending and elongation testing of carburized 20Kh2N4A (Cr-Ni) steel was obsd. The effect of H pickup of steel during treatment in a H-contg. atm., causing a decrease in static and brittle strengths, must be considered in use of diffusion coating. For casehardening and carbonitridation the steel contains $\leq 0.25\%$ C. Steel with 0.30-0.35% C is extremely sensitive to embrittlement by H. Satn. with H during casehardening and carbonitridation does not decrease the resistance to brittle fracture if the steel is subsequently hardened after heating in air for H desorption, resulting in improved strength and plasticity.

IT 37312-00-8

RL: RCT (Reactant); RACT (Reactant or reagent)

(carburization of, hydrogen effect on plasticity and strength in relation to)

RN 37312-00-8 CAPLUS

CN Iron alloy, base, Fe 95-97, Ni 0.80-1.10, Cr 0.70-1.10, Mn 0.70-1.00, Si 0.17-0.37, Cu 0-0.30, C 0.16-0.23, W 0-0.20, Mo 0-0.15, V 0-0.05, P 0-0.035, S 0-0.035, Ti 0-0.03, B 0.001 (20KhGMR) (CA INDEX NAME)

Component	Component Percent		Component Registry Number
=====+=====+=====			
Fe	95	- 97	7439-89-6
Ni	0.80	- 1.10	7440-02-0
Cr	0.70	- 1.10	7440-47-3
Mn	0.70	- 1.00	7439-96-5
Si	0.17	- 0.37	7440-21-3
Cu	0	- 0.30	7440-50-8
C	0.16	- 0.23	7440-44-0
W	0	- 0.20	7440-33-7
Mo	0	- 0.15	7439-98-7
V	0	- 0.05	7440-62-2
P	0	- 0.035	7723-14-0
S	0	- 0.035	7704-34-9
Ti	0	- 0.03	7440-32-6
B		0.001	7440-42-8

CC 55-6 (Ferrous Metals and Alloys)

ST carburization steel mech property; carbonitridation steel mech property; cementation steel hydrogen embrittlement

IT Natural gas

RL: USES (Uses)

(carbonitridation in, of steels, plasticity and strength in relation to)

IT Diffusion

(of hydrogen in casehardening of steels, plasticity and

strength in relation to)
 IT Carbonitridation and Cyanidation
 Carburization
 (of ~~steels~~, hydrogen effect on plasticity and strength in
 relation to)
 IT 1333-74-0, reactions
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (carbonitridation in gases contg., of ~~steels~~, plasticity and
 strength in relation to)
 IT 7664-41-7, reactions
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (carbonitridation in, of ~~steels~~, plasticity and strength in
 relation to)
 IT 37312-00-8
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (carburization of, hydrogen effect on plasticity and strength in
 relation to)

L13 ANSWER 100 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN

ACCESSION NUMBER: 1973:482245 CAPLUS Full-text
 DOCUMENT NUMBER: 79:82245
 ORIGINAL REFERENCE NO.: 79:13333a,13336a
 TITLE: Improvement of gas carburization
 AUTHOR(S): Beloruchev, L. V.; Korolev, V. A.; Cherepkova, K. F.
 CORPORATE SOURCE: USSR
 SOURCE: Nadezhnost Dolgovechnost Metal. Mater. Mashinostr.
 Priborostr. (1972) 99-102
 From: Ref. Zh., Met. 1973, Abstr. No. 11786
 DOCUMENT TYPE: Journal
 LANGUAGE: Russian

AB Progress in gas carburization by using endothermically controlled atms. as
 carrier gas in the USSR and abroad was studied. The feasibility of
 carburization in N with addn. of natural gas was tested. ~~Steel~~ 20KhGMR
 (Cr-Mn-Ni-B) was heated in an exptl. furnace at 940° for 10 hr in a
 mixt. of N with 6% H and 5% natural gas. A 1-8 mm carburized layer was
 obtained and internal oxidn. was absent. The carburizing capacity of a
 N-natural gas mixt. was high as was the diffusion rate of C in this mixt.

IT 37312-00-8
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (carburization of, in natural gas contg. nitrogen)

RN 37312-00-8 CAPLUS

CN Iron alloy, base, Fe 95-97, Ni 0.80-1.10, Cr 0.70-1.10, Mn 0.70-1.00, Si
 0.17-0.37, Cu 0-0.30, C 0.16-0.23, W 0-0.20, Mo 0-0.15, V 0-0.05, P 0-0.035, S
 0-0.035, Ti 0-0.03, B 0.001 (20KhGMR) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	95 - 97	7439-89-6
Ni	0.80 - 1.10	7440-02-0
Cr	0.70 - 1.10	7440-47-3
Mn	0.70 - 1.00	7439-96-5
Si	0.17 - 0.37	7440-21-3
Cu	0 - 0.30	7440-50-8
C	0.16 - 0.23	7440-44-0
W	0 - 0.20	7440-33-7
Mo	0 - 0.15	7439-98-7
V	0 - 0.05	7440-62-2
P	0 - 0.035	7723-14-0
S	0 - 0.035	7704-34-9
Ti	0 - 0.03	7440-32-6
B	0.001	7440-42-8

CC 55-6 (Ferrous Metals and Alloys)

ST gas carburization alloy ~~steel~~; natural gas carburization ~~steel~~;
 chromium manganese ~~steel~~ carburization; nickel chromium ~~steel~~
 carburization; boron contg ~~steel~~ carburization

IT Natural gas
 RL: USES (Uses)
 (carburization of ~~steel~~ in nitrogen-contg.)

IT Carburization

(of steel, in natural gas contg. nitrogen)
 IT 7727-37-9, reactions
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (carburization of steel in natural gas contg.)
 IT 37312-00-8
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (carburization of, in natural gas contg. nitrogen)

L13 ANSWER 101 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN
 ACCESSION NUMBER: 1973:162649 CAPLUS Full-text
 DOCUMENT NUMBER: 78:162649
 ORIGINAL REFERENCE NO.: 78:26093a,26096a
 TITLE: Strength characteristics of scale
 AUTHOR(S): Severdenko, V. P.; Makushok, E. M.; Ravin, A. N.
 CORPORATE SOURCE: Minsk, USSR
 SOURCE: Izvestiya Akademii Nauk SSSR, Metallurgy (1973), (1),
 123-7
 CODEN: IZNMAQ; ISSN: 0568-5303

DOCUMENT TYPE: Journal
 LANGUAGE: Russian

AB A method for detg. the yield strength, σ , of scales on St. 45, ShKh15, Kh18N10T, 20KhNR, and 25KhGT steels is discussed, and σ values for these scales at various temps. ($t = 600-1150^\circ$) and degrees of deformation (0.50-0.80) are tabulated. At high temp. and similar deformation conditions, the strengths of scales are lower than those of steels, i.e. scale decreases the friction coeff. of steels and can act as a lubricant during forming of steel. In absence of phase transformation in scales, their σ - t relations are exponential.

IT 12742-15-3, properties
 RL: USES (Uses)
 (yield strength of scale on)

RN 12742-15-3 CAPLUS

CN Iron alloy, base, Fe 95-98, Ni 0.80-1.10, Cr 0.70-1.10, Mn 0.60-0.90, Si 0.17-0.37, Cu 0-0.30, C 0.16-0.23, W 0-0.20, Mo 0-0.15, V 0-0.05, P 0-0.035, S 0-0.035, Ti 0-0.03, B 0.001 (20KhNR) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	95 - 98	7439-89-6
Ni	0.80 - 1.10	7440-02-0
Cr	0.70 - 1.10	7440-47-3
Mn	0.60 - 0.90	7439-96-5
Si	0.17 - 0.37	7440-21-3
Cu	0 - 0.30	7440-50-8
C	0.16 - 0.23	7440-44-0
W	0 - 0.20	7440-33-7
Mo	0 - 0.15	7439-98-7
V	0 - 0.05	7440-62-2
P	0 - 0.035	7723-14-0
S	0 - 0.035	7704-34-9
Ti	0 - 0.03	7440-32-6
B	0.001	7440-42-8

CC 55-11 (Ferrous Metals and Alloys)
 ST yield strength mill scale; friction steel scale strength
 IT Scale (coating)
 (mill, yield strength of)
 IT 12725-40-5 12741-98-9, properties 12742-15-3, properties
 37268-90-9, properties 54611-20-0
 RL: USES (Uses)
 (yield strength of scale on)

L13 ANSWER 102 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN
 ACCESSION NUMBER: 1972:529437 CAPLUS Full-text
 DOCUMENT NUMBER: 77:129437
 ORIGINAL REFERENCE NO.: 77:21303a,21306a
 TITLE: Use of protective glass coatings during the heat treatment of steel components
 AUTHOR(S): Emel'yanenko, N. L.; Shagabutdinov, R. I.; Valeev, R.

CORPORATE SOURCE: M.; Smirnova, L. P.
 SOURCE: Chelyab. Trakt. Zavod, Chelyabinsk, USSR
 Metallovedenie i Termicheskaya Obrabotka Metallov
 (1972), (7), 74-5
 CODEN: MTOMAX; ISSN: 0026-0819

DOCUMENT TYPE: Journal

LANGUAGE: Russian

AB The protective capacities of various coatings deposited on the surfaces of R12 and R18 (Cr-W-V), St. 45, R6M3 and R9K5 (Cr-Co-W-V), R9M4 (Cr-W-V), 20Kh (Cr), and 20KhGMR (Cr-Mn-Ni-B) steels during heating at 1250-1400° were examd. All the steels were preheated at 860° for 30 min, annealed at 1240-70° for 15-20 min, and oil quenched. Preliminary results showed that the best protective properties were achieved by using an enamel of the EZh-01 type contg. ~25% Al2O3. The same enamel was used to protect the steels 20KhGMR and 18Kh2N4VA (Cr-Ni-W) from decarburization during their thermal treatment (annealing at 870° for 2 hr and quenching from 880°, then tempering at 220° for 4 hr). In the presence of EZh-01, decarburization is completely suppressed, whereas in its absence the depth of the decarburized zone may reach 0.1 mm. After the thermal treatment, the coating can be easily removed by shot blasting or by dissolving in molten KOH or NaOH at 500-50°.

IT 37312-00-8

RL: USES (Uses)

(heat treatment of, protective glass coatings for)

RN 37312-00-8 CAPLUS

CN Iron alloy, base, Fe 95-97, Ni 0.80-1.10, Cr 0.70-1.10, Mn 0.70-1.00, Si 0.17-0.37, Cu 0-0.30, C 0.16-0.23, W 0-0.20, Mo 0-0.15, V 0-0.05, P 0-0.035, S 0-0.035, Ti 0-0.03, B 0.001 (20KhGMR) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
=====+=====	=====+=====	=====
Fe	95 - 97	7439-89-6
Ni	0.80 - 1.10	7440-02-0
Cr	0.70 - 1.10	7440-47-3
Mn	0.70 - 1.00	7439-96-5
Si	0.17 - 0.37	7440-21-3
Cu	0 - 0.30	7440-50-8
C	0.16 - 0.23	7440-44-0
W	0 - 0.20	7440-33-7
Mo	0 - 0.15	7439-98-7
V	0 - 0.05	7440-62-2
P	0 - 0.035	7723-14-0
S	0 - 0.035	7704-34-9
Ti	0 - 0.03	7440-32-6
B	0.001	7440-42-8

CC 55-6 (Ferrous Metals and Alloys)

ST coating steel heat treatment; enamel coating steel;
 decarburization prevention steel enameling

IT Coating removers

(alkali metal hydroxide, for protective glass dissoln. on steel
 after heat treatment)

IT Enamels

(aluminum oxide-contg., on steel for decarburization
 prevention during heat treatment)

IT Glass

RL: USES (Uses)

(coatings, on steel for decarburization prevention
 during heat treatment)

IT Coating materials

(glass, on steel for decarburization prevention during heat
 treatment)

IT 1310-58-3, uses and miscellaneous 1310-73-2, uses and miscellaneous

RL: USES (Uses)

(glass coating removal by molten, from heat-treated
 steel)

IT 12715-04-7, uses and miscellaneous 12743-13-4 37241-62-6 37302-40-2

37302-41-3 37302-42-4, uses and miscellaneous 37312-00-8

37329-39-8, uses and miscellaneous

RL: USES (Uses)

(heat treatment of, protective glass coatings for)

L13 ANSWER 103 OF 103 CAPLUS COPYRIGHT 2021 ACS on STN
ACCESSION NUMBER: 1972:116614 CAPLUS Full-text
DOCUMENT NUMBER: 76:116614
ORIGINAL REFERENCE NO.: 76:18841a,18844a
TITLE: Mechanical properties of nitrocemented steels at static loads
AUTHOR(S): Rozenberg, S. E.
CORPORATE SOURCE: USSR
SOURCE: Khim.-Term. Obrab. Metal. Splavov (1971) 98-101
From: Ref. Zh., Met. 1971, Abstr. No. 10I398
DOCUMENT TYPE: Journal
LANGUAGE: Russian

AB The effects of the carbonitrided layer depth (0.55, 0.8, and 1.1), chem. compn., and microstructure on the notch toughness and tensile strength (during bending and torsion) were detd. for the 20KhNR, 25KhGM, and 25KhGT steels. The carbonitrided 20KhNR steel had better mech. properties than the 25KhGM and 25KhGT steels. An increase in the carbonitrided layer depth from 0.55 to 1.1 mm results in a decrease of tensile strength during bending, notch toughness, and torsion angle, but increased the torsional strength. The content of N in the carbonitrided layer should be $\leq 0.3\%$. Cold treatment decreased all of the mech. properties. The carbonitrided 25KhGM steel has a strength similar to that of the 20KhNR steel. The 25KhGT steel has the lowest strength but the plasticity of its carbonitrided layer is higher than that on the 25KhGM steel.

IT 12742-15-3, properties
RL: PRP (Properties)
(mech., carbonitridation effect on)

RN 12742-15-3 CAPLUS

CN Iron alloy, base, Fe 95-98, Ni 0.80-1.10, Cr 0.70-1.10, Mn 0.60-0.90, Si 0.17-0.37, Cu 0-0.30, C 0.16-0.23, W 0-0.20, Mo 0-0.15, V 0-0.05, P 0-0.035, S 0-0.035, Ti 0-0.03, B 0.001 (20KhNR) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Fe	95 - 98	7439-89-6
Ni	0.80 - 1.10	7440-02-0
Cr	0.70 - 1.10	7440-47-3
Mn	0.60 - 0.90	7439-96-5
Si	0.17 - 0.37	7440-21-3
Cu	0 - 0.30	7440-50-8
C	0.16 - 0.23	7440-44-0
W	0 - 0.20	7440-33-7
Mo	0 - 0.15	7439-98-7
V	0 - 0.05	7440-62-2
P	0 - 0.035	7723-14-0
S	0 - 0.035	7704-34-9
Ti	0 - 0.03	7440-32-6
B	0.001	7440-42-8

CC 55 (Ferrous Metals and Alloys)
ST carbonitrided steel property
IT Carbonitridation and Cyanidation
(of steel, mech. properties in relation to)

IT 12597-69-2, properties 12741-98-9, properties 12742-15-3, properties
RL: PRP (Properties)
(mech., carbonitridation effect on)

=>

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

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Commissioner for Patents
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Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

23280 7590 02/09/2021
Davidson, Davidson & Kappel, LLC
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22nd Floor
New York, NY 10018

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Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

Simon Steiner	(Typed or printed name)
/Simon Steiner/	(Signature)
February 9, 2021	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/413,799	05/16/2019	Pascal DRILLET	20631.1028CON5	7637

TITLE OF INVENTION: Coated Steel Strips, Coated Stamped Products and Methods

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$1200	\$0.00	\$0.00	\$1200	05/10/2021

EXAMINER	ART UNIT	CLASS-SUBCLASS
SCHLEIS, DANIEL J	1784	428-653000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-09 or more recent) attached. Use of a Customer Number is required.

2. For printing on the patent front page, list

(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,

(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 Davidson, Davidson & Kappel, LLC

2 _____

3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

ArcelorMittal

Luxembourg, Luxembourg

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. Fees submitted: ☒ Issue Fee ☐ Publication Fee (if required) ☐ Advance Order - # of Copies _____

4b. Method of Payment: (Please first reapply any previously paid fee shown above)

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☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. 500552

5. Change in Entity Status (from status indicated above)

☐ Applicant certifying micro entity status. See 37 CFR 1.29

☐ Applicant asserting small entity status. See 37 CFR 1.27

☐ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature /williamcgehris/

Date February 9, 2021

Typed or printed name William C. Gehris

Registration No. 38156

Electronic Patent Application Fee Transmittal

Application Number:	16413799			
Filing Date:	16-May-2019			
Title of Invention:	Coated Steel Strips, Coated Stamped Products and Methods			
First Named Inventor/Applicant Name:	Pascal DRILLET			
Filer:	William C. Gehris/Simon Steiner			
Attorney Docket Number:	20631.1028CON5			
Filed as Large Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
UTILITY APPL ISSUE FEE	1501	1	1200	1200

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				1200

Electronic Acknowledgement Receipt

EFS ID:	41878012
Application Number:	16413799
International Application Number:	
Confirmation Number:	7637
Title of Invention:	Coated Steel Strips, Coated Stamped Products and Methods
First Named Inventor/Applicant Name:	Pascal DRILLET
Customer Number:	23280
Filer:	William C. Gehris/Simon Steiner
Filer Authorized By:	William C. Gehris
Attorney Docket Number:	20631.1028CON5
Receipt Date:	09-FEB-2021
Filing Date:	16-MAY-2019
Time Stamp:	14:55:39
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	\$ 1200
RAM confirmation Number	E202129E55560588
Deposit Account	500552
Authorized User	Simon Steiner

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

37 CFR 1.16 (National application filing, search, and examination fees)

37 CFR 1.17 (Patent application and reexamination processing fees)

37 CFR 1.19 (Document supply fees)
 37 CFR 1.20 (Post Issuance fees)
 37 CFR 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	IF.PDF	141026	no	1
			c2a03d638a9e47237fc317afc897868a2f1d bca0		

Warnings:

Information:

2	Fee Worksheet (SB06)	fee-info.pdf	30545	no	2
			96c30217e94cedede5504277a2a52555eea ff743		

Warnings:

Information:

Total Files Size (in bytes):			171571
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This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Doc code: IDS

PTO/SB/08a (03-15)

Doc description: Information Disclosure Statement (IDS) Filed

Approved for use through 07/31/2016. OMB 0651-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)

Application Number	16413799
Filing Date	2019-05-16
First Named Inventor	Pascal DRILLET
Art Unit	
Examiner Name	SCHLEIS, DANIEL J
Attorney Docket Number	20631.1028CON5

U.S.PATENTS

Remove

Examiner Initial*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
Change(s) applied to document, P.H./ 2/18/2021	1	5116645	A	1992-05-26	Boston et al. ARMCO STEEL CO LP	
	2	4257549	A	1981-03-24	Bricmont ROBERTSON CO LLC	
	3	5495736	A	1996-03-05	Nishi et al.	

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Examiner Initial*	Cite No	Publication Number	Kind Code ¹	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20020114884	A1	2002-08-22	FRIEDERSDORF FRITZ J et al.	

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Examiner Initial*	Cite No	Foreign Document Number ³	Country Code ²ⁱ	Kind Code ⁴	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T ⁵
	1	19749706	DE	C1	1999-03-04	MANNESMANN AG	See English Abstract and EPO machine translation	

PART B - FEE(S) TRANSMITTAL

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22nd Floor
New York, NY 10018

Certificate of Mailing or Transmission

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Simon Steiner	(Typed or printed name)
/Simon Steiner/	(Signature)
February 9, 2021	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/413,799	05/16/2019	Pascal DRILLET	20631.1028CON5	7637

TITLE OF INVENTION: Coated Steel Strips, Coated Stamped Products and Methods

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$1200	\$0.00	\$0.00	\$1200	05/10/2021

EXAMINER	ART UNIT	CLASS-SUBCLASS
SCHLEIS, DANIEL J	1784	428-653000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-09 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,

(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 Davidson, Davidson & Kappel, LLC

2

3

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY AND STATE OR COUNTRY)

ArcelorMittal

Luxembourg, Luxembourg

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. Fees submitted: ☒ Issue Fee ☐ Publication Fee (if required) ☐ Advance Order - # of Copies

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☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. 500552

5. Change in Entity Status (from status indicated above)

☐ Applicant certifying micro entity status. See 37 CFR 1.29

☐ Applicant asserting small entity status. See 37 CFR 1.27

☐ Applicant changing to regular undiscounted fee status.

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NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature	/williamcgehris/	Date	February 9, 2021
Typed or printed name	William C. Gehris	Registration No.	38156

Electronic Acknowledgement Receipt

EFS ID:	42017791
Application Number:	16413799
International Application Number:	
Confirmation Number:	7637
Title of Invention:	Coated Steel Strips, Coated Stamped Products and Methods
First Named Inventor/Applicant Name:	Pascal DRILLET
Customer Number:	23280
Filer:	William C. Gehris/Simon Steiner
Filer Authorized By:	William C. Gehris
Attorney Docket Number:	20631.1028CON5
Receipt Date:	25-FEB-2021
Filing Date:	16-MAY-2019
Time Stamp:	09:19:12
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	IssueFees.PDF	141611	no	1
			f8c22c57b9bd7a6e9aaaae2d5d836226444e b7991		

Warnings:

Information:	
Total Files Size (in bytes):	141611
<p>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</p> <p><u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</p> <p><u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</p> <p><u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</p>	



UNITED STATES PATENT AND TRADEMARK OFFICE

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Address: COMMISSIONER FOR PATENTS
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Alexandria, Virginia 22313-1450
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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/413,799	03/30/2021	10961602	20631.1028CON5	7637

23280 7590 03/10/2021
Davidson, Davidson & Kappel, LLC
589 8th Avenue
22nd Floor
New York, NY 10018

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment is 0 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site <http://pair.uspto.gov> for additional applicants):

Pascal DRILLET, Rozerieulles, FRANCE;
ArcelorMittal, Luxembourg, LUXEMBOURG;
Dominique Spehner, Balan, FRANCE;
Ronald Kefferstein, Saint Mitre Les Ramparts, FRANCE;

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit SelectUSA.gov.

IN THE UNITED STATES PATENT & TRADEMARK OFFICE

Application of: ARCELORMITTAL
Inventor(s): Drillet et al.
Application No.: 16/413,799
Filed: May 16, 2019
Patent No. : 10,961,602 B2
Issued: March 30, 2021
Attorney Docket No.: 20631.1028CON5
Confirmation No.: 7637
Examiner: Daniel J. Schleis
Title: Coated Steel Strips, Coated Stamped Products and Methods

Submitted electronically via EFS-WEB

April 19, 2021

REQUEST FOR CERTIFICATE OF CORRECTION UNDER 37 C.F.R. § 1.323

Sir:

Pursuant to 35 U.S.C. § 255 and 37 C.F.R. § 1.323, Applicant hereby requests that the U.S. Patent and Trademark Office issue a Certificate of Correction for the above-identified patent to correct mistakes of a clerical nature, typographical nature.

The following corrections are requested:

- 1) In column 7, line 8, -- . -- should be inserted between “ABCD” and “For sheets”;
- 2) In column 7, line 27, -- (e.g., -- should be inserted before “7.7”;
- 3) In column 12, line 19, -- . -- should be inserted between “coating” and “On series A”;
and
- 4) In column 13, line 12, -- . -- should be inserted between “surface” and “Resis-”.

Applicant submits that these corrections do not require changes which would constitute new matter or require reexamination.

The appropriate fees under 37 C.F.R. 1.20(a) in the amount of \$ 160.00 are submitted herewith. In the event that fees are due, the Commissioner is hereby authorized to charge the fee required for this correction to Deposit Account No. 50-0552.

Respectfully submitted,
DAVIDSON, DAVIDSON & KAPPEL, LLC

By: /Oleg Ioselevich/
(Oleg Ioselevich, Reg. No. 56,963)

Davidson, Davidson & Kappel, LLC
589 Eighth Ave, 22nd Floor
New York, New York 10018

**UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION**Page 1 of 1

PATENT NO. : 10,961,602
APPLICATION NO.: 16/413,799
ISSUE DATE : Mar. 30, 2021
INVENTOR(S) : Pascal Drillet et al.

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In column 7, line 8, -- . -- should be inserted between "ABCD" and "For sheets"
In column 7, line 27, -- (e.g., -- should be inserted before "7.7"
In column 12, line 19, -- . -- should be inserted between "coating" and "On series A"
In column 13, line 12, -- . -- should be inserted between "surface" and "Resis-"

MAILING ADDRESS OF SENDER (Please do not use Customer Number below):

Davidson, Davidson & Kappel, LLC
589 Eighth Ave, 22nd Floor
New York, New York 10018

This collection of information is required by 37 CFR 1.322, 1.323, and 1.324. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1.0 hour to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Attention Certificate of Corrections Branch, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
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5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Patent Application Fee Transmittal				
Application Number:		16413799		
Filing Date:		16-May-2019		
Title of Invention:		Coated Steel Strips, Coated Stamped Products and Methods		
First Named Inventor/Applicant Name:		Pascal DRILLET		
Filer:		Oleg Ioselevich		
Attorney Docket Number:		20631.1028CON5		
Filed as Large Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
CERTIFICATE OF CORRECTION	1811	1	160	160

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				160

Electronic Acknowledgement Receipt

EFS ID:	42487161
Application Number:	16413799
International Application Number:	
Confirmation Number:	7637
Title of Invention:	Coated Steel Strips, Coated Stamped Products and Methods
First Named Inventor/Applicant Name:	Pascal DRILLET
Customer Number:	23280
Filer:	Oleg loselevich
Filer Authorized By:	
Attorney Docket Number:	20631.1028CON5
Receipt Date:	19-APR-2021
Filing Date:	16-MAY-2019
Time Stamp:	13:57:45
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$ 160
RAM confirmation Number	E20214IE00144345
Deposit Account	500552
Authorized User	Oleg loselevich

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:
37 CFR 1.21 (Miscellaneous fees and charges)

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Request for Certificate of Correction	206311028con5ReqCerCor_19April21.pdf	501958	no	2
			b18e05364e397d816e1a3750878a2530c9a afe64		
Warnings:					
Information:					
2	Request for Certificate of Correction	sb0044_19April2021.pdf	228629	no	2
			a40453527dc4118408b141873fb57ba99a0 d1acf		
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	30308	no	2
			cbe6b149f357b36c47fb6e6c84fb6f851b898 a41		
Warnings:					
Information:					
Total Files Size (in bytes):			760895		
<p>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</p> <p><u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</p> <p><u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</p> <p><u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</p>					

UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 10,961,602 B2
APPLICATION NO. : 16/413799
DATED : March 30, 2021
INVENTOR(S) : Pascal Drillet et al.

Page 1 of 1

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In the Specification

In Column 7, Line 8, -- . -- should be inserted between "ABCD" and "For sheets"

In Column 7, Line 27, -- (e.g., -- should be inserted before "7.7"

In Column 12, Line 19, -- . -- should be inserted between "coating" and "On series A"

In Column 13, Line 12, -- . -- should be inserted between "surface" and "Resis-"

Signed and Sealed this
Eighteenth Day of May, 2021



Drew Hirshfeld
*Performing the Functions and Duties of the
Under Secretary of Commerce for Intellectual Property and
Director of the United States Patent and Trademark Office*