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**Koenig et al.**

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(54) **STACKABLE CONTAINER ASSEMBLY WITH RECIPROCAL LOCKING OF THE STACKED CONTAINERS**

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USPC ..... 206/308, 425, 503, 511; 220/380, 761, 220/781
See application file for complete search history.

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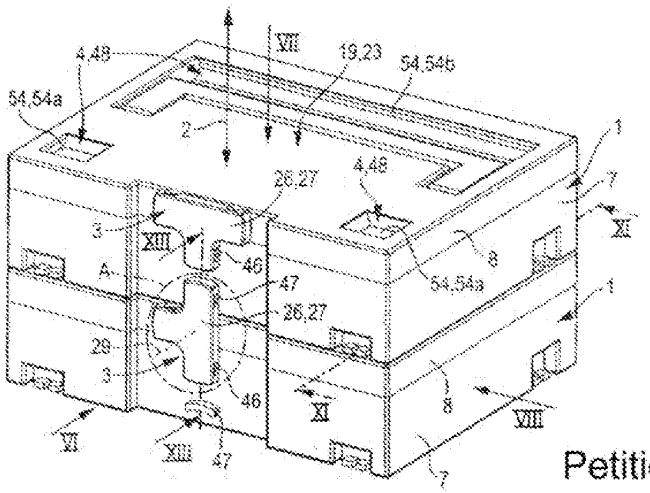
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(57) **ABSTRACT**

It is a matter of a container assembly with at least one stackable container (**1**) which has a bottom part (**7**) and a lid (**8**) mounted on top thereof Several containers (**1**) may be so stacked that the lid (**8**) of the lower container (**1**) is located between two bottom parts (**7**). The container (**1**) is equipped with at least one connecting device (**3**) which has coupling means (**26**) mounted movably on the lid (**8**) of the container (**1**). The coupling means (**26**) are movable, for the connection of two containers (**1**) mounted one above the other, into a connected position relative to the lid (**8**), in which they are simultaneously in connecting engagement with the bottom parts (**7**) of both stacked containers (**1**).

**41 Claims, 8 Drawing Sheets**




Petitioner Ex. 1007
Page 1 of 22

Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2003 - Page 326
Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products
IPR2024-01401

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Petitioner Ex. 1007
Page 2 of 22

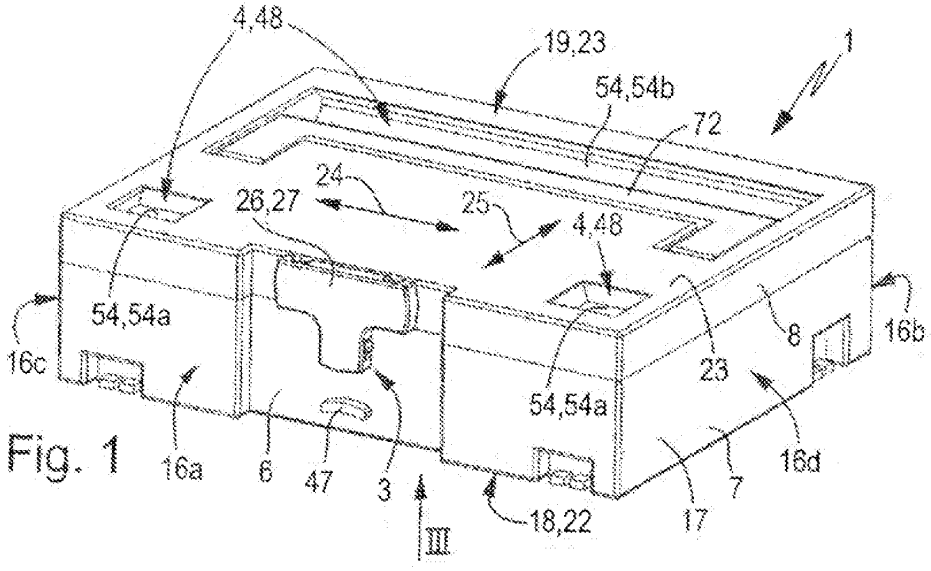

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16a
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47
3
III
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17
7
16d

Fig. 1

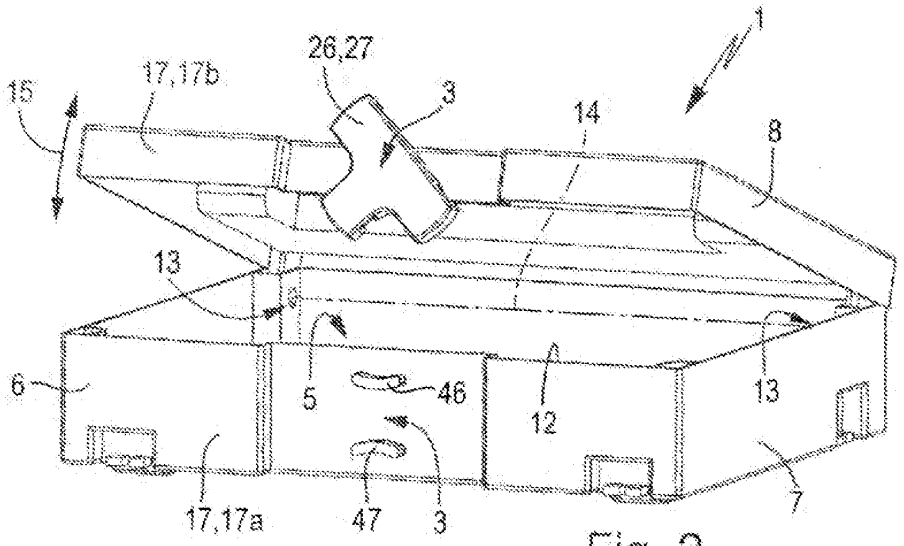

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Fig. 2

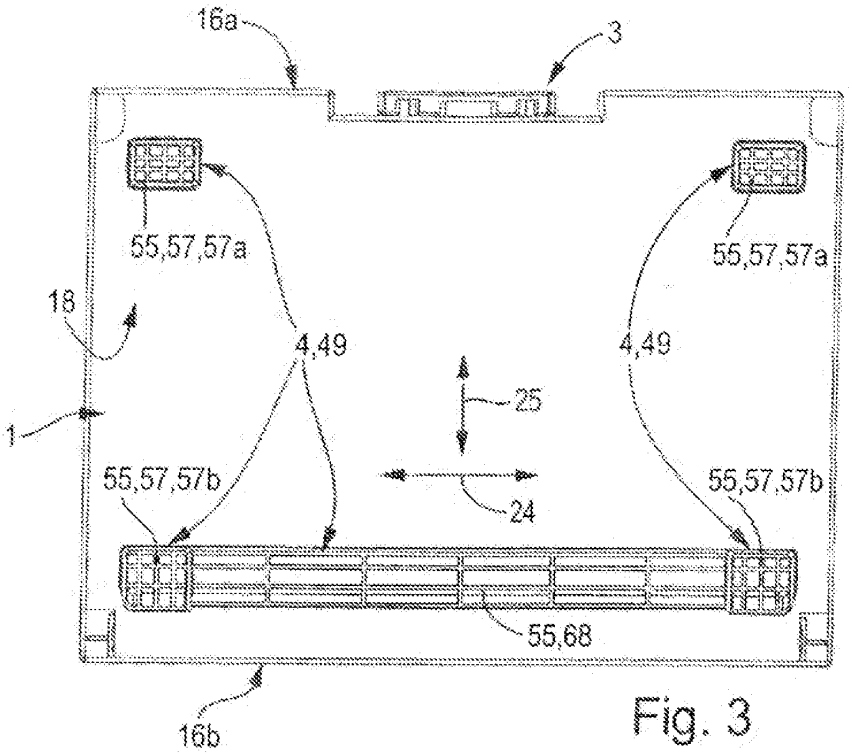

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16b

Fig. 3

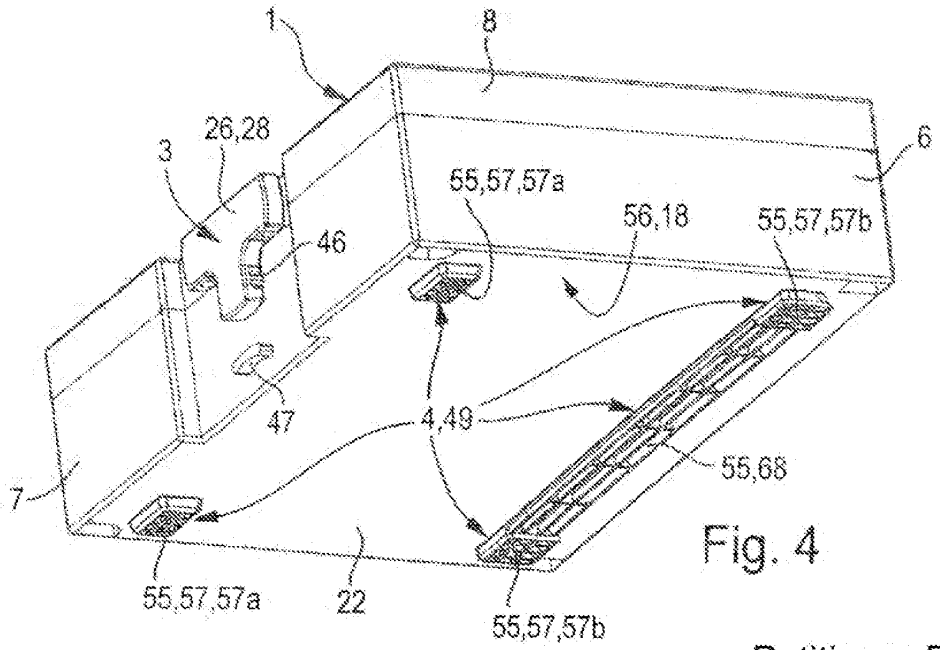

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55,57,57b

Fig. 4

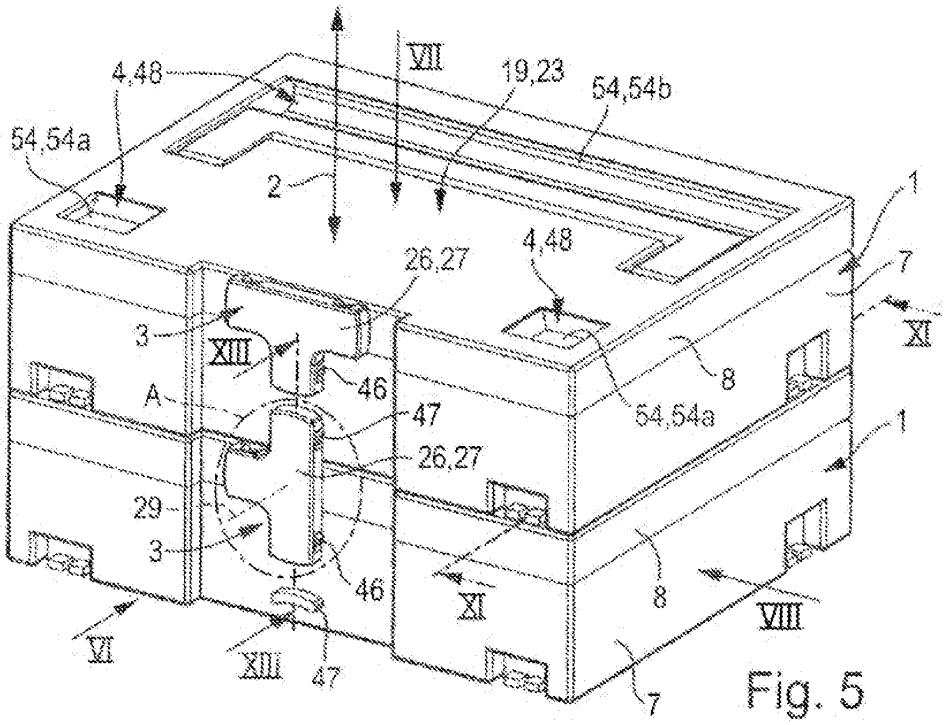



Fig. 5

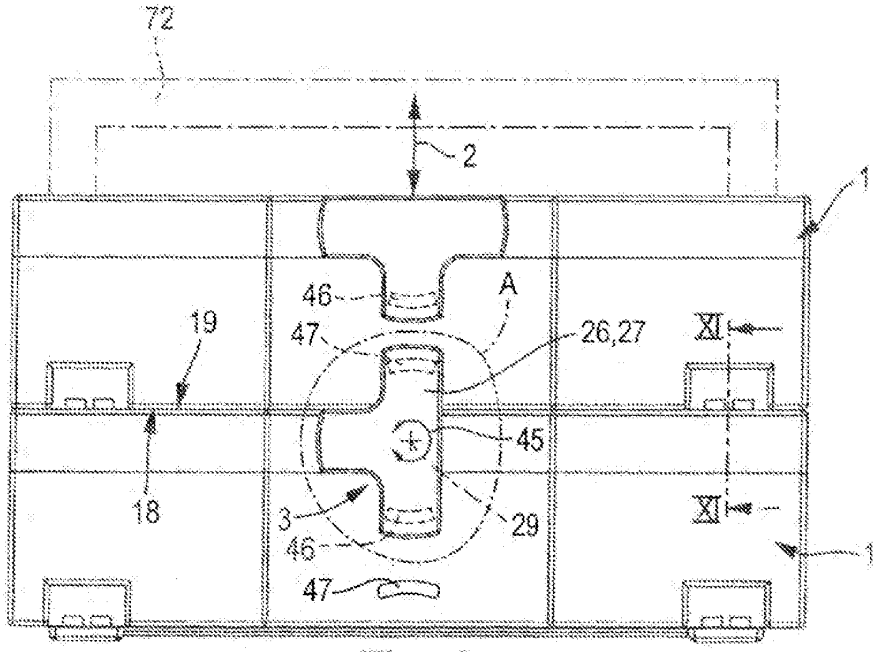



Fig. 6

Petitioner Ex. 1007
Page 5 of 22

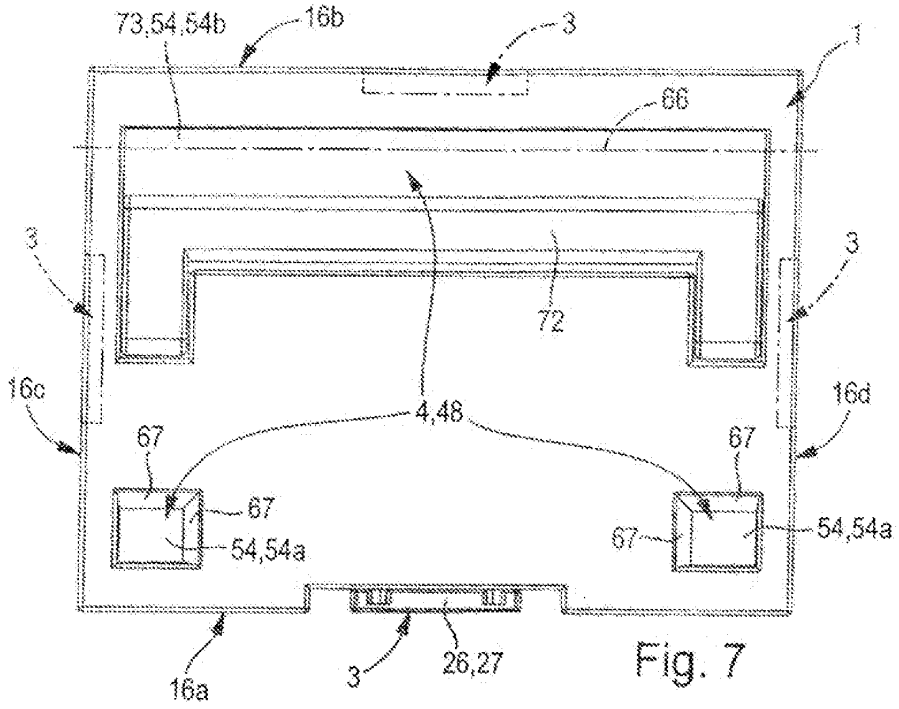



Fig. 7

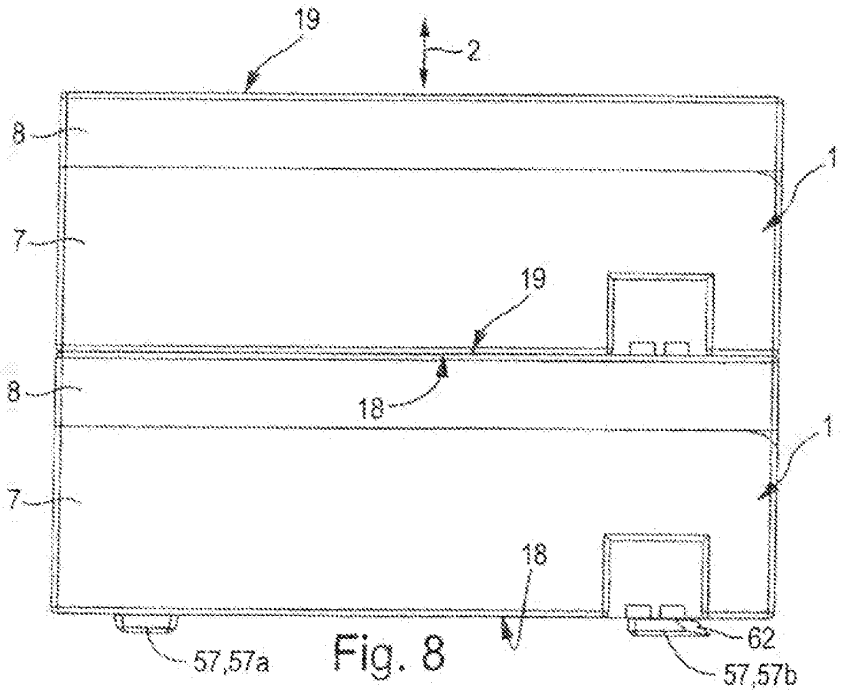



Fig. 8

Petitioner Ex. 1007
Page 6 of 22

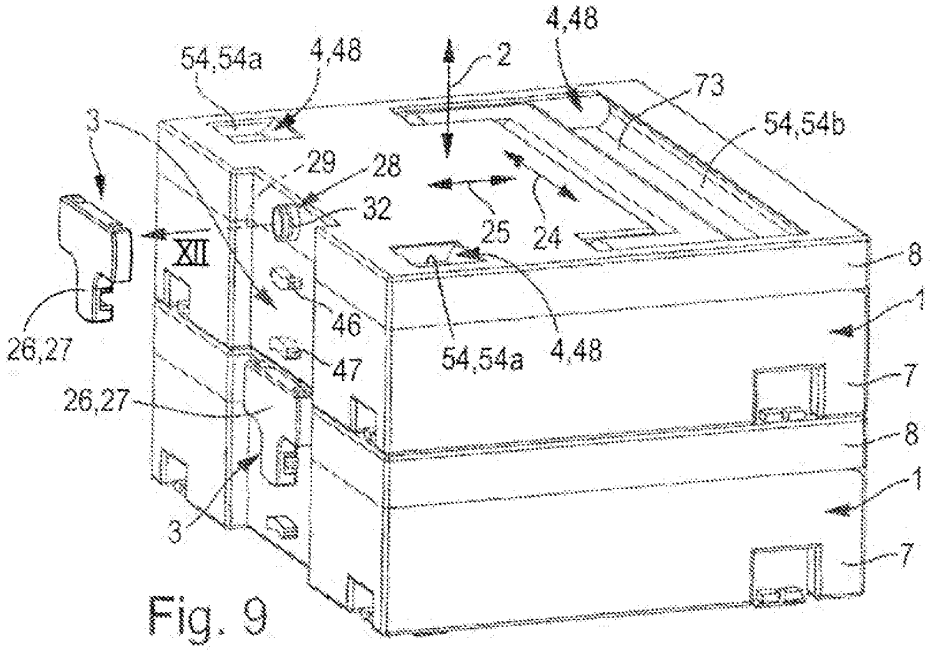



Fig. 9

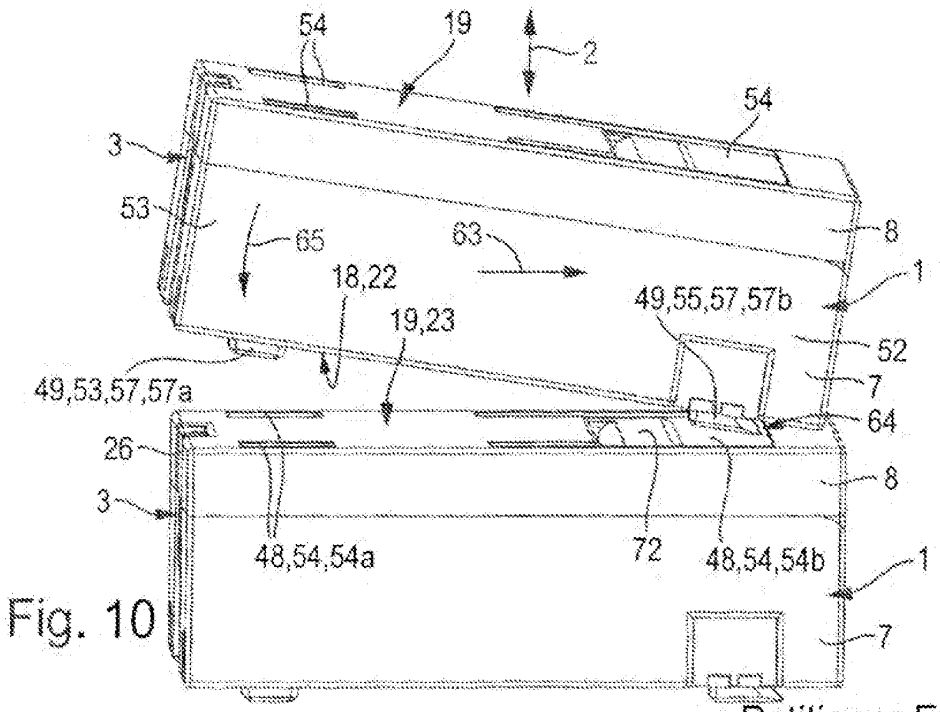



Fig. 10

Petitioner Ex. 1007
Page 7 of 22

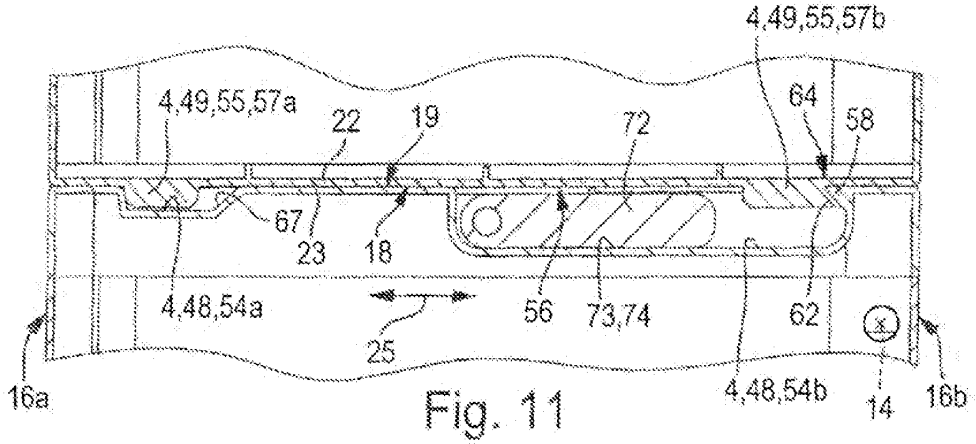



Fig. 11

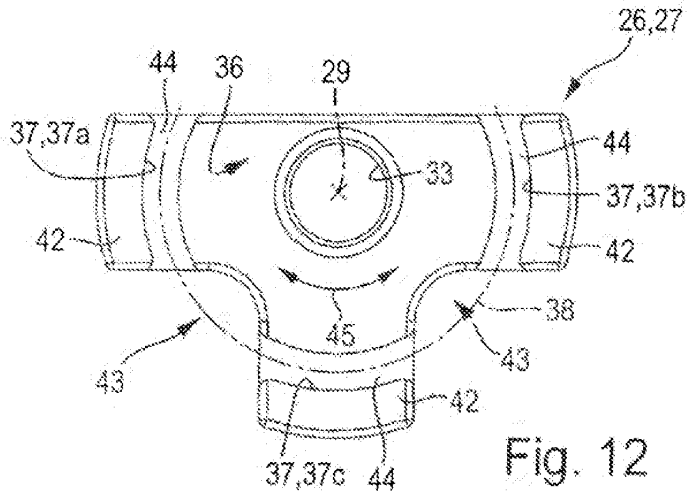



Fig. 12



Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2003 - Page 333
Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products
IPR2024-01401

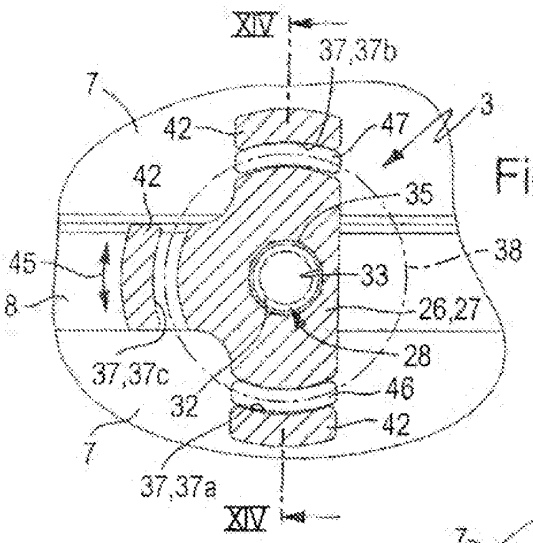



Fig. 13

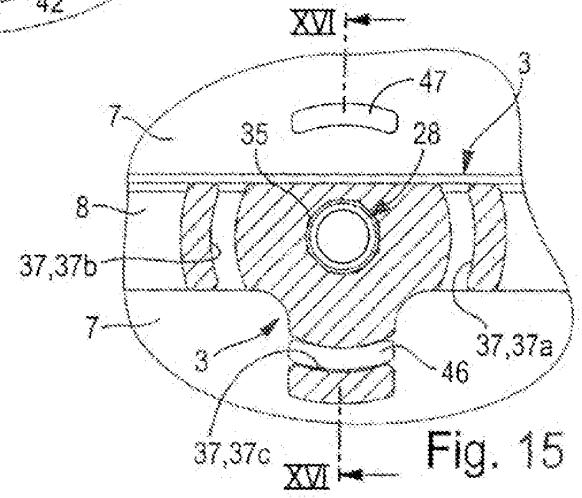



Fig. 15

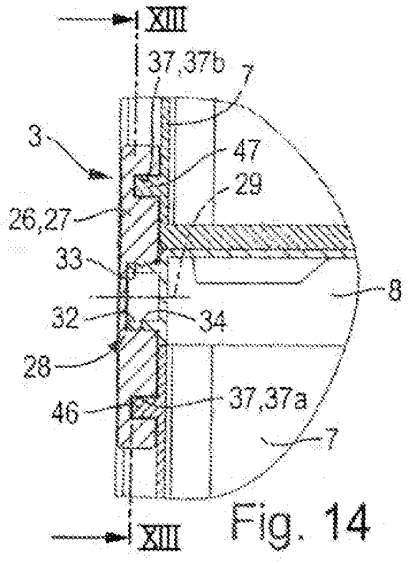



Fig. 14

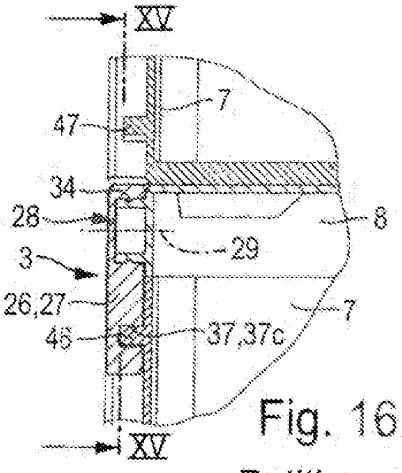



Fig. 16

Petitioner Ex. 1007
Page 9 of 22

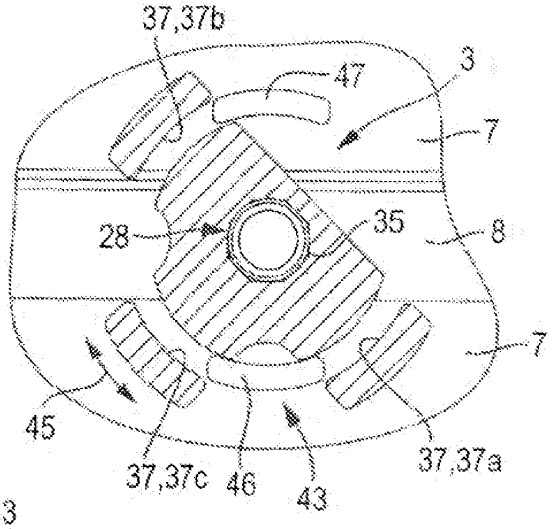



Fig. 17

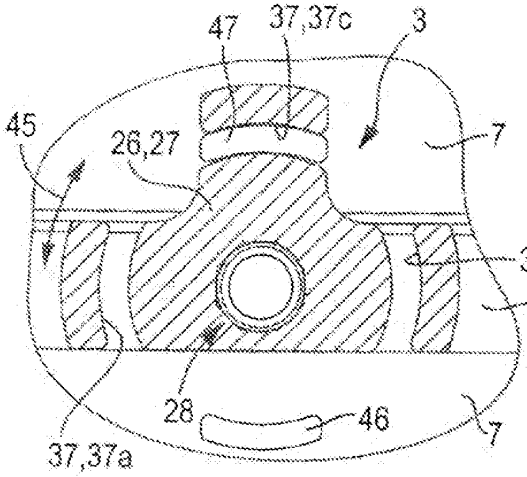



Fig. 18

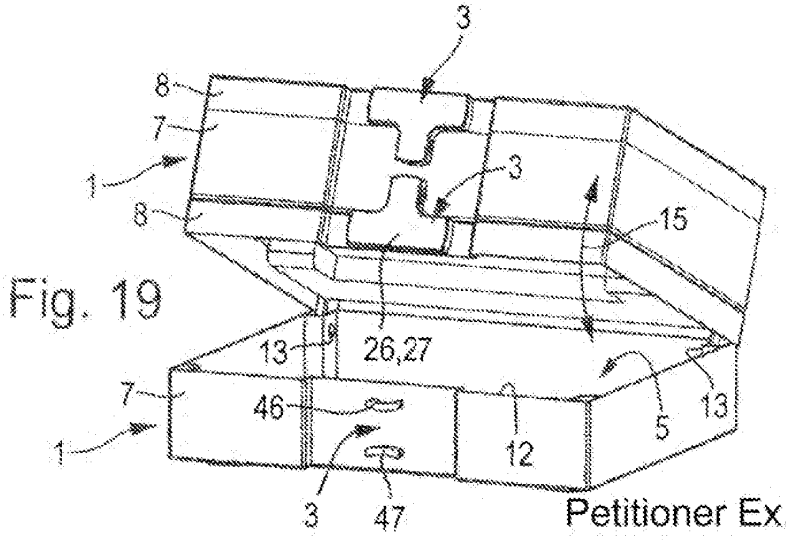



Fig. 19

Petitioner Ex. 1007
Page 10 of 22

# STACKABLE CONTAINER ASSEMBLY WITH RECIPROCAL LOCKING OF THE STACKED CONTAINERS

This application claims priority based on an International Application filed under the Patent Cooperation Treaty, PCT/EP2009/004668, filed Jun. 29, 2009.

## BACKGROUND OF THE INVENTION

The invention relates to a container assembly, with at least one stackable container which has a box- or bowl-shaped bottom part with an opening, and a lid assigned to the opening of the bottom part and movable relative to the bottom part for either opening or closing the opening, and designed for the vertical stacking of several containers in such a way that the lid of a lower container comes to lie between the bottom parts of the lower container and an upper container positioned immediately above, wherein the container is provided with at least one connecting device which has a movable connecting means, by which the bottom parts of containers resting directly on top of one another may be connected releasably together to obtain a container unit comprised of several containers.

An existing container assembly of this kind known from EP 1 059 240 B1 includes a container with a bottom part and a lid mounted pivotably on the former. This container may be stacked together with several similar containers in such a way that its lid comes to lie beneath the bottom part of a lid resting on top of it. On opposite side end faces of the container there is provided in each case a connecting device comprised of two connecting means in the form of rotating locking bolts, one of which is mounted on a pivotable carrying handle. Depending on the pivoted position of the carrying handle, the lid is locked to or released from the lid by the connecting means of the carrying handle. To connect two stacked containers to one another to obtain a uniformly transportable container unit, the second connecting means may be similarly rotated so that it makes connecting engagement with the bottom part of the upper container. The cohesion between two connected containers is thus effected through the connection of the two bottom parts. If such a container unit is transported by taking hold of the upper container, the pivotable mounting of the connecting means is subjected to a heavy load which can lead to premature wear, but at least requires a very stable and robust and therefore costly design.

A comparable situation exists with the container assembly described in EP 0 555 533 B1, which discloses a stackable container equipped with connecting devices distributed over its periphery, each having connecting means in the form of a pivotable locking tab. Here, differing from EP 1 059 240 B1, a single connecting means is able either to lock just the lid to the bottom part, or to join several containers to an upper container by means of locking engagement to form a container unit. In the case of such a container unit, once again the movable support of the connecting means is subject to a heavy load, so that additional anchoring means are provided on the bottom part and relieve its pivotable mounting means through interaction with the connecting means. Associated with this is an increased cost of manufacture.

Known from DE 44 09 411 A1 is a packing container which may be stacked with others of its kind and made into a container unit through complementary engaging structures on its top and bottom sides, which engage with one another when an upper container is placed on a lower container in a combined insert and turn movement. The engaging structure prevents the upper container from being lifted off in certain areas, in the vicinity of the rear of the container. Fixing of the front section of the container is effected by means of an additional connecting device, which has several connecting means in the form of rotating locking bolts which may be rotated in such a way that they create a connecting engagement between the front sections of the stacked containers. In this packing container, the container opening is arranged at the side and may be closed by means of two cover panels which can be placed over one another and are mounted pivotably on the body of the container. The rotatable connecting means allow simultaneous locking of the cover panels to one another and to the cover panels of the next container above.

The problem of the present invention is to create a container assembly in which the stackable container is equipped with means which may be produced at low cost and which, with simple operation, allow a stable connection of containers stacked on top of one another.

## SUMMARY OF THE INVENTION

To solve this problem it is provided that the movable connecting means of the one or more connecting devices is mounted on the lid of the container and, to connect the container to a container placed on top of it, may be moved relative to the lid into a connected position in which it is simultaneously in connecting engagement with the bottom parts of both stacked containers.

Since the connecting means mounted movably on the lid is in the connected position simultaneously in connecting engagement with both bottom parts flanking the lid, the bearing force occurring due to the connecting means when a container unit is transported is transferred at least mainly directly between the bottom parts, so that the bearing means provided on the lid for movement support of the connecting means are relieved of stress.

These bearing means are therefore not subject to any increased wear and have no special requirements in terms of stability, which favours cost-effective manufacture. Operation of the connecting device is moreover very simple, since connection and release of two containers lying on top of one another may be effected more or less with just one movement of the hand. Preferably a single handling operation involving the connecting means is sufficient to bring both the bottom part of the assignal lid and also the bottom part of the upper lid lying on top into connecting engagement ensuring firm cohesion in the stacking direction.

Advantageous developments of the invention are set out in the dependent claims.

Expediently the movable connecting means of the connecting device is in the form of a rotating locking bolt, in particular one-piece, mounted rotatably on the lid. The desired connecting engagement may therefore be made or released by simple turning of the rotating locking bolt. In the connected position, the rotating locking bolt acts simultaneously on anchoring means of both containers arranged on top of one another, thereby ensuring stable cohesion.

The anchoring means provided on the bottom part of the container are expediently divided into first and second anchoring means spaced apart in the stacking direction. The first anchoring means lie closer to the lid than the second anchoring means. In this way, the rotating locking bolt of a lower container in the connected position may cooperate on the one hand with the first anchoring means of the bottom part of the lower container, and simultaneously with the second anchoring means of the bottom part of the upper container.

Petitioner Ex. 1007
Page 11 of 22

advantage of this design is that the rotating locking bolt may be made with compact dimensions irrespective of the overall height of the container.

For interaction with the anchoring means provided on the bottom part, the rotating locking bolt expediently has suitable locking structures. These are, like the anchoring means, expediently curved, with the curve centre points lying in particular on the rotation axis of the rotating locking bolt. By this means, the locking and unlocking process can take place very easily and it is possible at the same time to ensure in the connected position a curved contact over a large area between the locking structures and the anchoring means, so that even with a high loading force to be transferred, only minimal surface pressure occurs.

The anchoring means are preferably in the form of projections, in particular one-piece elements of the bottom part. The locking structures are expediently integral parts of groove-like recesses formed in the rotating locking bolt.

The connecting device may advantageously have a multiple function. Thus, the movable connecting means is designed in particular so as to be movable not only into the connected position but also at least into a closed position in which the connecting engagement with any upper container mounted on the container is released, while however maintaining connecting engagement with the bottom part located beneath the lid. The closed position is therefore that position in which the rotating locking bolt may be shifted if it is intended to place an upper container on the lower container, or to remove an upper container from the lower container. The closed position is moreover that position which ensures cohesion between lid and bottom part, when the container is to be transported on its own.

In the case of an embodiment as rotating locking bolt, the closed position is a rotary position relative to the lid which differs from the connected position. Expediently provided on the rotating locking bolt are locking structures, offset in its direction of rotation, which in the connected position and in the closed position are alternately in connecting engagement with one and the same anchoring means located on the bottom part. If the anchoring means have first and second anchoring means of the type described above, then the rotating locking bolt expediently cooperates in the connected position and in the closed position with the first anchoring means in each case.

The locking structures cooperating alternately in the connected position and in the closed position with the anchoring means of the bottom part are expediently offset on the rotating locking bolt in the direction of rotation in such a way that the rotating locking bolt may be rotated into an open position in which the aforementioned anchoring means lie between the locking structures and the latter are as it were able to move past the anchoring means, to permit raising or lowering of the lid from or on to the bottom part, when the opening of the bottom part is to be either opened or covered.

Another function which may be integrated in the connecting device or devices is the creation of connecting engagement with only the bottom part of an upper container mounted on the lid, with simultaneous removal of the connecting engagement to the bottom part arranged beneath the lid. In this position which may be described as the semi-connected position it is possible to swing the lid of the container upwards even when another container is mounted on this lid, with this further container remaining fixed to the raised lid so that the container unit does not need to be broken up.

If the connecting means are in the form of a rotating locking bolt then the semi-connected position corresponds expediently to a rotary position which is rotated through 90° relative to the connected position.

Although it would be possible in principle to make the lid so that it is removable from the bottom part in its entirety, a design with swivel mounting relative to the bottom part is recommended, so that the lid may be swivelled to open and close the container.

It is possible to equip the container with several connecting devices of the type described, which are then expediently placed at several points distributed along the periphery of the container. In particular if only such connecting devices are used to create the container unit, it is expedient to provide in each case at least one connecting device on at least two opposite end faces of the container.

In an advantageous manner, at least one connecting device of the type described may be combined with other measures for creating a cohesive container unit of stacked containers.

Such additional measures may involve in particular the provision of a first engaging structure on the top of the lid and a second engaging structure on the underside of the bottom part. These two engaging structures are matched to one another in such a way that, when two containers are resting on top of one another, the first engaging structure of the lower container lying on top, and the second engaging structure of the upper container lying below, engage in one another in such a way that the two containers are on the one hand secured against shifting relative to one another at right-angles to the stacking direction, and on the other hand through localised locking, lifting of the upper container from the lower container at certain points is prevented. The latter feature is obtained by the locking engagement of special rear-engaging or behind engaging elements of the engaging structures, with this locking engagement being produced through a relative movement of the two containers when an upper container is placed on the lower container. The connecting device or devices according to the invention is or are arranged with clearance from the locking area defined by the rear-engaging elements cooperating with one another, and hold the two containers together in the connected position in such a way that the upper container is also connected in that area, vertically immobile, to the lower container, which is not prevented by the engaging structure from being lifted. Consequently there is a combined effect between the engaging structures on the one hand and the connecting device or devices on the other hand.

Preferably the first engaging structure provided on the lid consists of engaging recesses and the second engaging structure on the bottom part is made up of engaging projections. In an advantageous manner, the engaging projections are at the same time designed as feet, on which the container may be stored stably when not stacked on another container. These feet also form expediently at least partly the rear-engaging elements of the second engaging structure which, for stacked containers, prevent localised lifting from the lower container by engaging in a first engaging structure. Feet equipped with this rear-engaging function may be described as locking feet. Other feet which, interacting with the first engaging structure, provide only protection against shifting at right-angles to the stacking direction, may be described as supporting feet.

Preferably provided on the underside of the bottom part, in particular towards the rear, are two locking feet spaced apart from one another. In order to ensure reliable locking engagement even with wear, a locking strip extending between the two locking feet may also be provided, which [illegible] are stacked, this strip is also intended for a rear-engaging element of the first engaging structure of the lid.

Petitioner Ex. 1007
Page 12 of 22

For interaction with the locking feet, the first engaging structure expediently has at least one locking engaging recess with a relief-cut cross-section and a rear-engaging projection on its edge, which is able to make locking engagement with the assigned locking feet and also, if provided, with a locking strip. A single locking engaging recess may be so designed as to facilitate the simultaneous engagement of all locking feet provided. In particular a locking engaging recess designed in this way may also undertake the additional function of a handgrip recess in which it is possible to reach with one hand in order to carry the container. In particular with relative flat containers, i.e. comparable in size to a briefcase, the container may also be transported very easily in this way in an upright position similar to a briefcase.

Apart from that, the container is expediently equipped with a carrying handle in the area of its upper side, which may expediently be swivelled into an out-of-use position in which it is swivelled into a locating recess formed on the top of the lid. This locating recess is formed expediently by a suitably large engaging recess of the first engaging structure, which makes it easier to produce and which, amongst other things, also favours its use if required as a handgrip recess.

The container assembly may have several containers of the type described, differing from one another in particular in their height but identical in respect of their connecting device and expediently also the engaging structures, so that they may be stacked in any desired combination and order, and linked to form a container unit.

## BRIEF DESCRIPTION OF THE DRAWINGS

The invention is explained in detail below with the aid of the appended drawing, which shows in:

FIG. **1** a perspective view of a container according to the invention in the closed state

FIG. **2** the container of FIG. **1** with the lid swung into an open position

FIG. **3** a view of the container from below, looking in the direction of arrow III of FIG. **1**

FIG. **4** an oblique view of the underside of the container

FIG. **5** a container assembly consisting of two stacked containers, connected to form a container unit

FIG. **6** a front view of the assembly of FIG. **5** looking in the direction of arrow VI

FIG. **7** a top view of the container assembly of FIG. **5** looking in the direction of arrow VII

FIG. **8** a side view of the assembly of FIG. **5** looking in the direction of arrow VIII

FIG. **9** the container assembly of FIG. **5** from a different angle of view and with the connecting means of a connecting device removed

FIG. **10** the container assembly of FIG. **5** in a perspective side view, with an upper container being placed on a lower container

FIG. **11** a cross-section through the container assembly along section line XI-XI of FIGS. **5** and **6** in the area of the engaging structures in engagement with one another

FIG. **12** a detail view of connecting means in a rear view looking in the direction of arrow XII of FIG. **9**

FIG. **13** the detail A bordered in FIGS. **5** and **6** of a container unit in the connected position of the connecting means, in a sectional view along section line XIII-XIII of FIGS. **5** and **14**

FIG. **14** the assembly of FIG. **13** in a section along section line XIV-XIV

FIG. **15** the detail A of FIGS. **5** and **6** in the same sectional view as FIG. **13**, with connecting means moved into the closed position and in a sectional view along section line XV-XV of FIG. **16**

FIG. **16** the assembly of FIG. **15** in a section along section line XVI- XVI

FIG. **17** the detail A of FIGS. **5** and **6** in a view comparable to FIGS. **13** and **15**, with the connecting means shown in the open position

FIG. **18** the detail A of FIGS. **5** and **6** in a view corresponding to FIGS. **13** and **15**, with the connecting means shown in the semi-connected position

FIG. **19** the container assembly of FIG. **5** in an open position of the lower container, with an upper container simultaneously connected to the lid of the lower container.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The container assembly depicted in FIGS. **1** to **4** comprises a container **1** which is designed to produce, by stacking on top of one another in a stacking direction **2**, in particular vertical, several containers **1** of its kind, a container assembly comprising several containers **1** resting one on top of the other, as evident by way of example from FIGS. **5** to **10**.

The container **1** is preferably also equipped with at least one connecting device **3** and with an engaging device **4** which allow the releasable connection to one another of cases resting on one another in such a way that the container assembly forms a container unit consisting of several connected containers **1**, which may be handled and in particular transported as a unit.

The container **1** is expediently substantially rectangular in shape. inside it has a storage space **5** to hold articles of any kind. Its body **6** is expediently divided into a box- or shell-shaped bottom part **7** and a lid **8** assigned to the opening **12** of the bottom part **7** and which may in turn also be box- or shell-shaped.

In the normal position of use of the container **1**, the bottom part **7** is at the bottom and the lid **8** is on top. The present description relates to this normal position of use.

The lid **8** may adopt a covering position relative to the bottom part **7**, as seen for example in FIGS. **1** and **5**. Here it sits completely on the edge of the bottom part **7** and seals the opening **12**, so that the storage space **5** is covered and inaccessible.

On the other hand, the lid **8** may also be moved away from the bottom part **7**, into an open position seen for example in FIGS. **2** and **9**, in order to free the opening **12** and anke the storage space **5** accessible.

In principle, no permanently connected link is required between the bottom part **7** and the lid **8**, which would allow complete removal of the lid **8** from the bottom part **7** to obtain an open position. It is however expedient to fix the two components to one another in such a way that they also represent a cohesive assembly in the open position of the lid **8**. Exemplarily, this is obtained through a pivotable mounting of the lid **8** on the bottom part **7** using hinge means **13**, which define a lid swivel axis **14** around which the lid **8** may be pivoted according to double arrow **15** in the vertical direction of the container **1**, in order to open and close the container **1**.

Based on the normal position of use, the container **1** has on its outside a front end face **16***a*, an opposite rear end face **16***b*, together with two similarly opposite side end faces **16***c*, **16***d* running between the front and rear end faces **16***a*, **16***b*. The end faces **16***a*-**16***d* are part of a frame-like peripheral wall **17**, which in the embodiment is divided [illegible]

Petitioner EX. 1007
Page 13 of 22

section **17***a* belonging to the bottom part **7** and a peripheral wall section **17***b* belonging to the lid **8**. With the container **1** closed, the two peripheral wall sections **17***a*, **17***b* are expediently flush with one another.

The exterior of the container **1** also has a lower outer surface described as the underside **18** and an upper outer surface described as the top side **19**. The underside **18** is part of a bottom surface **22** belonging to the bottom part **7**, while the top side **19** is part of a top panel **23** belonging to the lid **8**. The bottom surface **22** and the top panel **23** both extend in the normal position of use in a horizontal plane, while the stacking direction **2** which coincides with the vertical direction of the container **1** is oriented at right-angles to the former.

If, as may be seen in FIGS. **5** to **19**, two containers **1** are stacked one on top of the other, the lid **8** of the currently lower container **1** in the stacking direction **2** lies between the bottom part **7** of the lower container **1** and the bottom part **7** of the upper container **1** lying on top. In particular the arrangement is such that the bottom surface **22** of the upper container **1** is in direct contact with the top panel **23** of the lid **8** lying below.

The hinge means **13** are expediently so fitted that the lid swivel axis **14** is assigned to the rear end face **16***b*. To open the container **1**, the lid **8** may therefore be swivelled upwards in the area of its front side.

Where the terms "front side" and "rear side" are used below, they refer to those sides of the container **1** on which the front end face **16***a* and the rear end face **16***b* are located. In what follows, "transverse direction **24**" describes a direction which is at right-angles to the stacking direction **2** and at the same time parallel to the front and rear end faces **16***a*, **16***b*. A direction at right-angles to the transverse direction **24** is described as the vertical direction **25**.

The connecting device **3** allows a releasable connection of a lower container **1** to an upper container **1** currently resting on top of it. As indicated in FIG. **7** by dot-dash lines, in each case at least one connecting device **3** could in principle be provided on several or even on all end faces **16***a*-**16***d* of the container **1**. Due to the additional provision of the engaging device **4**, provision of the connecting device **3** in the embodiment is restricted to the front end face **16***a*, with preferably only a single connecting device **3** being provided, and placed centrally relative to the transverse direction **24**, i.e. on the front end face **16***a* in the centre of its width. Handling is thereby greatly simplified.

A multiple arrangement of connecting devices **3**, in particular operable independently of one another, is recommended especially if the load to be transferred through the connecting process is very high and is to be distributed over several points.

The connecting device **3** has a connecting means **26**, mounted on and movable relative to the lid **8**, and movable into a connected position shown in the lower half of FIGS. **5** and **6**, also in FIGS. **13** and **14**. In this connected position it is simultaneously in such connecting engagement with the bottom parts **7** of both stacked containers **1** that the two bottom parts **7** may no longer be moved relative to one another in the stacking direction **2**. The connecting means **26** prevents the lifting of the upper container, while in the opposite direction the fixing is effected by the reciprocal direct vertical support of the containers **1** between themselves.

In principle one could imagine the connecting means **26** as an element with any desired and suitable degree of freedom of movement. Regarded as especially expedient, however is a design in the form of a rotating locking bolt **27**, as is the case in the embodiment. FIG. **12** shows a detail view of a preferred version of the rotating locking bolt **27** seen from the rear.

The rotating locking bolt **27** is expediently mounted rotatably on the front end face **16***a* of the lid **8**, with the rotation axis **29** defined by the assigned pivotable mounting means **28** running in particular at right-angles to the front end face **16***a*. In the embodiment the pivotable mounting means **28** consist of a pivot pin **32**, for example shaped like a pipe socket and extending forwards from the front end face **16***a* of the lid **8**, and a bearing recess **33** formed in the rotating locking bolt **27**, which is preferably in one piece and in particular made of plastic, and by which the rotating locking bolt **27** is rotatably attached to the pivot pin **32**. The axial fixing may be effected by any desired securing means, for example by latching means **34** (FIGS. **14** and **16**).

As indicated in FIGS. **13**, **15**, **17** and **18**, the pivotable mounting means **28** may be provided with indexing means **35**, which may be used to locate the rotating locking bolt **27** in various preferred positions non-rotatable relative to the lid **8**, in such a way that it may be rotated further by applying only slightly increased force. This may for example involve latching means. Also conceivable are indexing means **35** of the kind based on a locking principle and requiring active unlocking with the finger of one hand.

The rotating locking bolt **27** has on its rear side **36** facing the body **6** several locking structures **37** evident from FIG. **12** and arranged with radial clearance from the rotation axis **29**, wherein this radial clearance is expediently identical for all locking structures **37**. These locking structures **37** are distributed in the peripheral direction of the rotation axis **29** and are spaced apart from one another, but lie preferably on a common circular arc **38**, the centre of which lies on the rotation axis **29**.

Preferably the locking structures **37** comprise at least three locking structures, designated below as first, second and third locking structures **37***a*, **37***b*, **37***c*. Of these, the first and second locking structures **37***a*, **37***b* preferably lie diametrically opposite relative to the rotation axis **29**, i.e. they are located on opposite sides of the rotation axis **29**. The circumferential offset of the first and second locking structures **37***a*, **37***b* with respect to the rotation axis **29** therefore amounts substantially to at least 180°. The third locking structure **37***c* is offset by 90° relative to the two aforementioned locking structures **37***a*, **37***b*.

The rotating locking bolt **27** is especially convenient to grip if it is roughly T-shaped, as depicted, in particular with three locking bolt arms **42**, substantially of equal length, and extending radially outwards from the locking bolt centre with the bearing recess **33**. Expediently, each locking bolt arm **42** is provided with one of the locking structures **37***a*, **37***b*, **37***c*. Between the locking bolt arm **42** with the third locking structure **37***c* and each of the other two locking bolt arms **42** there is expediently a gap **43**, the purpose of which will be explained below.

Preferably the locking structures **37** are comprised in each case of the radially-outwards lying outer recess flanks, facing the rotation axis **29**, of a slot-like recess **44** formed in the rear of the body of the rotating locking bolt **27**. Each recess **44** expediently curves along the arc **38**.

The outer locking flanks acting as locking structures **37** also have a correspondingly curved shape with the curve centres lying on the rotation axis **29**.

If the rotating locking bolt **27** is rotated according to double arrow **45** around the rotation axis **29**, the locking bolt arms **42** pivot around the rotation axis **29**, whereat a locking bolt arm **42** momentarily extending [illegible] stacking direction **2** extends outwards in the corresponding direction over the lid **8**. The distan[illegible]

Petitioner Ex. 1007
Page 14 of 22

structures **37** and the rotation axis **29** is therefore greater than the distance between the rotation axis **29** and the top and bottom of the lid **8**.

As further components, the connecting device **3** has first and second anchoring means **46**, **47**, which are located on the front end face **16***a* of that bottom part **7** to which the lid **8** carrying the rotating locking bolt **27** also belongs. The two anchoring means **46**, **47** are mounted in the stacking direction **2** beneath the lid **8**, preferably with clearance, while in the stacking direction **2** they are expediently flush and in particular spaced apart from one another in such a way that the first anchoring means **46** are positioned closer to the lid **8** than the second anchoring means **47**.

As complementary elements to the slot-like recesses **44**, the anchoring means **46**, **47** are each formed in the embodiment by a projection, in particular arc-shaped. The first anchoring means **46**, which are therefore curved, are so arranged on the bottom part **7** that their curvature corresponds to that of the arc **38** and they are arranged exactly on this arc **38**.

The curvature of the second anchoring means **47** is opposite to that of the first anchoring means **46**. Consequently, the convex surfaces of the two anchoring means **46**, **47** face one another. The curvature of the second anchoring means **47** is identical to that of the first anchoring means **46**, while the second anchoring means **47** are so positioned with such clearance from the rotation axis **29** that the distance between the second anchoring means **47** of an upper container **1** from the rotation axis of the container **1** lying below is the same as the distance between the rotation axis **29** and the first anchoring means **46**.

So, when two containers **1** rest one on top of the other, the first anchoring means **46** of the lower container **1** and the second anchoring means **47** of the upper container **1** lie together on the arc **38** (see FIG. **13**).

A reverse arrangement would also be possible, to the effect that the anchoring means **46**, **47** are in the form of slot-like recesses into which the anchoring structures **37** of the rotating locking bolt **27**, formed by projections, are able to engage.

In principle it would also be possible to design the first and second anchoring means **46**, **47** as a unit.

When two containers **1** rest one on top of the other, the rotating locking bolt **27** of the lower container **1** may be rotated into the connected position evident from FIGS. **5**, **6**, **13** and **14**, in which the first locking structure **37***a* is in connecting engagement with the first locking means **46** of the lower bottom part **7**, and there is at the same time connecting engagement between the second locking structure **37***b* located on the upwards extending locking bolt arm **42** and the second anchoring means **47** of the upper bottom part **7**. A position in which the rotating locking bolt **27** is rotated through 180° brings the same result, only here the first and second locking structures **37***a*, **37***b* are transposed in respect of their interaction with the two anchoring means **46**, **47**.

In the connected position, the anchoring means **46**, **47** are overlapped, on the sides facing in opposite directions relative to the stacking direction **2**, by the first and second locking structures **37***a*, **37***b*, so that the bottom parts **7** may no longer be disconnected from one another in the stacking direction **2**. Here the lid **8** of the lower container **1** may be clamped between the bottom parts **7** flanking it above and below.

Besides the connected position, the rotating locking bolt **27** may also be put into other rotary positions which meet a specific function. In this connection, the positioning is aided by the indexing means **35**. A further such position is the closed position evident for example from FIGS. **1**, **15** and **16**, which is also present for the rotating locking bolt of the upper container **1** in FIGS. **5** to **10**. The closed position differs from the connected position by a position rotated through 90°, so that the first and second locking structures **37***a*, **37***b* come to lie without effect in the area of the front end face **16***a* of the lid **8**, and only the third locking structure **37***c*, located on a locking bolt arm **42** extending downwards into the closed position, is effective. This third locking structure **37***c* is in connecting engagement with the first anchoring means **46**, so that the lid **8** is locked relative to the bottom part **7** and cannot be lifted. The locking force effective between the lid **8** and the bottom part **7** is here transferred on the part of the lid **8** via the pivotable mounting means **28**, which however represents no further problem since only a closing force is involved, which is relatively small and places only a small load on the pivotable mounting means **28**.

The design of the rotating locking bolt **27** is such that, in the closed position, it does not extend into that area in which the second anchoring means **47** of a further upper container **1** which may possibly be placed on this container are to be found. Especially advantageous is a a structure with the effect that the rotating locking bolt **27** in the closed position does not extend at all or else only slightly over the top side **19** of the lid **8**.

On adoption of the closed position of the rotating locking bolt **27**, a further container **1** may be placed at any time on the assigned container **1**, and also removed again unimpeded.

The closed position of the rotating locking bolt **27** may therefore be used to disconnect the container unit. It may also be used for releasable locking of the lid **8**, relative to the bottom part **7**, of a container **1** to be used separately, so that the lid **8** is secured in the covering position. Such a situation is shown in FIG. **1**.

As is clear, the locking structures **37** of the rotating locking bolt **27** always cooperate in both the connected position and also the closed position with the same first anchoring means **46** of the lower bottom part **7**. The design cost is therefore relatively low.

Another functional position of the rotating locking bolt **27** is shown in FIGS. **2** and **17**. This involves an open position in which the locking between lid **8** and bottom part **7** is released so that the lid **8** may be swivelled up to open the container **1** as shown by arrow **15**. Expediently this open position, as also the closed position explained above, simultaneously forms a release position with respect to the upper container resting on the container **1** and in which the locking engagement of the rotating locking bolt **27** is released in both the open position and also the closed position.

In the open position, the gaps **43** located between adjacent locking structures **37** acquire their importance. The width of these gaps **43** is at least as great as the width of the first anchoring means **46**, while the rotating locking bolt **27** is so positioned in the open position that the gap **43** comes to lie in the area of the first anchoring means **46**. In other words the first anchoring means **46** are therefore located in the gap **43**, which is large enough to allow upwards swivelling of the lid **8**, without this being prevented by the first anchoring means **46**. In the open position, therefore, the first anchoring means **46** are entirely out of connecting engagement with any locking structures **37**.

On account of the preferred symmetrical design of the rotating locking bolt **27**, the latter may be put into two alternative open positions which, starting from the closed position, may be reached by rotating the rotating locking bolt **27** in one or the other direction, preferably by an angle of rotation of preferably 45° in each case. If only one open position is provided, then one of the gaps **43** may be omitted.

Petitioner Ex. 1007
Page 15 of 22

Finally, the rotating locking bolt **27** may also be brought into a functional position shown in FIG. **18** and described as the semi-connected position because, while the connecting engagement with the bottom part **7** belonging to the lid **8** is released, the connecting engagement with the bottom part **7** of the upper container **1** resting on the lower container **1** is not released. The semi-connected position is also evident once more in FIG. **19** in connection with the rotating locking bolt **27** belonging to the lower container **1**.

In the embodiment, the semi-connected position is a position rotated through 90° relative to the connected position. Here the locking bolt arm **42** equipped with the third locking structures **37***c* extends upwards, in front of the front end face **16***a* of the bottom part **7** of the upper container **1**. There the third locking structure **37***c* is in locking engagement with the second anchoring means **47**. Relative to the first anchoring means **46**, the locking engagement is cancelled, while the first and second locking structures **37***a*, **37***b* are in the same position as in the closed position according to FIG. **15**, only interchanged in their orientation.

In the semi-connected position, the lid **8** which is no longer locked to the bottom part of the lower container **1** may be swivelled up as shown in FIG. **19**, and specifically together with the one or more further containers **1** mounted on this lid **8**, which continue(s) to be locked to the lid **8** which may be swivelled upwards in the same manner as in the case of a connected position. The container unit is therefore not disassembled, while the lower container **1** may still be opened to give access to the storage space **5**.

It goes without saying that the design of the rotating locking bolt **27** may deviate from that depicted; in particular it would be possible to provide additional wall structures covering the gaps **41** at the front, so that the rotating locking bolt **27** has a more uniform external contour, for example comparable to the shape of a circle segment.

The engaging device **4** which is also present contains a first engaging structure **48** located on the top side **19** of the container **1**, and a second engaging structure **49** provided on the underside **18** of the container **1**. In the embodiment, the first engaging structure **48** is located externally on the top panel **23** of the lid **8**, and the second engaging structure **49** externally on the bottom surface **22** of the bottom part **7**. The two engaging structures **48**, **49** are so matched that, in the stacked state of two containers **1**, the upwards facing first engaging structure **48** of the lower container **1** and the downwards facing second engaging structure **49** of the upper container **1** engage with one another. This reciprocal engagement has the effect that the stacked containers **1** are on the one hand supported mutually at right-angles to the stacking direction **2** and may not be displaced relative to one another. On the other hand, it is brought about that the engaging structures **48**, **49** engage at least partly from behind at right-angles to the stacking direction in such a way that effective locking is provided in the stacking direction and prevents at least a vertically upwards directed lifting of at least a certain area of the upper container **1** from the lower contained.

In practice, the engaging structures **48**, **49** are preferably so designed that they prevent lifting of the rear section **52** of the upper container **1**, but on the other hand allow lifting of the front section **53** of the upper container **1**. This circumstance is clear from FIG. **10**. So that the front section **53** is also locked, unable to be lifted, to the lower container **1**, and therefore the entire upper container **1** enters into a stable connection with the lower container **1**, the connecting device or devices **3**, already explained in detail, is or are provided. This connecting device **3**, which rests expediently in the area of the front end face **16***a*, on assuming the connected position securely holds together the upper bottom part **7** and the lower bottom part **7**, with the lower lid **8** interposed, in the manner described above.

If no connecting device **3** were provided, it could also be ensured through a suitable design of the first and second engaging structures **48**, **49** that, in the stacked condition of two containers, the upper container **1** may not be lifted upwards in its entirety in the stacking direction **2**. However, there are benefits in terms of handling as a result of the combination of the engaging device **4** and the connecting device **3**.

The first engaging structure **48** consists of a multiplicity of engaging recesses **54** formed in the top side **19** of the lid **8** and distributed over the lid surface. The second engaging structure **49** consists of several engaging projections **55**, expediently arranged with the same distribution as the engaging recesses **54** and projecting downwards over the expediently at least smooth outer base area **56** of the bottom surface **22**.

Several of these engaging projections **55** form feet **57**, expediently distributed at points over the underside **18**, wherein the embodiment has altogether four such feet **57**, placed in the corner zones of the outer base area **56** of the bottom surface **22**, but here with a certain clearance in each case from the end faces **16***a*-**16***d*.

When used individually, each container **1** may be stored stably on a floor with the help of the feet **57**. The same applies to the use of a container **1** as lower container of a stacked container assembly. The feet **57** are expediently integral with the body **6**, but may also if required be attached so as to be at least partly releasable, to facilitate replacement in case of wear.

Beneath the engaging recesses **54** are two elements **54***a* which are located in the two front corner areas of the preferred rectangular top side **19**. A similar arrangement would also be possible for the engaging recesses assigned to the rear feet **57**, but in the embodiment an advantageous variant has been chosen in which there is a single rear engaging recess **54***b* with dimensions such that both rear feet **57** can engage in it simultaneously.

As is evident in particular from FIGS. **1**, **7** and **9**, the rear engaging recess **54***b* may have an elongated shape with its long side running in the transverse direction **24** and extending parallel to the rear end face **16***b*. The front engaging recesses **54***a* on the other hand are, like the assigned front feet **57**, punctiform in shape and therefore have a square outline.

In the embodiment, the two front feet are pure support feet **57***a*, with an outline complementary to that of the front engaging recesses **54***a* so that, when inserted in the front engaging recesses **54***a*, they rest on the inner side walls of the front engaging recesses **54***a*. By this means, the upper container **1** may no longer be shifted on the lower container **1** at right-angles angles to the stacking direction **2**. The structuring of the support feet **57***a* and the front engaging recesses **54***a* is however such that there is no locking in the stacking direction **2**, so that the front section **53** of the upper container **1** may be lifted at any time when the connecting means **26** are in the release position.

The rear feet **57** which cooperate with the preferred single rear engaging recess **54***b* are in contrast designed as locking feet **57***b*. Their special feature is that they function as rear-engaging elements of the second engaging structure **49** and are able to engage from the rear inside the rear engaging recess **54***b* designed for locking engagement at right-angles to the stacking direction **2**, so that a locking engagement preventing relative movement [illegible] direction **2** is the result. The rear engaging recess **54***b* is therefore also described below as the locking engaging recess.

Petitioner Ex. 1007
Page 16 of 22

If each locking foot **57***b* is assigned a separate engaging recess **54**, this is also in each case in the form of a locking engaging recess.

The rear engaging recess obtains its function as locking engaging recess **54***b* in particular through its design with a relief-cut cross-section, of which FIG. **11** shows an embodiment. The locking engaging recess **54***b* which is otherwise open at the top has, at least on its edge area adjacent to the rear end face **16***b*, a rear-engaging projection **58** which is preferably rib-like and extends forwards in the vertical direction **25**. This leads to the locking engaging recess **54***b* having an opening cross-section which is smaller than the base area of the floor of the recess.

On its rear side facing the rear end face **16***b*, each locking foot **57***b* has a rear-engaging section **62**, expediently with a wedge-shaped profile, so that in the transition zone to the outer base area **56** of the bottom surface **22** there is a gap with a cross-section complementary to the rear-engaging projection **58** (FIG. **11**).

The dimensions of the opening of the rear engaging recess **54***b* are greater in the vertical direction **25** than those of each locking foot **57***b*. The latter may therefore be inserted easily from above into the locking engaging recess **54***b*.

To fit an upper container **1** on a lower container **1**, the upper container **1** is set down as shown in FIG. **10** in an inclined position, and with the downwards tilted rear section **52** leading, on to the top side **19** of the lower container **1**, whereby the locking feet **57***b* dip into the locking engaging recess **54***b*. At the same time or afterwards, the upper container **1** is pressed or pushed downwards as indicated by arrow **63**, so that the rear-engaging sections **62** come into locking engagement with the rear-engaging projection or projections **58**. The area in which this locking engagement occurs may be described as the locking area **64**.

In a further step, the front section **53** of the upper container **1** is swivelled downwards as shown by arrow **65**, whereby the rear-engaging structures in the locking area **64** define a pivot axis **66**, outlined in FIG. **7**, for the aforementioned swivelling process.

On further swivelling of the front section **53** on to the top side **19** of the lower container **1**,the support feet **57***a* dip into the assigned front engaging recesses **54***a* and finally complete the mutual engagement of the engaging structures **48**, **49**.

The rear section **52** of the upper container **1** is secured against vertical lifting by the locking engagement between the locking feet **57***b* and the locking engaging recess **54***b*. The corresponding vertical securing of the front section **53** is obtained by rotating the connecting means **26** into the connected position.

Insertion of the support feet **57***a* into the front engaging recesses **54***a* may be aided by making the side wall of the front engaging recesses **54***a* at least partly an inclined sliding surface **67**. The front engaging recesses **54***a* therefore have in the area of their opening a larger cross-section than at their bottom surface, with the difference in cross-section being bridged by the inclined sliding surfaces **67**. Consequently, automatic centring take place when the upper container is put on.

From FIG. **4** it is clear that, between the two locking feet **57***b* arranged with clearance from one another in the transverse direction **24**, there may extend an additional locking strip **68** which also has a rear-engaging section **62** similar to that of the locking feet **57***b* and which expediently bridges the entire gap between the two locking feet **57***b*. This locking strip **68** also forms a rear-engaging element of the second engaging structure **49** which additionally acts on the locking feet **57***b* and increases the length of the locking contact, so that greater load-bearing capacity is obtained.

The height of the locking strip **68** measured in the stacking direction **2** is expediently less than that of the locking feet **57***b*, so that the latter extend down beyond the locking strip **68**. Here, it is advantageous for the locking strip **68** and the locking feet **57***b* to be made as one-piece. It may be joined in particular integrally to the body of the bottom part **7**, in a similar manner to the feet **57**.

It is also quite easily possible to have a different number of feet **57** from the embodiment. For example a single strip-like locking foot **57***b* could be provided at the rear, i.e. comparable to an arrangement in which the locking strip **68** has the same height as the locking feet **57***b*.

So that the container **1** or the container unit may be transported easily, the container **1** expediently has a carrying handle **72** on its top. Expediently this carrying handle **72** is mounted on the lid. Moreover it is advantageously so designed that it may adopt either an out-of-use position, evident from the drawing, in which it is swivelled on to the top side **19**, or a position of use indicated in FIG. **6**, in which it is swivelled upwards and therefore extends up over the top side **19**. It is preferably a bow- or U-shaped carrying handle **72**.

So that the carrying handle **72** does not impede the stacking of the containers **1** a locating recess **73**, open at the top, is formed in the top side **19** of the lid **8**. The carrying handle **72** comes to lie in this recess when not in use. Here it is of advantage if this locating recess **73** is formed directly by the locking engaging recess **54***b* which is of matching size.

In the embodiment, the aforementioned locking engaging recess **54***b* simultaneously forms a handgrip recess **74** open on the top side **19**. This gives the option of transporting a single container in an upright position rotated through 90° relative to the normal position of use, like a briefcase, and in so doing engaging from above with one hand in the handgrip recess **74**, whereby the rear-engaging projection **58** may be encompassed by the fingers, so that more secure transport is possible.

Varying from the embodiment, the locking engaging feet **54***b* could also be so designed that their rear-engaging section **62** is oriented towards the front. In this case, the rear-engaging projection **58** would also be located on the edge section lying closer to the front end face **16** of at least one locking engaging recess **54***b*, and would face rearwards.

In the embodiment, the entire load-bearing force between two vertically-connected containers **1** is transferred via a three-point connection. The three connection points are comprised of locking measures in the area of the two locking feet **57***b* and the rotating locking bolt **27** fitted with clearance from the locking area **64**. A certain surface force may also be transferred by the locking strip **68**.

There is no problem at all in providing containers **1** of varying overall height, and which have the same connecting devices **3** and engaging devices **4** as the described container **1**. By this means it is also possible to stack containers **1** of varying size without difficulty in any desired order, and combine them to form a container unit.

The combined existence of the connecting device or devices **3** and the engaging device **4** is especially advantageous, however the container **1** may in principle also have no engaging device **4** and/or an engaging device differing from the type described.

The invention claimed is:

**1**. A container assembly, with at least one stackable container which has a bottom part for carrying goods and a lid assigned to the opening of the bottom part and movable relative to the bottom part for either closing or opening the

Petitioner Ex. 1007
Page 17 of 22

opening, and designed for the vertical stacking of several containers in such a way that the lid of a lower container comes to lie between the bottom part of the lower container and an upper container positioned immediately above, wherein the at least one stackable container is provided with at least one connecting device which has a movable connecting means, by which the bottom parts of containers resting directly on top of one another may be connected releasably together to obtain a container unit comprised of several containers, and wherein the movable connecting means comprises:

a rotating locking bolt mounted on the lid, the locking bolt being rotatable with respect to the lid between a connected position and an open position;

first and second anchoring means provided on the bottom part to interact with the rotating locking bolt, the first and second anchoring means being spaced apart in the stacking direction of the container, whereby the first anchoring means are disposed closer to the lid than the second anchoring means in such a way that, when the rotating locking bolt is in the connected position, the rotating locking bolt of the lower of two stacked containers is simultaneously in connecting engagement with the first anchoring means provided on the bottom part of the lower container and with the second anchoring means provided on the bottom part of the upper container, and, when the rotating locking bolt is in the open position, the rotating locking bolt is entirely out of connecting engagement with the first anchoring means provided on the bottom part of the lower container for releasing the locking between the lid and the bottom part, while the rotating locking bolt is still in engagement with the lid; and

a pivot pin extending outwardly from a front face of the lid, the pivot pin defining a rotation axis for the rotating locking bolt and the rotating locking bolt being rotatably mounted on the pivot pin, wherein the rotating locking bolt comprises a plurality of locking slots adapted for engagement with the anchoring means of the bottom part, the locking slots being spaced apart from one another on a common circular arc, the center of the circular arc being the rotation axis defined by the pivot pin.

2. The container assembly according to claim 1, wherein the movable connecting means of at least one connecting device is movable into a closed position deviating from the connected position, in which it is disconnected from an upper container mounted over the assigned lid and is simultaneously in connecting engagement with the bottom part located below the lid in such a way that the lid is locked in a covering position relative to this bottom part which closes the opening of the bottom part.

3. The container assembly according to claim 1, wherein the movable connecting means of at least one connecting device is movable into a semi-connected position deviating from the connected position, in which it is in connecting engagement with the bottom part of an upper container mounted above the assigned lid, and is simultaneously disconnected from the bottom part located below the lid, so that it is possible to lift the lid together with the container mounted above the lid from the bottom part located below the lid.

4. The container assembly according to claim 3, wherein the movable connecting means of at least one connecting device is in the form of a rotating locking bolt mounted rotatably on the lid, and anchoring means provided on the bottom part to interact with the rotating locking bolt are arranged in such a way that the rotating locking bolt of the lower of two stacked containers, on assuming the connected position, is in simultaneous connecting engagement with the anchoring means of the bottom parts of both containers, and wherein the rotating locking bolt in the semi-connected position altogether assumes a rotated position deviating from the connected position relative to the lid.

5. The container assembly according to claim 4, wherein the rotated positions in the connected position and in the semi-connected position are rotated through 90° relative to each other.

6. The container assembly according to claim 1, wherein several connecting devices are provided, distributed at several points along the periphery of the container, and operable independently of one another.

7. The container assembly according to claim 1, wherein the rotating locking bolt, on assuming the connected position, has locking structures, which are in connecting engagement with the anchoring means of two stacked containers.

8. The container assembly according to claim 7, wherein the anchoring means are in the form of projections.

9. The container assembly according to claim 8, wherein the locking structures are portions of slot-like recesses, or vice-versa.

10. The container assembly according to claim 7, wherein both the anchoring means and also the locking structures are curved, with bow centers lying on the rotation axis of the rotating locking bolt.

11. The container assembly according to claim 1, wherein the connecting device or devices is or are located on an end face of the container oriented at right-angles to the stacking direction of the container, whereby the rotating locking bolt is rotatable relative to a rotation axis at right-angles to this end face.

12. The container assembly according to claim 1, wherein the movable connecting means of at least one connecting device is movable into a closed position deviating from the connected position, in which it is disconnected from an upper container mounted over the assigned lid and is simultaneously in connecting engagement with the bottom part located below the lid in such a way that the lid is locked in a covering position relative to this bottom part which closes the opening of the bottom part, and wherein, in the closed position, the rotating locking bolt assumes a rotated position relative to the lid, which deviates from the connected position.

13. The container assembly according to claim 12, wherein the rotating locking bolt has, offset in its direction of rotation, locking structures which in the connected position and in the closed position are alternately in connecting engagement with the same anchoring means located on the bottom part.

14. The container assembly according to claim 13, wherein the locking structures are so offset relative to one another in the direction of rotation of the rotating locking bolt that the rotating locking bolt may be rotated into an open position in which the anchoring means fitted to the bottom part and cooperating with the rotating locking bolt in the connected position and in the closed position lie between the locking structures, thereby cancelling out the connecting engagement, to allow raising of the lid from the bottom part to open the opening of the bottom part.

15. The container assembly according to claim 1, wherein the movable connecting means is in the form of a rotating locking bolt mounted rotatably on the lid, which may be rotated into several different rotated positions, including at least a connected position, a closed position connecting the lid only with the bottom part below it, and an open position disconnecting the lid from the bottom part lying below it.

Petitioner Ex. 1007
Page 18 of 22

16. The container assembly according to claim 15, wherein the rotating locking bolt is also rotatable to a semi-connected position disconnecting the lid from the bottom part lying below it and simultaneously connecting it to the bottom part lying above it.

17. The container assembly according to claim 1, wherein the lid is mounted pivotably on the bottom part with clearance from the front end face of the container in such a way that, with the movable connecting means of at least one connecting device moved into an open position, it may be swiveled upwards in the front section relative to the bottom part.

18. The container assembly according to claim 17, wherein it has only a single connecting device, which is located in the center of the width of a front end face of the container.

19. The container assembly according to claim 1, wherein a first engaging structure is provided on the top side of the lid, and a second engaging structure on the underside of the bottom part, whereby the two engaging structures are so matched to one another that, when two containers are resting on top of one another, the first engaging structure lying on top of the lower container, and the second engaging structure lying below of the upper container, engage in one another in such a way that the two containers are on the one hand secured against shifting relative to one another at right-angles to the stacking direction and on the other hand, due to rear-engaging elements of the engaging structures engaging from behind at right-angles to the stacking direction, there exists between the containers a locking which prevents lifting of the upper container from the lower container only in certain areas, so that the upper container may be swiveled up around the locking area defined by the rear-engaging elements, whereby the connecting device or devices is or are arranged with clearance from the locking area and, in the connected position of its coupling means, prevent the upper container from being swiveled up from the lid of the lower container.

20. The container assembly according to claim 19, wherein the engaging structures are so designed that the fitting of an upper container on to a lower container to obtain the locking effected in the stacking direction by the engaging structures may be carried out by placing the upper container in an inclined position relative to the lower container until there is mutual engagement of the engaging structures, and then swiveling the upper container on to the lower container around a swivel axis defined by the engaging structures which engage themselves behind.

21. The container assembly according to claim 19, wherein the first engaging structure consists of engaging recesses located on the top side of the container, and the second engaging structure of engaging projections located on the underside of the container, while the container has distributed on its underside several downwards projecting feet which belong to the second engaging structure and form at least partly its elements.

22. The container assembly according to claim 21, wherein at least one foot is designed as a locking foot forming a rear-engaging element of the second engaging structure, and at least one other foot is located with clearance from the locking foot in the area of the container capable of swiveling upwards, and forms a pure support foot not used for vertical locking.

23. The container assembly according to claim 22, wherein the second engaging structure has two locking feet spaced apart and each forming a rear-engaging element.

24. The container assembly according to claim 22, wherein the locking foot or feet has or have a wedge-shaped profiled rear-engaging section for engaging behind the first engaging structure.

25. The container assembly according to claim 24, wherein the wedge-shaped profiled rear-engaging section engages behind the first engaging structure and faces away from the support foot or feet.

26. The container assembly according to claim 22, wherein the first engaging structure has for interaction with the locking feet at least one locking engaging recess with a relief-cut cross-section, on the edge of which is provided a rear-engaging projection which may be engaged from the rear by a locking foot dipping into the locking engaging recess.

27. The container assembly according to claim 22, wherein the side wall of at least one engaging recess serving to accommodate a support foot is designed at least partly as an inclined sliding surface to assist the dipping-in of the support foot.

28. The container assembly according to claim 19, wherein at least one engaging recess of the first engaging structure is designed to accommodate simultaneously two of the spaced apart locking feet acting as rear-engaging elements.

29. The container assembly according to claim 19, wherein there is provided on the top side of the container a carrying handle which may be swiveled relative to the body of the container and which, in an out-of-use position, may be swiveled into a locating recess on the top side of the container, whereby this locating recess is formed directly by an engaging recess of the first engaging structure.

30. The container assembly according to claim 29, wherein the locating recess is formed by a locking engaging recess forming the rear-engaging elements of the first engaging structure.

31. The container assembly according to claim 19, wherein at least one engaging recess simultaneously forms a handgrip recess which may be used for carrying the container.

32. The container assembly according to claim 1, wherein it has at least two containers which may be stacked one on top of the other and connected releasably together to form a container unit.

33. A container assembly, with at least one stackable container which has a bottom part with an opening, and a lid assigned to the opening of the bottom part and movable relative to the bottom part for either opening or closing the opening, and designed for the vertical stacking of several containers in such a way that the lid of a lower container comes to lie between the bottom part of the lower container and an upper container positioned immediately above, wherein the at least one stackable container is provided with at least one connecting device which has a movable connecting means, by which the bottom parts of containers resting directly on top of one another may be connected releasably together to obtain a container unit comprised of several containers, and wherein the movable connecting means is mounted on the lid of the container and, to connect the container to a container placed on top of it, may be moved relative to the lid into a connected position in which it is simultaneously in connecting engagement with the bottom parts of both stacked containers, and

wherein a first engaging structure is provided on the top side of the lid, and a second engaging structure is provided on the underside of the bottom part, whereby the two engaging structures are so matched to one another that, when two containers are resting on top of one another, the first engaging structure lying on top of the lower container, and the second engaging structure lying below of the upper container, engage in one another in such a way that the two containers are on the one hand secured against shifting relative to one another at right-angles to the stacking direction and on the other hand, due to rear-engaging elements of the engaging structures

Petitioner Ex. 1007
Page 19 of 22

engaging from behind at right-angles to the stacking direction, there exists between the containers a locking which prevents lifting of the upper container from the lower container only in certain areas, so that the upper container may be swiveled up around the locking area defined by the rear-engaging elements, whereby the connecting device or devices is or are arranged with clearance from the locking area and, in the connected position of its coupling means, prevent the upper container from being swiveled up from the lid of the lower container, and

wherein the first engaging structure comprises engaging recesses located on the top side of the container, and the second engaging structure comprises engaging projections located on the underside of the container, while the container has distributed on its underside several downwards projecting feet which belong to the second engaging structure and form at least partly its elements, and

wherein at least one foot is designed as a locking foot forming a rear-engaging element of the second engaging structure, and at least one other foot is located with clearance from the locking foot in the area of the container capable of swiveling upwards, and forms a pure support foot not used for vertical locking, and

wherein the second engaging structure has two locking feet spaced apart and each forming a rear-engaging element, and

wherein, between the two locking feet, there extends a locking strip which, in the stacked condition of two containers is also in locking engagement with the rear-engaging elements of the first engaging structure.

**34**. The container assembly according to claim **33**, wherein the movable connecting means of at least one connecting device is in the form of a rotating locking bolt mounted rotatably on the lid, and anchoring means provided on the bottom part to interact with the rotating locking bolt are arranged in such a way that the rotating locking bolt of the lower of two stacked containers, on assuming the connected position, is in simultaneous connecting engagement with the anchoring means of the bottom parts of both containers.

**35**. The container assembly according to claim **34**, wherein at least one connecting device has, located on the bottom part and spaced apart in the stacking direction of the container, first and second anchoring means, of which the first anchoring means are placed closer to the lid than the second anchoring means in such a way that the rotating locking bolt of the lower of two stacked containers, on assuming the connected position, is in connecting engagement on the one hand with the first anchoring means provided on the bottom part of the lower container, and on the other hand with the second anchoring means provided on the bottom part of the upper container.

**36**. A container assembly, with at least one stackable container which has a bottom part with an opening, and a lid assigned to the opening of the bottom part and movable relative to the bottom part for either opening or closing the opening, and designed for the vertical stacking of several containers in such a way that the lid of a lower container comes to lie between the bottom part of the lower container and an upper container positioned immediately above, wherein the at least one stackable container is provided with at least one connecting device which has a movable connecting means, by which the bottom parts of containers resting directly on top of one another may be connected releasably together to obtain a container unit comprised of several containers, and wherein the movable connecting means comprises:

a rotating locking bolt mounted on the lid, the locking bolt being rotatable with respect to the lid between a connected position and an open position;

first and second anchoring means provided on the bottom part to interact with the rotating locking bolt, the first and second anchoring means being spaced apart in the stacking direction of the container, whereby the first anchoring means are disposed closer to the lid than the second anchoring means in such a way that, when the rotating locking bolt is in the connected position, the rotating locking bolt of the lower of two stacked containers is simultaneously in connecting engagement with the first anchoring means provided on the bottom part of the lower container and with the second anchoring means provided on the bottom part of the upper container, and, when the rotating locking bolt is in the open position, the rotating locking bolt is entirely out of connecting engagement with the first anchoring means provided on the bottom part of the lower container for releasing the locking between the lid and the bottom part, while the rotating locking bolt is still in engagement with the lid; and

a pivot pin extending outwardly from a front face of the lid, the pivot pin defining a rotation axis for the rotating locking bolt and the rotating locking bolt being rotatably mounted on the pivot pin,

wherein the rotating locking bolt comprises a plurality of locking slots adapted for engagement with the anchoring means of the bottom part, the locking slots being spaced apart from one another on a common circular arc, the center of the circular arc being the rotation axis defined by the pivot pin, and

wherein the rotating locking bolt has three locking bolt arms defining a T-shape, each arm having one of the plurality of locking slots.

**37**. A container assembly with at least one stackable container designed for the vertical stacking of several containers, the at least one stackable container comprising:

a bottom part defining an opening;

a lid attached to the bottom part adjacent the opening, the lid being movable relative to the bottom part for either opening or closing the opening in such a way that the lid of a lower container comes to lie between the bottom part of the lower container and an upper container positioned immediately above upon vertical stacking of several containers;

a rotating locking bolt mounted on the lid, the locking bolt being rotatable with respect to the lid between a connected position, a semi-connected position and a closed position; and

anchoring means provided on the bottom part to interact with the rotating locking bolt,

wherein, when the rotating locking bolt is in the connected position, the rotating locking bolt of the lower container of two stacked containers is in simultaneous connecting engagement with the anchoring means of the bottom parts of both containers, whereby the upper container and the lower container are connected releasably together to obtain a container unit, and

wherein, when the rotating locking bolt is in the semi-connected position, the rotating locking bolt of the lower container of two stacked containers is in connecting engagement with the anchoring means of the bottom part of an upper container mounted over the assigned lid, and is simultaneously [illegible] from the anchoring means of the bottom part of the lower container, so that it is possible to lift the lid of the [illegible]

Petitioner Ex. 1007
Page 20 of 22

with the upper container mounted above the lid from the bottom part of the lower container, and

wherein, when the rotating locking bolt is in the closed position, the rotating locking bolt of the lower container of two stacked containers is disconnected from the anchoring means of the bottom part of an upper container mounted over the assigned lid, and is simultaneously in connecting engagement with the anchoring means of the bottom part of the lower container in such a way that the lid of the lower container is locked in a covering position relative to the bottom part which closes the opening of the bottom part, and

wherein the rotating locking bolt is further rotatable to an open position, wherein, when the rotating locking bolt is in the open position, the rotating locking bolt is entirely out of connecting engagement with the anchoring means provided on the bottom part of the lower container for releasing the locking between the lid and the bottom part, while the rotating locking bolt is still in engagement with the lid.

**38**. The container assembly according to claim **37**, further comprising a pivot pin extending outwardly from a front face of the lid, the pivot pin defining a rotation axis for the rotating locking bolt and the rotating locking bolt being rotatably mounted on the pivot pin.

**39**. The container assembly according to claim **38**, wherein the rotating locking bolt comprises a plurality of locking slots adapted for engagement with the anchoring means of the bottom part, the locking slots being spaced apart from one another on a common circular arc, the center of the circular arc being the rotation axis defined by the pivot pin.

**40**. A container assembly with at least one stackable container designed for the vertical stacking of several containers, the at least one stackable container comprising:

a bottom part defining an opening and having a front face;

a lid attached to the bottom part adjacent the opening, the lid having a front face and being pivotably movable relative to the bottom part about a pivot axis for either opening or closing the opening in such a way that the lid of a lower container comes to lie between the bottom part of the lower container and an upper container positioned immediately above upon vertical stacking of several containers, the pivot axis of the lid being spaced from and parallel with the front face of the bottom part and the front face of the lid;

a rotating locking bolt mounted on the front face of the lid, the locking bolt being rotatable with respect to the lid about a rotation axis between a connected position and an open position, the rotation axis of the rotating locking bolt being perpendicular to the pivot axis of the lid; and

first and second anchoring means provided on the front face of the bottom part to interact with the rotating locking bolt, the first and second anchoring means being spaced apart in the stacking direction of the container, whereby the first anchoring means is disposed closer to the lid than the second anchoring means in such a way that, when the rotating locking bolt is in the connected position, the rotating locking bolt of the lower of two stacked containers is simultaneously in connecting engagement with the first anchoring means provided on the bottom part of the lower container and with the second anchoring means provided on the bottom part of the upper container, and, when the rotating locking bolt is in the open position, the rotating locking bolt is entirely out of connecting engagement with the first anchoring means provided on the bottom part of the lower container for releasing the locking between the lid and the bottom part, while the rotating locking bolt is still in engagement with the lid.

**41**. The container assembly according to claim **40**, comprising only a single rotating locking bolt, the single rotating locking bolt being disposed in the center of the width of the front face of the lid and the first and second anchoring means being disposed in the center of the width of the front face of the bottom.

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Petitioner Ex. 1007
Page 21 of 22

Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2003 - Page 346
Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products
IPR2024-01401

UNITED STATES PATENT AND TRADEMARK OFFICE

# CERTIFICATE OF CORRECTION



PATENT NO. : 8,875,888 B2
APPLICATION NO. : 13/061161
DATED : November 4, 2014
INVENTOR(S) : Koenig et al.

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

**ON THE TITLE PAGE:**

**IN THE ABSTRACT:**

(57), Line 3: now reads "on top thereof Several containers"
should read -- on top thereof. Several containers --

**IN THE SPECIFICATION:**

Column 11, line 24: now reads "or more farther containers"
should read -- or more further containers --

Column 11, line 56: now reads "the lower contained."
should read -- the lower container 1. --

Column 12, lines 51-52: now reads "right-angles angles to the"
should read -- right-angles to the --

Signed and Sealed this
Fifteenth Day of September, 2015

Michelle K. Lee

Michelle K. Lee
*Director of the United States Patent and Trademark Office*

Petitioner Ex. 1007
Page 22 of 22

US00D627967S

# (12) United States Design Patent

Kuhls

(10) Patent No.: US D627,967 S
(45) Date of Patent: ** Nov. 30, 2010

(54) **STORAGE BOX**

(75) Inventor: **Timo Kuhls**, Stuttgart (DE)

(73) Assignee: **TTS Tooltechnic Systems AG & Co. KG**, Wendlingen (DE)

(**) Term: **14 Years**

(21) Appl. No.: **29/349,068**

(22) Filed: **Mar. 5, 2010**

(30) **Foreign Application Priority Data**

Dec. 21, 2009 (WO) ..... 526558901

(51) **LOC (9) Cl.** ..... **03-01**
(52) **U.S. Cl.** ..... **D3/273**
(58) **Field of Classification Search** ..... D3/201, D3/273, 274, 276, 283, 284, 294, 295, 303, D3/318, 321, 323, 905; 190/19, 102, 109, 190/110, 111, 121, 124; 206/349
See application file for complete search history.

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*Assistant Examiner*—Karen E Eldridge Powers
(74) *Attorney, Agent, or Firm*—Hoffmann & Baron, LLP

(57) **CLAIM**

The ornamental design for a storage box, as shown and described.

**DESCRIPTION**

FIG. **1** is a top perspective view of a storage box showing my new design;

FIG. **2** is a top plan view thereof;

FIG. **3** is a bottom plan view thereof;

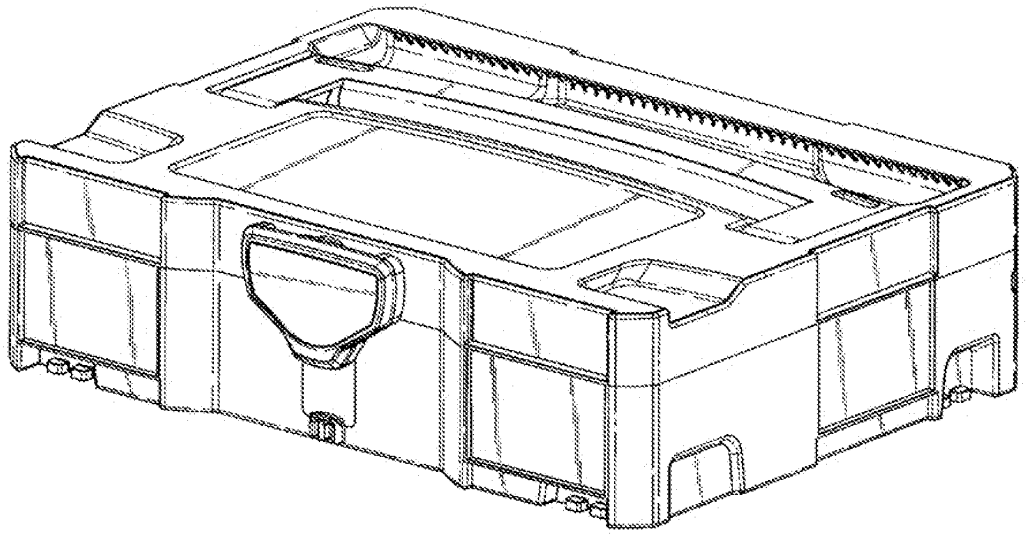
FIG. **4** is a front view thereof;

FIG. **5** is a rear view thereof;

FIG. **6** is a right view thereof; and,

FIG. **7** is a left view thereof.

**1 Claim, 5 Drawing Sheets**





**Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2003 - Page 348**
**Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products**
**IPR2024-01401**

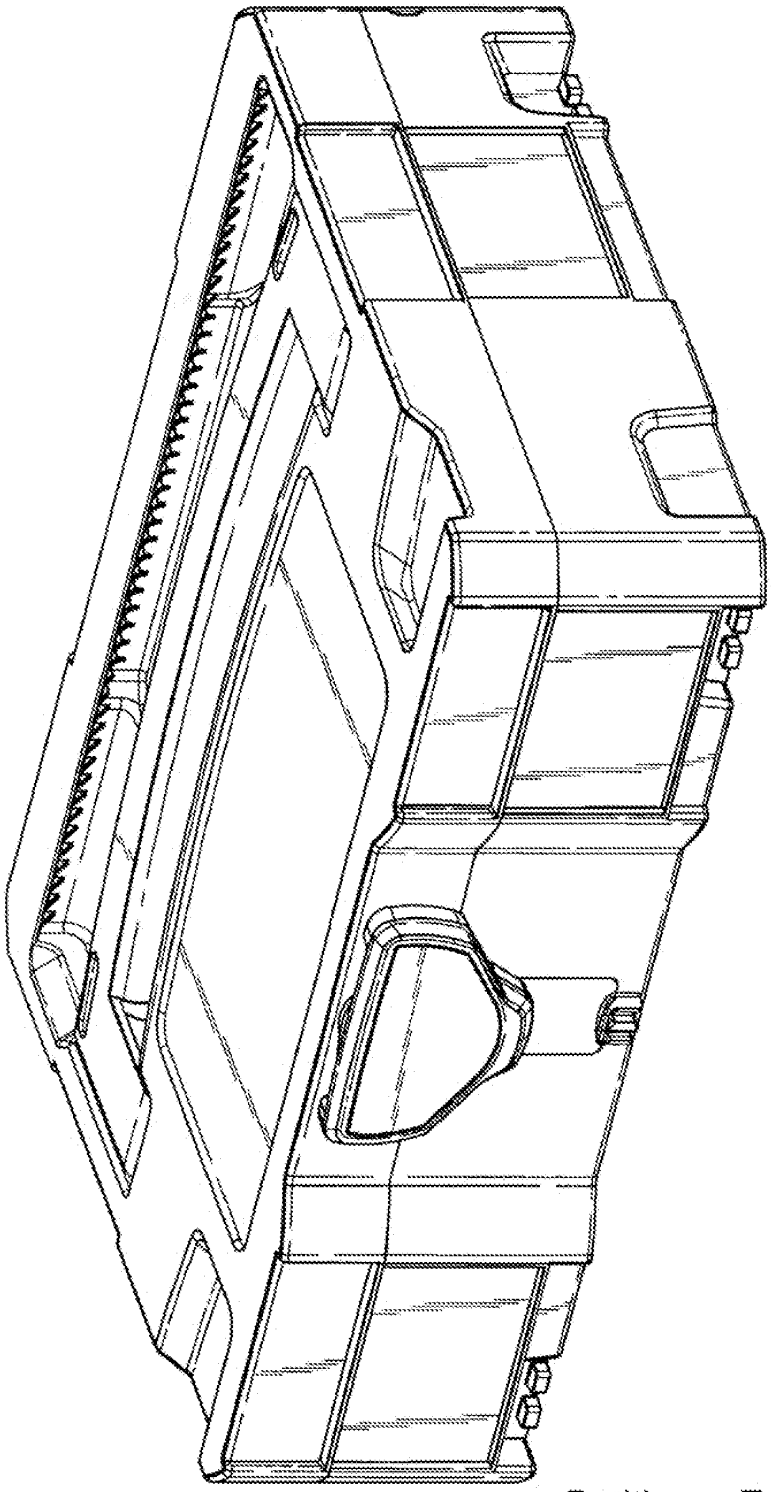


FIG. 1



Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2003 - Page 349
Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products
IPR2024-01401

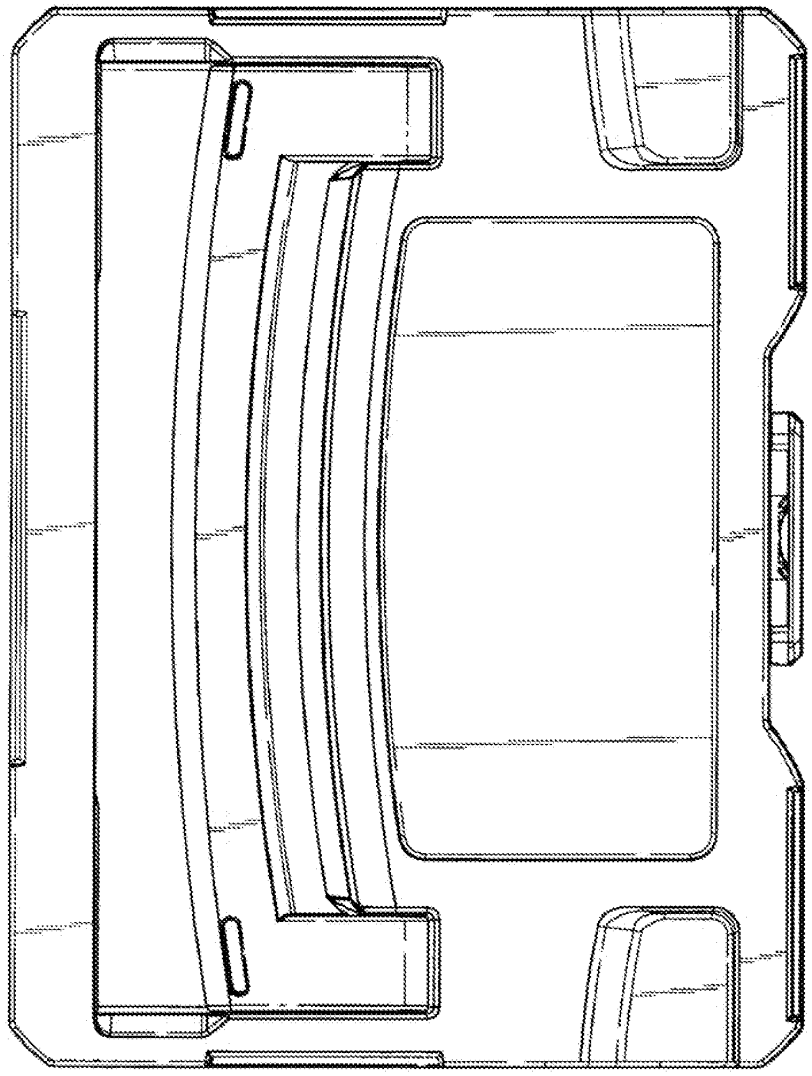


FIG. 2



Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2003 - Page 350
Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products
IPR2024-01401

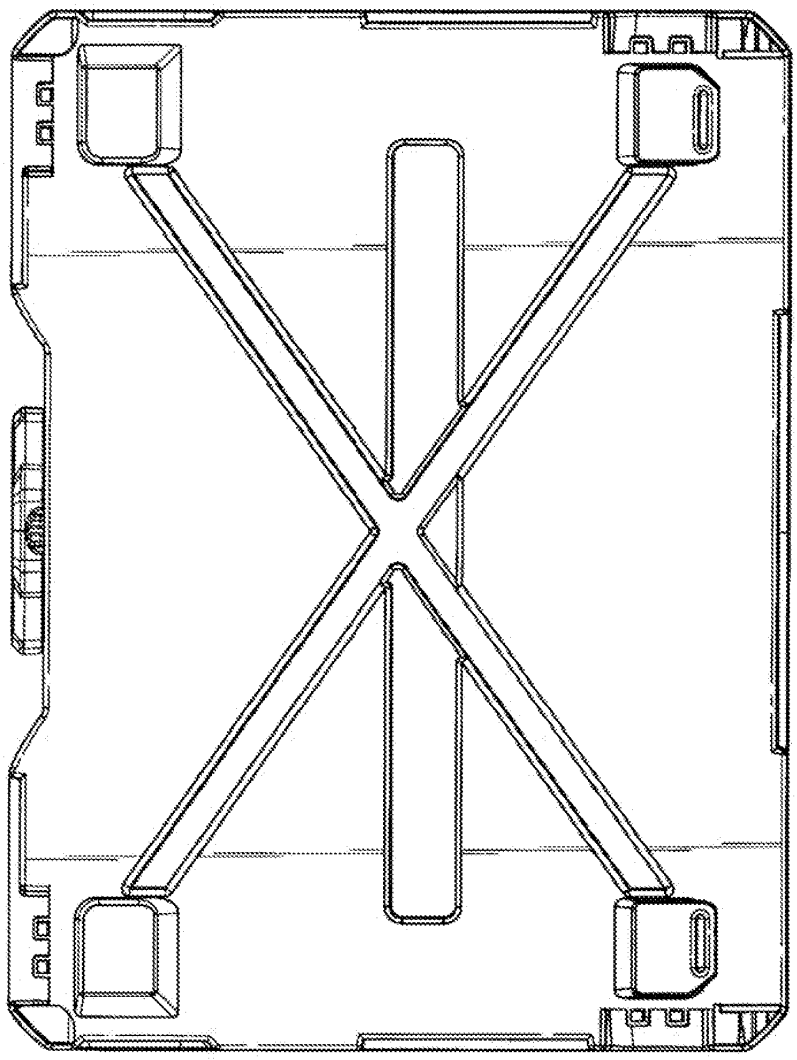


FIG. 3

FIG. 4

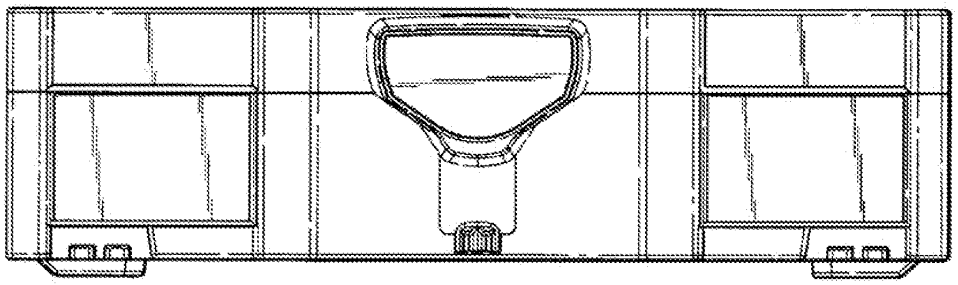
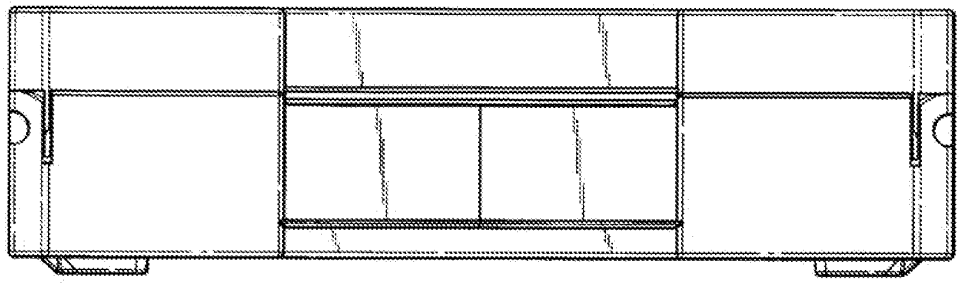


FIG. 5





Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2003 - Page 352
Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products
IPR2024-01401

FIG. 6

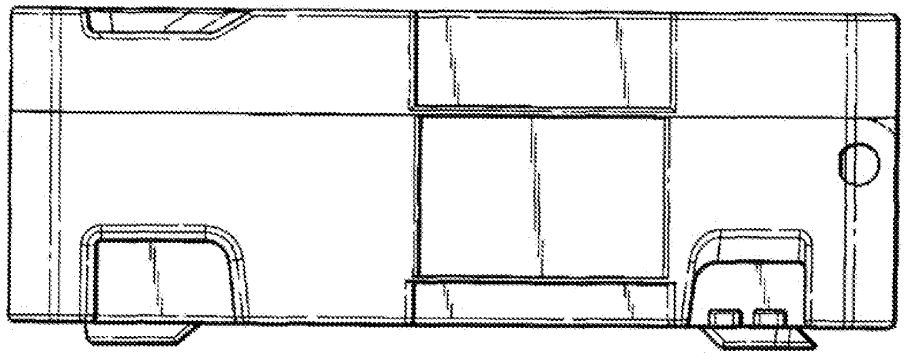
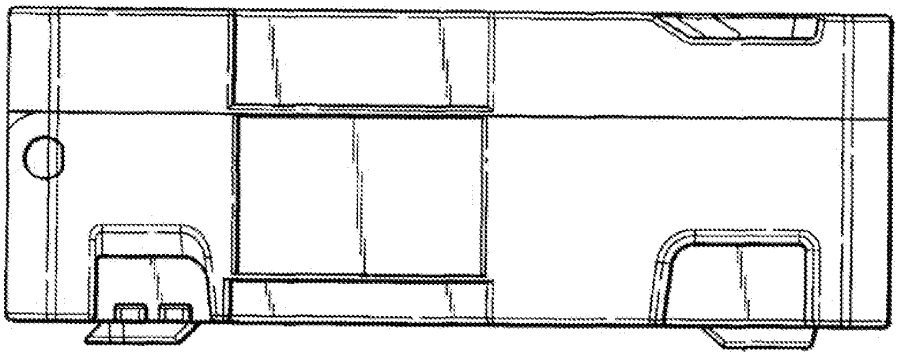


FIG. 7





Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2003 - Page 353
Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products
IPR2024-01401

*IN THE UNITED STATES PATENT AND TRADEMARK OFFICE*

| | |
|---|---|
| Applicant: | Milwaukee Electric Tool Corporation |
| Title: | Utility Assembly and Coupling Mechanism |
| Appl. No.: | 16/752,441 |
| Filing Date: | January 24, 2020 |
| Examiner: | WEINERTH, GIDEON R |
| Art Unit: | 3736 |
| Confirmation Number: | 9540 |

**INFORMATION DISCLOSURE STATEMENT UNDER 37 CFR §1.56**

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Submitted herewith on Form PTO/SB/08 is a listing of the documents known to Applicants in order to comply with Applicants' duty of disclosure pursuant to 37 CFR § 1.56.

A copy of each non-U.S. patent document and each non-patent document is being submitted to comply with the provisions of 37 CFR § 1.97 and §1.98.

The submission of any document herewith, which is not a statutory bar, is not intended as an admission that such document constitutes prior art against the claims of the present application or that such document is considered material to patentability as defined in 37 CFR §1.56(b). Applicants do not waive any rights to take any action which would be appropriate to antedate or otherwise remove as a competent reference any document which is determined to be a *prima facie* art reference against the claims of the present application.



**Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2003 - Page 354**
**Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products**
**IPR2024-01401**

## TIMING OF THE DISCLOSURE

The listed documents are being submitted in compliance with 37 CFR §1.97(c), before the mailing date of any of a final action under 37 CFR § 1.113, a notice of allowance under 37 CFR §1.311, or an action that otherwise closes prosecution in the application.

## FEES

The IDS Fee of $260.00 under 37 CFR 1.17(p) is being paid via Deposit Account No. 18-0882 via EFS-web.

## RELEVANCE OF EACH DOCUMENT

All of the documents are in English.

Applicants respectfully request that each listed document be considered by the Examiner and be made of record in the present application and that an initialed copy of Form PTO/SB/08 be returned in accordance with MPEP §609.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 18-0882. If any extensions of time are needed for timely acceptance of papers submitted herewith, applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 18-0882.

Respectfully submitted,

Date January 7, 2021

By /Derek H. Campbell/

Reinhart Boerner Van Deuren s.c.
Customer Number: 142078
Telephone: (414) 298-8374
Facsimile: (414) 298-8097

Derek H. Campbell
Attorney for Applicant
Registration No. 70,608



Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2003 - Page 355
Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products
IPR2024-01401

PTO/SB/08 (09-06)
Approved for use through 03/31/2007. 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.

| Substitute for form 1449/PTO | | | | *Complete if Known* | |
|---|---|---|---|---|---|
| **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** | | | | **Application Number** | 16/752,441 |
| | | | | **Filing Date** | January 24, 2020 |
| Date Submitted: December 22, 2020 | | | | **First Named Inventor** | Yaron Brunner |
| | | | | Art Unit | 3736 |
| *(use as many sheets as necessary)* | | | | Examiner Name | WEINERTH, GIDEON R |
| Sheet | 1 | of | 2 | Attorney Docket Number | 066749-2584 |

**U.S. PATENT DOCUMENTS**

| Examiner Initials* | Cite No.[1] | Document Number: Number-Kind Code[2] (*if known*) | Publication Date MM-DD-YYYY | Name of Patentee or Applicant of Cited Document | Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear |
|---|---|---|---|---|---|
| | A1 | 3,514,170 | 05-26-1970 | SHEWCHUK DONALD | |
| | A2 | 3,743,372 | 07-03-1973 | Ruggerone; Guiseffe | |
| | A3 | 4,805,859 | 02-21-1989 | Hudson; Don | |
| | A4 | 5,282,554 | 02-01-1994 | Thomas; Jan B. | |
| | A5 | 5,653,366 | 08-05-1997 | Liserre; Tony | |
| | A6 | 5,775,046 | 07-07-1998 | Fanger; David J. | |
| | A7 | 5,890,613 | 04-06-1999 | Williams; Warren Bret | |
| | A8 | 5,957,421 | 09-28-1999 | Barbour; Lee | |
| | A9 | 8,448,829 | 05-28-2013 | Watanabe; Takata | |
| | A10 | 10,758,065 | 09-01-2020 | Penalver, Jr.; John | |
| | A11 | 2005/0242144 | 11-03-2005 | Panosian, Michael | |
| | A12 | 2008/0296443 | 12-04-2008 | Lunitz; Barbara | |
| | A13 | 2009/0127146 | 05-21-2009 | Krebs; Kolja | |
| | A14 | 2012/0074158 | 03-29-2012 | LAFLEUR; ANDRE | |
| | A15 | 2019/0168376 | 06-06-2019 | BROCKET; Stephen | |

**UNPUBLISHED U.S. PATENT APPLICATION DOCUMENTS**

| Examiner Initials* | Cite No.[1] | U.S. Patent Application Document: Serial Number-Kind Code[2] (*if known*) | Filing Date of Cited Document MM-DD-YYYY | Name of Patentee or Applicant of Cited Document | Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear |
|---|---|---|---|---|---|
| | | | | | |

**FOREIGN PATENT DOCUMENTS**

| Examiner Initials* | Cite No.[1] | Foreign Patent Document: Country Code[3]-Number[4]-Kind Code[5] (*if known*) | Publication Date MM-DD-YYYY | Name of Patentee or Applicant of Cited Documents | Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear | T[6] |
|---|---|---|---|---|---|---|
| | | | | | | |

| Examiner Signature | | Date Considered | |
|---|---|---|---|

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant's unique citation designation number (optional). 2 See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. 3 Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). 4 For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. 5 Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. 6 Applicant is to place a check mark here if English language Translation is attached.

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 2 hours 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, 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**.

*If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.*

PTO/SB/08 (09-06)
Approved for use through 03/31/2007. 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.

| Substitute for form 1449/PTO | | | | ***Complete if Known*** | |
|---|---|---|---|---|---|
| **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** | | | | **Application Number** | 16/752,441 |
| | | | | **Filing Date** | January 24, 2020 |
| Date Submitted: December 22, 2020 | | | | **First Named Inventor** | Yaron Brunner |
| | | | | Art Unit | 3736 |
| *(use as many sheets as necessary)* | | | | Examiner Name | WEINERTH, GIDEON R |
| Sheet | 2 | of | 2 | Attorney Docket Number | 066749-2584 |

| NON PATENT LITERATURE DOCUMENTS | | | |
|---|---|---|---|
| Examiner Initials* | Cite No.[1] | 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, page(s), volume-issue number(s), publisher, city and/or country where published. | T[6] |
| | | | |

| Examiner Signature | | Date Considered | |
|---|---|---|---|

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant's unique citation designation number (optional). 2 See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. 3 Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). 4 For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. 5 Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. 6 Applicant is to place a check mark here if English language Translation is attached.

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 2 hours 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, 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**.

*If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.*

| Electronic Patent Application Fee Transmittal | |
|---|---|
| **Application Number:** | 16752441 |
| **Filing Date:** | 24-Jan-2020 |
| **Title of Invention:** | Utility Assembly and Coupling Mechanism |
| **First Named Inventor/Applicant Name:** | Yaron Brunner |
| **Filer:** | Derek Howard Campbell/Andrea Dietzel |
| **Attorney Docket Number:** | 066749-2584 |
| 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:** | | | | |
| **Extension-of-Time:** | | | | |

| Description | Fee Code | Quantity | Amount | Sub-Total in USD($) |
|---|---|---|---|---|
| **Miscellaneous:** | | | | |
| SUBMISSION- INFORMATION DISCLOSURE STMT | 1806 | 1 | 260 | 260 |
| | | **Total in USD ($)** | | **260** |

| Electronic Acknowledgement Receipt | |
|---|---|
| **EFS ID:** | 41467617 |
| **Application Number:** | 16752441 |
| **International Application Number:** | |
| **Confirmation Number:** | 9540 |
| **Title of Invention:** | Utility Assembly and Coupling Mechanism |
| **First Named Inventor/Applicant Name:** | Yaron Brunner |
| **Customer Number:** | 142078 |
| **Filer:** | Derek Howard Campbell/Andrea Dietzel |
| **Filer Authorized By:** | Derek Howard Campbell |
| **Attorney Docket Number:** | 066749-2584 |
| **Receipt Date:** | 22-DEC-2020 |
| **Filing Date:** | 24-JAN-2020 |
| **Time Stamp:** | 17:06:01 |
| **Application Type:** | Utility under 35 USC 111(a) |

## Payment information:

| | |
|---|---|
| Submitted with Payment | yes |
| Payment Type | DA |
| Payment was successfully received in RAM | $260 |
| RAM confirmation Number | E2020BLH06223718 |
| Deposit Account | 180882 |
| Authorized User | Andrea Dietzel |
| The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:<br>37 CFR 1.21 (Miscellaneous fees and charges)<br>37 CFR 1.20 (Post Issuance fees) | |

37 CFR 1.19 (Document supply fees)

37 CFR 1.17 (Patent application and reexamination processing fees)

37 CFR 1.16 (National application filing, search, and examination fees)

## File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|---|---|---|---|---|---|
| 1 | Transmittal Letter | 066749-2584_IDS_Transmittal.pdf | 82039<br>a71abe25cf718de84eb1e899755770bc765d4115 | no | 2 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 2 | Information Disclosure Statement (IDS) Form (SB08) | 066749-2584_SB08.pdf | 113442<br>fcfb8ad5ad13fda926e6d4a08b277ad042644e61 | no | 2 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| This is not an USPTO supplied IDS fillable form | | | | | |
| 3 | Fee Worksheet (SB06) | fee-info.pdf | 30732<br>186cca4de7f1e88eb808cc7cd13e61f2f0a60746 | no | 2 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| | | **Total Files Size (in bytes):** | 226213 | | |

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**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.**

*IN THE UNITED STATES PATENT AND TRADEMARK OFFICE*

| | |
|---|---|
| Applicant: | Milwaukee Electric Tool Corporation |
| Title: | Utility Assembly and Coupling Mechanism |
| Appl. No.: | 16/752,441 |
| Filing Date: | January 24, 2020 |
| Examiner: | WEINERTH, GIDEON R |
| Art Unit: | 3736 |
| Confirmation Number: | 9540 |

**INFORMATION DISCLOSURE STATEMENT UNDER 37 CFR §1.56**

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Submitted herewith on Form PTO/SB/08 is a listing of the documents known to Applicants in order to comply with Applicants' duty of disclosure pursuant to 37 CFR § 1.56.

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**Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2003 - Page 362**
**Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products**
**IPR2024-01401**

## TIMING OF THE DISCLOSURE

The listed documents are being submitted in compliance with 37 CFR §1.97(c), before the mailing date of any of a final action under 37 CFR § 1.113, a notice of allowance under 37 CFR §1.311, or an action that otherwise closes prosecution in the application.

## FEES

The IDS Fee of $260.00 under 37 CFR 1.17(p) is being paid via Deposit Account No. 18-0882 via EFS-web.

## RELEVANCE OF EACH DOCUMENT

All of the documents are in English.

Applicants respectfully request that each listed document be considered by the Examiner and be made of record in the present application and that an initialed copy of Form PTO/SB/08 be returned in accordance with MPEP §609.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 18-0882. If any extensions of time are needed for timely acceptance of papers submitted herewith, applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 18-0882.

Respectfully submitted,

Date December 22, 2020

By /Derek H. Campbell/

Reinhart Boerner Van Deuren s.c.
Customer Number: 142078
Telephone: (414) 298-8374
Facsimile: (414) 298-8097

Derek H. Campbell
Attorney for Applicant
Registration No. 70,608



Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2003 - Page 363
Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products
IPR2024-01401

| | |
|---|---|
| **Doc Code: DIST.E.FILE**<br>**Document Description: Electronic Terminal Disclaimer - Filed** | PTO/SB/26<br>U.S. Patent and Trademark Office<br>Department of Commerce |

| | |
|---|---|
| Electronic Petition Request | **TERMINAL DISCLAIMER TO OBVIATE A DOUBLE PATENTING REJECTION OVER A "PRIOR" PATENT** |
| Application Number | 16752441 |
| Filing Date | 24-Jan-2020 |
| First Named Inventor | Yaron Brunner |
| Attorney Docket Number | 066749-2584 |
| Title of Invention | Utility Assembly and Coupling Mechanism |

☒ Filing of terminal disclaimer does not obviate requirement for response under 37 CFR 1.111 to outstanding Office Action

☒ This electronic Terminal Disclaimer is not being used for a Joint Research Agreement.

| Owner | Percent Interest |
|---|---|
| KETER PLASTIC LTD. | 100% |
| Milwaukee Electric Tool Corporation | 100% |

The owner(s) with percent interest listed above in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of prior patent number(s)

10583962

as the term of said prior patent is presently shortened by any terminal disclaimer. The owner hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the prior patent are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

In making the above disclaimer, the owner does not disclaim the terminal part of the term of any patent granted on the instant application that would extend to the expiration date of the full statutory term of the prior patent, "as the term of said prior patent is presently shortened by any terminal disclaimer," in the event that said prior patent later:
- expires for failure to pay a maintenance fee;
- is held unenforceable;
- is found invalid by a court of competent jurisdiction;
- is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321;
- has all claims canceled by a reexamination certificate;
- is reissued; or
- is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer.

◉ Terminal disclaimer fee under 37 CFR 1.20(d) is included with Electronic Terminal Disclaimer request.

○ I certify, in accordance with 37 CFR 1.4(d)(4), that the terminal disclaimer fee under 37 CFR 1.20(d) required for this terminal disclaimer has already been paid in the above-identified application.

Applicant claims the following fee status:

○ Small Entity

○ Micro Entity

◉ Regular Undiscounted

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

THIS PORTION MUST BE COMPLETED BY THE SIGNATORY OR SIGNATORIES

I certify, in accordance with 37 CFR 1.4(d)(4) that I am:

◉ An attorney or agent registered to practice before the Patent and Trademark Office who is of record in this application

Registration Number 70608

○ A sole inventor

○ A joint inventor; I certify that I am authorized to sign this submission on behalf of all of the inventors as evidenced by the power of attorney in the application

○ A joint inventor; all of whom are signing this request

| | |
|---|---|
| Signature | /Derek H. Campbell/ |
| Name | Derek H. Campbell |

*Statement under 37 CFR 3.73(b) is required if terminal disclaimer is signed by the assignee (owner).
Form PTO/SB/96 may be used for making this certification. See MPEP § 324.

# Electronic Patent Application Fee Transmittal

| | |
|---|---|
| **Application Number:** | 16752441 |
| **Filing Date:** | 24-Jan-2020 |
| **Title of Invention:** | Utility Assembly and Coupling Mechanism |
| **First Named Inventor/Applicant Name:** | Yaron Brunner |
| **Filer:** | Derek Howard Campbell/Sarah Sesterhenn-Lee |
| **Attorney Docket Number:** | 066749-2584 |

Filed as Large Entity

**Filing Fees for Utility under 35 USC 111(a)**

| Description | Fee Code | Quantity | Amount | Sub-Total in USD($) |
|---|---|---|---|---|
| **Basic Filing:** | | | | |
| STATUTORY OR TERMINAL DISCLAIMER | 1814 | 1 | 170 | 170 |
| **Pages:** | | | | |
| **Claims:** | | | | |
| **Miscellaneous-Filing:** | | | | |
| **Petition:** | | | | |
| **Patent-Appeals-and-Interference:** | | | | |
| **Post-Allowance-and-Post-Issuance:** | | | | |

| Description | Fee Code | Quantity | Amount | Sub-Total in USD($) |
|---|---|---|---|---|
| **Extension-of-Time:** | | | | |
| **Miscellaneous:** | | | | |
| | | **Total in USD ($)** | | **170** |

Doc Code: DISQ.E.FILE
Document Description: Electronic Terminal Disclaimer – Approved

Application No.: 16752441

Filing Date: 24-Jan-2020

Applicant/Patent under Reexamination: Brunner

Electronic Terminal Disclaimer filed on December 18, 2020

☒ APPROVED

**This patent is subject to a terminal disclaimer**

☐ DISAPPROVED

Approved/Disapproved by: Electronic Terminal Disclaimer automatically approved by EFS-Web

U.S. Patent and Trademark Office

| Electronic Acknowledgement Receipt | |
|---|---|
| **EFS ID:** | 41428500 |
| **Application Number:** | 16752441 |
| **International Application Number:** | |
| **Confirmation Number:** | 9540 |
| **Title of Invention:** | Utility Assembly and Coupling Mechanism |
| **First Named Inventor/Applicant Name:** | Yaron Brunner |
| **Customer Number:** | 142078 |
| **Filer:** | Derek Howard Campbell/Sarah Sesterhenn-Lee |
| **Filer Authorized By:** | Derek Howard Campbell |
| **Attorney Docket Number:** | 066749-2584 |
| **Receipt Date:** | 18-DEC-2020 |
| **Filing Date:** | 24-JAN-2020 |
| **Time Stamp:** | 15:09:26 |
| **Application Type:** | Utility under 35 USC 111(a) |

## Payment information:

| | |
|---|---|
| Submitted with Payment | yes |
| Payment Type | DA |
| Payment was successfully received in RAM | $170 |
| RAM confirmation Number | E2020BHF09239129 |
| Deposit Account | 180882 |
| Authorized User | Sarah Sesterhenn-Lee |
| The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:<br>37 CFR 1.16 (National application filing, search, and examination fees)<br>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 | Terminal Disclaimer-Filed (Electronic) | eTerminal-Disclaimer.pdf | 34600<br>023a499056e270a5671fc1735772ebb8f2d7cffe | no | 3 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 2 | Fee Worksheet (SB06) | fee-info.pdf | 30535<br>5a4173d90a62e67d48dea7928acf09eaa9ba356c | no | 2 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| | | **Total Files Size (in bytes):** | 65135 | | |

**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.**

*IN THE UNITED STATES PATENT AND TRADEMARK OFFICE*

| | |
|---|---|
| Applicant: | Milwaukee Electric Tool Corporation et al. |
| Title: | Utility Assembly and Coupling Mechanism |
| Appl. No.: | 16/752,441 |
| Filing Date: | January 24, 2020 |
| Examiner: | Weinerth, Gideon R. |
| Art Unit: | 3736 |
| Confirmation No: | 9540 |

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

**REPLY UNDER 37 C.F.R. § 1.111**

This communication is responsive to the Non-Final Office Action dated September 25, 2020, concerning the above-referenced patent application.

A listing of claims is reproduced beginning on page 2 of this document for the Examiner's convenience and reference. No claim amendments are made herein.

**Remarks** begin on page 7 of this document.

Please amend the application as follows:



**Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2003 - Page 372**
**Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products**
**IPR2024-01401**

This listing of claims is reproduced for the Examiner's convenience and reference. No claim amendments are made herein:

**Listing of Claims:**

1. (Original) A container assembly comprising:

a first container comprising:

a first coupler extending from a first face of the first container, the first coupler comprises two sidewalls and a rib, the two sidewalls project from a depressed surface of the first face, the rib extends from at least one of the two sidewalls; and

a latch recess; and

a second container comprising:

a second coupler extending from a second face of the second container, the second coupler comprises a tongue that is offset from the second face, the tongue of the second container is engageable with the rib of the first container, the second coupler defines a first planar surface generally parallel to the second face and that faces away from the second face, and wherein the second coupler defines a second planar surface generally parallel to the second face and that faces towards the second face; and

a latch coupled to the second container, the latch positionable in a locked position in which the latch prevents disengagement of the first container and the second container when the tongue and rib are engaged.

2. (Original) The container assembly of claim 1, wherein the first and second couplers on the first and second containers, respectively, engage when the first and second containers are slid along a sliding path defined by the rib and the tongue.



**Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2003 - Page 373**
**Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products**
**IPR2024-01401**

3. (Original) The container assembly of claim 1, wherein the first face of the first container comprises a top face of the first container, and wherein the second face of the second container comprises a bottom face of the second container.

4. (Original) The container assembly of claim 1, wherein the rib extends in a first direction that is parallel to a bottom face of the first container.

5. (Original) The container assembly of claim 4, wherein the tongue extends in a second direction opposite the first direction.

6. (Original) The container assembly of claim 1, wherein the two sidewalls of the first coupler project from the depressed surface away from each other, and wherein the two sidewalls of the first coupler project from the depressed surface at an obtuse angle with respect to the depressed surface.

7. (Original) The container assembly of claim 1, wherein the rib is perpendicular to at least one of the two sidewalls, and , wherein the rib is parallel to the depressed surface of the first face.

8. (Original) The container assembly of claim 1, wherein a width of the second container is half-size a width of the first container.

9. (Original) The container assembly of claim 1, wherein at least one of the latch and the second coupler are actuated between a first position extending above the second face and a second position not extending above the second face.

10. (Original) The container assembly of claim 1, wherein when the tongue and rib are engaged:

a first side wall of the two sidewalls of the first coupler and a second sidewall of the second coupler interface to restrict displacement between the first container and the second container in a third direction perpendicular to the first direction and parallel to the first face of the first container.

11. (Original) A first container configured to be removably coupled to a second container, the first container comprising:

a first face;

a second face; and

a first coupler that extends from the first face, wherein the first coupler comprises two sidewalls and a rib, the two sidewalls project from a depressed surface of the first face, the rib extends from at least one of the two sidewalls;

a second coupler that extends from the second face, wherein the second coupler comprises a tongue that is offset from the second face, wherein the second coupler defines a first planar surface generally parallel to the second face and that faces away from the second face, and wherein the second coupler defines a second planar surface generally parallel to the second face and that faces towards the second face;

a latch recess; and

a latch, the latch positionable in a locked position in which the latch interlocks with a second latch recess in the second container restricting displacement between the first container and the second container.

12. (Original) The first container of claim 11, wherein the first face comprises a top face of the first container, and wherein the second face comprises a bottom face of the first container.

13. (Original) The first container of claim 11, wherein the rib extends in a first direction that is parallel to a bottom face of the first container, and wherein the tongue extends in a second direction opposite the first direction.



**Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2003 - Page 375**
**Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products**
**IPR2024-01401**

14. (Original) The first container of claim 11, wherein the two sidewalls of the first coupler project from the depressed surface away from each other, and wherein the two sidewalls of the first coupler project from the depressed surface at an obtuse angle with respect to the depressed surface.

15. (Original) The first container of claim 11, wherein the rib is perpendicular to at least one of the two sidewalls, and wherein the rib is parallel to the depressed surface of the first face.

16. (Original) A container assembly comprising:

a first container comprising:

a first coupler extending from a first face of the first container, the first coupler comprises two sidewalls and a rib, the two sidewalls project from a depressed surface of the first face, the rib extends from at least one of the two sidewalls, and the rib extends in a first direction that is parallel to the first face of the first container; and

a latch recess; and

a second container comprising:

a second coupler extending from a second face of the second container, the second coupler comprises a tongue that is offset from the second face, the tongue extends in a second direction opposite the first direction, the tongue of the second container is engageable with the rib of the first container, the second coupler defines a first planar surface generally parallel to the second face and that faces away from the second face, and wherein the second coupler defines a second planar surface generally parallel to the second face and that faces towards the second face; and



**Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2003 - Page 376**
**Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products**
**IPR2024-01401**

a latch coupled to the second container, the latch positionable in a locked position in which the latch prevents disengagement of the first container and the second container when the tongue and rib are engaged.

17. (Original) The container assembly of claim 16, wherein when the tongue and rib are engaged:

a portion of the first coupler and a portion of the second coupler interface to restrict displacement between the first container and the second container in a third direction perpendicular to the first direction and parallel to the first face of the first container.

18. (Original) The container assembly of claim 16, wherein at least one of the latch and the second coupler actuate between a first position and a second position, wherein the at least one of the latch and the second coupler extends above the second face when in the first position.

19. (Original) The container assembly of claim 16, wherein the first face of the first container comprises a top face of the first container, and wherein the second face of the second container comprises a bottom face of the second container.

20. (Original) The container assembly of claim 1, wherein the two sidewalls of the first coupler project from the depressed surface at an obtuse angle with respect to the depressed surface.



**Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2003 - Page 377**
**Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products**
**IPR2024-01401**

## REMARKS

This reply is intended to be completely responsive to the Non-Final Office Action dated September 25, 2020.

## Status

Claims 1-20 are pending in this application. Claims 1-20 were rejected.

No claims are amended, added or cancelled with this response.

A terminal disclaimer is submitted herewith to overcome the double patenting rejection, which was the only rejection or objection in the Office Action.

Applicant believes that each of the rejections raised by the Examiner has been addressed and the application is in condition for allowance. Reconsideration and allowance of the application is respectfully requested.

## Double Patenting

On pages 2-5 of the Office Action, the Examiner has rejected claims 1-20 on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-12 of U.S. Patent No. 10,583,962. Applicant submits herewith a terminal disclaimer, signed by the Attorney of Record, to overcome the referenced obviousness-type double patenting rejection. Withdrawal of the double patent rejection is respectfully requested.

## Conclusion

Applicant believes that the present application is in condition for allowance. Favorable reconsideration of the application is respectfully requested.



**Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2003 - Page 378**
**Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products**
**IPR2024-01401**

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

It should be noted that, for the sake of clarity and simplicity, Applicant's remarks have focused on the rejections of the independent claims set forth in the Office Action with the understanding that the dependent claims are patentable for at least the same reasons as the independent claims. Further, in addressing the Examiner's rejections, Applicant's remarks have set forth only some of the available arguments for patentability of the rejected claims. Applicant expressly reserves the right to argue the patentability of all claims separately and to provide new, different, and/or additional arguments for patentability not set forth herein, including, but not limited to, the failure of cited references to disclose, teach, or suggest other elements of the claims, the lack of motivation to combine cited references, teachings away from the combination of cited references, the failure of references to qualify as prior art or improper combination of the cited references, in this or any future proceedings.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 18-0882. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 18-0882.

Respectfully submitted,

Date December 18, 2020

By /Derek H. Campbell/

Reinhart Boerner Van Deuren s.c.
Customer Number: 142078
Telephone: (414) 298-8374
Facsimile: (414) 298-8097

Derek H. Campbell
Attorney for Applicant
Registration No. 70,608



**Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2003 - Page 379**
**Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products**
**IPR2024-01401**

| Electronic Acknowledgement Receipt | |
|---|---|
| **EFS ID:** | 41427723 |
| **Application Number:** | 16752441 |
| **International Application Number:** | |
| **Confirmation Number:** | 9540 |
| **Title of Invention:** | Utility Assembly and Coupling Mechanism |
| **First Named Inventor/Applicant Name:** | Yaron Brunner |
| **Customer Number:** | 142078 |
| **Filer:** | Derek Howard Campbell/Sarah Sesterhenn-Lee |
| **Filer Authorized By:** | Derek Howard Campbell |
| **Attorney Docket Number:** | 066749-2584 |
| **Receipt Date:** | 18-DEC-2020 |
| **Filing Date:** | 24-JAN-2020 |
| **Time Stamp:** | 15:06:11 |
| **Application Type:** | Utility under 35 USC 111(a) |

## Payment information:

| Submitted with Payment | no |
|---|---|

## File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|---|---|---|---|---|---|
| 1 | | 066749-2584_NFOA_Response.pdf | 107319<br>5e8b041a72eef2d00d13bdb8bb92571f192aa62a | yes | 8 |

| | Multipart Description/PDF files in .zip description | | |
|---|---|---|---|
| | **Document Description** | **Start** | **End** |
| | Amendment/Req. Reconsideration-After Non-Final Reject | 1 | 1 |
| | Claims | 2 | 6 |
| | Applicant Arguments/Remarks Made in an Amendment | 7 | 8 |
| **Warnings:** | | | |
| **Information:** | | | |
| | **Total Files Size (in bytes):** | 107319 | |

**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.**

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
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 displays a valid OMB control number.

| PATENT APPLICATION FEE DETERMINATION RECORD<br>Substitute for Form PTO-875 | Application or Docket Number<br>16/752,441 | Filing Date<br>01/24/2020 | ☐ To be Mailed |
|---|---|---|---|

**ENTITY:** ☑ LARGE ☐ SMALL ☐ MICRO

## APPLICATION AS FILED - PART I

| FOR | (Column 1)<br>NUMBER FILED | (Column 2)<br>NUMBER EXTRA | | RATE ($) | FEE ($) |
|---|---|---|---|---|---|
| ☐ BASIC FEE<br>(37 CFR 1.16(a), (b), or (c)) | N/A | N/A | | N/A | |
| ☐ SEARCH FEE<br>(37 CFR 1.16(k), (i), or (m)) | N/A | N/A | | N/A | |
| ☐ EXAMINATION FEE<br>(37 CFR 1.16(o), (p), or (q)) | N/A | N/A | | N/A | |
| TOTAL CLAIMS<br>(37 CFR 1.16(i)) | minus 20 = | * | | x $100 = | |
| INDEPENDENT CLAIMS<br>(37 CFR 1.16(h)) | minus 3 = | * | | x $460 = | |
| ☐ APPLICATION SIZE FEE (37 CFR 1.16(s)) | If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s). | | | | |
| ☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j)) | | | | | |
| * If the difference in column 1 is less than zero, enter "0" in column 2. | | | | TOTAL | |

## APPLICATION AS AMENDED - PART II

| | | (Column 1) | | (Column 2) | (Column 3) | | | |
|---|---|---|---|---|---|---|---|---|
| AMENDMENT | 12/18/2020 | CLAIMS REMAINING AFTER AMENDMENT | | HIGHEST NUMBER PREVIOUSLY PAID FOR | PRESENT EXTRA | | RATE ($) | ADDITIONAL FEE ($) |
| | Total<br>(37 CFR 1.16(i)) | * 20 | Minus | ** 20 | = 0 | | x $100 = | 0 |
| | Independent<br>(37 CFR 1.16(h)) | * 3 | Minus | *** 3 | = 0 | | x $480 = | 0 |
| | ☐ Application Size Fee (37 CFR 1.16(s)) | | | | | | | |
| | ☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) | | | | | | | |
| | | | | | | | TOTAL ADD'L FEE | 0 |

| | | (Column 1) | | (Column 2) | (Column 3) | | | |
|---|---|---|---|---|---|---|---|---|
| AMENDMENT | | CLAIMS REMAINING AFTER AMENDMENT | | HIGHEST NUMBER PREVIOUSLY PAID FOR | PRESENT EXTRA | | RATE ($) | ADDITIONAL FEE ($) |
| | Total<br>(37 CFR 1.16(i)) | * | Minus | ** | = | | x $0 = | |
| | Independent<br>(37 CFR 1.16(h)) | * | Minus | *** | = | | x $0 = | |
| | ☐ Application Size Fee (37 CFR 1.16(s)) | | | | | | | |
| | ☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) | | | | | | | |
| | | | | | | | TOTAL ADD'L FEE | |

| | |
|---|---|
| * If the entry in column 1 is less than the entry in column 2, write "0" in column 3. | LIE |
| ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20". | /DAWN BREWER/ |
| *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3". | |
| The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1. | |

This collection of information is required by 37 CFR 1.16. 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 12 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: 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.*

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
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Address: COMMISSIONER FOR PATENTS
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| APPLICATION NUMBER | FILING or 371(c) DATE | GRP ART UNIT | FIL FEE REC'D | ATTY.DOCKET.NO | TOT CLAIMS | IND CLAIMS |
|---|---|---|---|---|---|---|
| 16/752,441 | 01/24/2020 | 3736 | 1720 | 066749-2584 | 20 | 3 |

**CONFIRMATION NO. 9540**

**CORRECTED FILING RECEIPT**

142078
Reinhart (Milwaukee Tool)
ATTN: TRAVIS MCDONNELL, PARALEGAL
1000 NORTH WATER STREET
SUITE 2100
MILWAUKEE, WI 53202

OC000000122048656

Date Mailed: 12/17/2020

Receipt is acknowledged of this non-provisional utility patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF FIRST INVENTOR, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection.

**Please verify the accuracy of the data presented on this receipt.** If an error is noted on this Filing Receipt, please submit a written request for a corrected Filing Receipt, including a properly marked-up ADS showing the changes with strike-through for deletions and underlining for additions. If you received a "Notice to File Missing Parts" or other Notice requiring a response for this application, please submit any request for correction to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections provided that the request is grantable.

**Inventor(s)**

Yaron Brunner, Kibbutz Gvat, ISRAEL;
Grant T. Squiers, Cudahy, WI;
Christopher S. Hoppe, Milwaukee, WI;
Steven W. Hyma, Milwaukee, WI;

**Applicant(s)**

Milwaukee Electric Tool Corporation, Brookfield, WI;
Keter Plastic LTD., Herzelyia, ISRAEL;

**Power of Attorney:** The patent practitioners associated with Customer Number 142078

**Domestic Priority data as claimed by applicant**

This application is a CON of 16/216,724 12/11/2018 PAT 10583962
which is a CON of 15/826,232 11/29/2017 PAT 10703534
which is a CON of PCT/IL2017/050481 04/30/2017
which claims benefit of 62/459,076 02/15/2017
and claims benefit of 62/330,334 05/02/2016

**Foreign Applications** for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.) - None.
*Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.*



**Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2003 - Page 383**
**Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products**
**IPR2024-01401**

**Permission to Access Application via Priority Document Exchange:** No

**Permission to Access Search Results:** No

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

**If Required, Foreign Filing License Granted:** 02/12/2020

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 16/752,441**

**Projected Publication Date:** Not Applicable

**Non-Publication Request:** No

**Early Publication Request:** No

**Title**

Utility Assembly and Coupling Mechanism

**Preliminary Class**

220

**Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications:** No

## PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

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## Title 35, United States Code, Section 184

## Title 37, Code of Federal Regulations, 5.11 & 5.15

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This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

**NOT GRANTED**

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

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| APPLICATION NUMBER | FILING OR 371(C) DATE | FIRST NAMED APPLICANT | ATTY. DOCKET NO./TITLE |
|---|---|---|---|
| 16/752,441 | 01/24/2020 | Yaron Brunner | 066749-2584 |

**CONFIRMATION NO. 9540**

142078
Reinhart (Milwaukee Tool)
ATTN: TRAVIS MCDONNELL, PARALEGAL
1000 NORTH WATER STREET
SUITE 2100
MILWAUKEE, WI 53202

**POA ACCEPTANCE LETTER**

*OC000000122048650*

Date Mailed: 12/17/2020

## NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 12/14/2020.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/nbekele/

Doc Code: PA..
Document Description: Power of Attorney

PTO/AIA/82B (07-13)
Approved for use through 03/31/2021. OMB 0651-0035
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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# POWER OF ATTORNEY BY APPLICANT

I hereby revoke all previous powers of attorney given in the application identified in either the attached transmittal letter or the boxes below.

| Application Number | Filing Date |
|---|---|
| 16/752,441 | January 24, 2020 |

(Note: The boxes above may be left blank if information is provided on form PTO/AIA/82A.)

☑ I hereby appoint the Patent Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above: 142078

OR

☐ I hereby appoint Practitioner(s) named in the attached list (form PTO/AIA/82C) as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the patent application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above. (Note: Complete form PTO/AIA/82C.)

**Please recognize or change the correspondence address for the application identified in the attached transmittal letter or the boxes above to:**

☑ The address associated with the above-mentioned Customer Number

OR

☐ The address associated with Customer Number:

OR

| | | | | | |
|---|---|---|---|---|---|
| ☐ Firm or Individual Name | | | | | |
| Address | | | | | |
| City | | State | | Zip | |
| Country | | | | | |
| Telephone | | Email | | | |

I am the Applicant (if the Applicant is a juristic entity, list the Applicant name in the box):

Keter Plastic Ltd.

☐ Inventor or Joint Inventor (title not required below)

☐ Legal Representative of a Deceased or Legally Incapacitated Inventor (title not required below)

☑ Assignee or Person to Whom the Inventor is Under an Obligation to Assign (provide signer's title if applicant is a juristic entity)

☐ Person Who Otherwise Shows Sufficient Proprietary Interest (e.g., a petition under 37 CFR 1.46(b)(2) was granted in the application or is concurrently being filed with this document) (provide signer's title if applicant is a juristic entity)

**SIGNATURE of Applicant for Patent**

The undersigned (whose title is supplied below) is authorized to act on behalf of the applicant (e.g., where the applicant is a juristic entity).

| | | | |
|---|---|---|---|
| Signature | /[illegible]/ | Date (Optional) | 03/02/2020 |
| Name | [illegible] Rahistrant | Wyal Rahi | |
| Title | General Counsel | Group Treasurer | |

NOTE: Signature - This form must be signed by the applicant in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. If more than one applicant, use multiple forms.

☐ Total of forms are submitted.

This collection of information is required by 37 CFR 1.131, 1.32, and 1.33. 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 3 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: 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.*

Atty. Dkt. No. 066749-2584

*IN THE UNITED STATES PATENT AND TRADEMARK OFFICE*

Applicant: Milwaukee Electric Tool Corporation

Title: Utility Assembly and Coupling Mechanism

Appl. No.: 16/752,441

Filing Date: January 24, 2020

Examiner: WEINERTH, GIDEON R

Art Unit: 3736

Conf. No.: 9540

**TRANSMITTAL OF UPDATED APPLICATION DATA SHEET**

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Kindly add the Applicant Information for Applicant 2, as shown below and in the attached annotated Application Data Sheet in compliance with 37 C.F.R. §1.76(c):

Applicant Information

Applicant 2 is the Assignee and the Assignee is an Organization.

| | |
|---|---|
| Organization Name: | Keter Plastic LTD. |
| Mailing Address Information: | 2 Sapir Street<br>Herzelyia, Israel 4685206 |

As required by 37 C.F.R. 1.46(c), also attached is Statement Under 37 C.F.R. 3.73(c) establishing that Keter Plastic LTD. and Milwaukee Electric Tool Corporation collectively are the owner and the assignee of the entire right, title and interest in the above-referenced application.



**Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2003 - Page 389**
**Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products**
**IPR2024-01401**

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 18-0882.

Please direct all correspondence to the undersigned attorney or agent at the address indicated below.

Respectfully submitted,

Date December 14, 2020

By /Derek H. Campbell/

Reinhart Boerner Van Deuren s.c.
Customer Number: 142078
Telephone: (414) 298-8374
Facsimile: (414) 298-8097

Derek H. Campbell
Attorney for Applicant
Registration No. 70,608



**Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2003 - Page 390**
**Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products**
**IPR2024-01401**

| Electronic Acknowledgement Receipt | |
|---|---|
| **EFS ID:** | 41379317 |
| **Application Number:** | 16752441 |
| **International Application Number:** | |
| **Confirmation Number:** | 9540 |
| **Title of Invention:** | Utility Assembly and Coupling Mechanism |
| **First Named Inventor/Applicant Name:** | Yaron Brunner |
| **Customer Number:** | 142078 |
| **Filer:** | Derek Howard Campbell/Andrea Dietzel |
| **Filer Authorized By:** | Derek Howard Campbell |
| **Attorney Docket Number:** | 066749-2584 |
| **Receipt Date:** | 14-DEC-2020 |
| **Filing Date:** | 24-JAN-2020 |
| **Time Stamp:** | 17:19:17 |
| **Application Type:** | Utility under 35 USC 111(a) |

## Payment information:

| Submitted with Payment | no |
|---|---|

## File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|---|---|---|---|---|---|
| 1 | Application Data Sheet | 066749-2584_Updated_ADS.pdf | 86108<br>a7be0230f3f801f55d3441e46dade5361176e43f | no | 6 |
| **Warnings:** | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Information:** | | | | | |
| This is not an USPTO supplied ADS fillable form | | | | | |
| 2 | Assignee showing of ownership per 37 CFR 3.73 | 066749-2584_373c_Statement.pdf | 84074<br>1a0aca8e6cc410b6fb62b608f1c8021bde288766 | no | 3 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 3 | Power of Attorney | 066749-2584_Keter_PoA.pdf | 286182<br>3aab95a4232c0fea29ee1e4f28afd735066fea17 | no | 1 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 4 | Transmittal Letter | 066749-2584_Transmittal.pdf | 74993<br>6c17ec273ac4d8ae9f7d9c6007456f6efcd5f44c | no | 2 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| | | **Total Files Size (in bytes):** | 531357 | | |

**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.**

**Updated Application Data Sheet**

**Application Information**

| | |
|---|---|
| **Application Number:** | ~~To Be Determined~~ 16/752,441 |
| **Filing Date:** | January 24, 2020 |
| **Application Type:** | Nonprovisional |
| **Subject Matter:** | Utility |
| **CD-ROM or CD-R:** | None |
| **Computer Readable Form (CRF):** | No |
| **Title:** | Utility Assembly and Coupling Mechanism |
| **Attorney Docket Number:** | 066749-2584 |
| **Request for Early Publication:** | No |
| **Request for Non-Publication:** | No |
| **Suggested Drawing Figure:** | 1A |
| **Total Drawing Sheets:** | 48 |
| **Small Entity:** | No |
| **Petition included:** | No |
| **Secrecy Order in Parent Appl.:** | No |

**Inventor Information**

| | |
|---|---|
| **Status:** | Full Capacity |
| **Given Name:** | Yaron |
| **Family Name:** | Brunner |
| **City of Residence:** | Kibbutz Gvat |
| **State or Province of Residence:** | |
| **Country of Residence:** | IL |
| **Street of mailing address:** | Kibbutz Gvat, P.O.B. 248 |
| **City of mailing address:** | Kibbutz Gvat |



**Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2003 - Page 393**
**Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products**
**IPR2024-01401**

| | |
|---|---|
| **State or Province of mailing address:** | |
| **Country of mailing address:** | IL |
| **Postal or Zip Code of mailing address:** | 3657900 |

| | |
|---|---|
| **Status:** | Full Capacity |
| **Given Name:** | Grant T. |
| **Family Name:** | Squiers |
| **City of Residence:** | Cudahy |
| **State or Province of Residence:** | Wisconsin |
| **Country of Residence:** | US |
| **Street of mailing address:** | 3745 East Cudahy Avenue |
| **City of mailing address:** | Cudahy |
| **State or Province of mailing address:** | Wisconsin |
| **Country of mailing address:** | US |
| **Postal or Zip Code of mailing address:** | 53110 |

| | |
|---|---|
| **Status:** | Full Capacity |
| **Given Name:** | Christopher S. |
| **Family Name:** | Hoppe |
| **City of Residence:** | Milwaukee |
| **State or Province of Residence:** | Wisconsin |
| **Country of Residence:** | US |
| **Street of mailing address:** | 3126 South Burrell Street |
| **City of mailing address:** | Milwaukee |
| **State or Province of mailing address:** | Wisconsin |

| | |
|---|---|
| **Country of mailing address:** | US |
| **Postal or Zip Code of mailing address:** | 53207 |

| | |
|---|---|
| **Status:** | Full Capacity |
| **Given Name:** | Steven W. |
| **Family Name:** | Hyma |
| **City of Residence:** | Milwaukee |
| **State or Province of Residence:** | Wisconsin |
| **Country of Residence:** | US |
| **Street of mailing address:** | 1312 East Warnimont Avenue |
| **City of mailing address:** | Milwaukee |
| **State or Province of mailing address:** | Wisconsin |
| **Country of mailing address:** | US |
| **Postal or Zip Code of mailing address:** | 53207 |

**Correspondence Information**

| | |
|---|---|
| **Correspondence Customer Number:** | 142078 |
| **E-Mail address:** | ipadmin@reinhartlaw.com |

**Representative Information**

| | | |
|---|---|---|
| **Representative Customer Number:** | 142078 | |

**Domestic Priority Information**

| Application: | Continuity Type: | Prior Application No.: | Parent Filing Date: | Prior Application Status: | Patent No.: |
|---|---|---|---|---|---|
| This Application | Is a continuation of | 16/216,724 | December 11, 2018 | Pending | N/A |
| 16/216,724 | Is a continuation of | 15/826,232 | November 29, 2017 | Pending | N/A |
| 15/826,232 | Is a continuation of | PCT/IL2017/050481 | April 30, 2017 | Expired | N/A |
| PCT/IL2017/050481 | Claims the benefit under 35 U.S.C. 119(e) | 62/459,076 | February 15, 2017 | Expired | N/A |
| PCT/IL2017/050481 | Claims the benefit under 35 U.S.C. 119(e) | 62/330,334 | May 2, 2016 | Expired | N/A |

**Foreign Priority Information**

| Country: | Application number: | Filing Date: | Priority Claimed: |
|---|---|---|---|
| | | | |

**Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications**



Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2003 - Page 396
Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products
IPR2024-01401

| |
|---|
| ☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.<br><br>NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA. |

Applicant Information

Applicant 1:

| | | | |
|---|---|---|---|
| [ X ] Assignee | [ ] Legal Representative under 35 U.S.C. 117 | [ ] Person to whom the inventor is obligated to assign | [ ] Person who shows sufficient proprietary interest |
| If applicant is the legal representative, indicate the authority to file the patent application, the inventor is: | | | |
| Name of the Deceased or Legally Incapacitated Inventor: | | | |
| If the Assignee is an Organization check here [ X ] | | | |

| | |
|---|---|
| Organization Name: | Milwaukee Electric Tool Corporation |
| 13135 West Lisbon Road<br>Brookfield, Wisconsin 53005 | |

Applicant 2:

| | | | |
|---|---|---|---|
| [ X ] Assignee | [ ] Legal Representative under 35 U.S.C. 117 | [ ] Person to whom the inventor is obligated to assign | [ ] Person who shows sufficient proprietary interest |
| If applicant is the legal representative, indicate the authority to file the patent application, the inventor is: | | | |
| Name of the Deceased or Legally Incapacitated Inventor: | | | |
| If the Assignee is an Organization check here [ X ] | | | |



Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2003 - Page 397
Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products
IPR2024-01401

| | |
|---|---|
| **Organization Name:** | **Keter Plastic LTD.** |
| **2 Sapir Street<br>Herzelyia, Israel 4685206** | |

| | | | | |
|---|---|---|---|---|
| **Signature:** | **/Derek H. Campbell/** | | **Date:** | **December 14, 2020** |
| **First Name:** | **Derek H.** | **Last Name:** | **Campbell** | |
| **Registration No.:** | **70,608** | | | |

PTO/AIA/96 (08-12)
Approved for use through 11/30/2020. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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# STATEMENT UNDER 37 CFR 3.73(c)

Applicant/Patent Owner: Keter Plastic LTD.

Application No./Patent No.: 16/752,441 Filed/Issue Date: January 24, 2020

Titled: Utility Assembly and Coupling Mechanism

Keter Plastic LTD., a corporation

(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that, for the patent application/patent identified above, it is (choose **one** of options 1, 2, 3 or 4 below):

1. ☐ The assignee of the entire right, title, and interest.

2. ☑ An assignee of less than the entire right, title, and interest (check applicable box):

   ☐ The extent (by percentage) of its ownership interest is _____%. Additional Statement(s) by the owners holding the balance of the interest must be submitted to account for 100% of the ownership interest.

   ☑ There are unspecified percentages of ownership. The other parties, including inventors, who together own the entire right, title and interest are:

   Milwaukee Electric Tool Corporation

   Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

3. ☐ The assignee of an undivided interest in the entirety (a complete assignment from one of the joint inventors was made). The other parties, including inventors, who together own the entire right, title, and interest are:

   Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

4. ☐ The recipient, via a court proceeding or the like (*e.g.*, bankruptcy, probate), of an undivided interest in the entirety (a complete transfer of ownership interest was made). The certified document(s) showing the transfer is attached.

The interest identified in option 1, 2 or 3 above (not option 4) is evidenced by either (choose **one** of options A or B below):

A. ☑ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel 052469, Frame 0612, or for which a copy thereof is attached.

B. ☐ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

   1. From: _____ To: _____

      The document was recorded in the United States Patent and Trademark Office at

      Reel _____, Frame _____, or for which a copy thereof is attached.

   2. From: _____ To: _____

      The document was recorded in the United States Patent and Trademark Office at

      Reel _____, Frame _____, or for which a copy thereof is attached.



This collection of information is required by 37 CFR 3.73(b). 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 12 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: 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.*

PTO/AIA/96 (08-12)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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## STATEMENT UNDER 37 CFR 3.73(c)

3. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

4. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

5. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

6. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

☑ As required by 37 CFR 3.73(c)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

| | |
|---|---|
| /Derek H. Campbell/ | December 14, 2020 |
| Signature | Date |
| Derek H. Campbell | 70,608 |
| Printed or Typed Name | Title or Registration 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.

PTO/SB/08 (09-06)
Approved for use through 03/31/2007. 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.

Substitute for form 1449/PTO

**INFORMATION DISCLOSURE STATEMENT BY APPLICANT**

Date Submitted: November 12, 2020

*(use as many sheets as necessary)*

Sheet 1 of 3

| *Complete if Known* | |
|---|---|
| **Application Number** | 16/752,441 |
| **Filing Date** | January 24, 2020 |
| **First Named Inventor** | Yaron Brunner |
| Art Unit | 3736 |
| Examiner Name | Weinerth, Gideon R. |
| Attorney Docket Number | 066749-2584 |

**U.S. PATENT DOCUMENTS**

| Examiner Initials* | Cite No.[1] | Document Number Number-Kind Code[2] (*if known*) | Publication Date MM-DD-YYYY | Name of Patentee or Applicant of Cited Document | Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear |
|---|---|---|---|---|---|
| | A1 | 3,225,865 | 12-28-1965 | J. W. Downey | |
| | A2 | 4,971,201 | 11-20-1990 | Sathre | |
| | A3 | 5,098,235 | 03-24-1992 | Svetlik et al. | |
| | A4 | 6,305,498 | 10-23-2001 | Itzkovitch | |
| | A5 | 9,506,489 | 11-29-2016 | Ko | |
| | A6 | 9,725,209 | 08-08-2017 | Ben-Gigi | |
| | A7 | 10,106,180 | 10-23-2018 | Bar-Erez et al. | |
| | A8 | 10,583,962 | 03-10-2020 | Brunner et al. | |
| | A9 | 2002/0125072 | 09-12-2002 | Levy | |
| | A10 | 2003/0094393 | 05-22-2003 | Sahm, III | |
| | A11 | 2012/0292213 | 11-22-2012 | Brunner | |
| | A12 | 2015/0034515 | 02-05-2015 | Monyak et al. | |
| | A13 | 2016/0221177 | 08-04-2016 | Reinhart | |
| | A14 | 2018/0099405 | 04-12-2018 | Reinhart | |
| | A15 | 2018/0186513 | 07-05-2018 | Brunner | |
| | A16 | 2020/0243925 | 07-30-2020 | Polakowski et al. | |
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| Examiner Signature | | Date Considered | |
|---|---|---|---|

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**INFORMATION DISCLOSURE STATEMENT BY APPLICANT**

Date Submitted: November 12, 2020

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Sheet 2 of 3

| *Complete if Known* | |
|---|---|
| **Application Number** | 16/752,441 |
| **Filing Date** | January 24, 2020 |
| **First Named Inventor** | Yaron Brunner |
| Art Unit | 3736 |
| Examiner Name | Weinerth, Gideon R. |
| Attorney Docket Number | 066749-2584 |

**U.S. PATENT DOCUMENTS**

| Examiner Initials* | Cite No.[1] | Document Number | Publication Date MM-DD-YYYY | Name of Patentee or Applicant of Cited Document | Pages, Columns, Lines, Where Relevant |
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| Art Unit | 3736 |
| Examiner Name | Weinerth, Gideon R. |
| Attorney Docket Number | 066749-2584 |

**FOREIGN PATENT DOCUMENTS**

| Examiner Initials* | Cite No.[1] | Foreign Patent Document Country Code[3]-Number[4]-Kind Code[5] (*if known*) | Publication Date MM-DD-YYYY | Name of Patentee or Applicant of Cited Documents | Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear | T[6] |
|---|---|---|---|---|---|---|
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| | A55 | JPD1503434 | 07-28-2014 | Name not in English | | |
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**NON PATENT LITERATURE DOCUMENTS**

| Examiner Initials* | Cite No.[1] | 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, page(s), volume-issue number(s), publisher, city and/or country where published. | T[6] |
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| Electronic Patent Application Fee Transmittal | |
|---|---|
| **Application Number:** | 16752441 |
| **Filing Date:** | 24-Jan-2020 |
| **Title of Invention:** | Utility Assembly and Coupling Mechanism |
| **First Named Inventor/Applicant Name:** | Yaron Brunner |
| **Filer:** | Derek Howard Campbell/Sarah Sesterhenn-Lee |
| **Attorney Docket Number:** | 066749-2584 |
| 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:** | | | | |
| **Extension-of-Time:** | | | | |

| Description | Fee Code | Quantity | Amount | Sub-Total in USD($) |
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| **Miscellaneous:** | | | | |
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| **EFS ID:** | 41108496 |
| **Application Number:** | 16752441 |
| **International Application Number:** | |
| **Confirmation Number:** | 9540 |
| **Title of Invention:** | Utility Assembly and Coupling Mechanism |
| **First Named Inventor/Applicant Name:** | Yaron Brunner |
| **Customer Number:** | 142078 |
| **Filer:** | Derek Howard Campbell/Sarah Sesterhenn-Lee |
| **Filer Authorized By:** | Derek Howard Campbell |
| **Attorney Docket Number:** | 066749-2584 |
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| **Filing Date:** | 24-JAN-2020 |
| **Time Stamp:** | 17:41:50 |
| **Application Type:** | Utility under 35 USC 111(a) |

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## File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|---|---|---|---|---|---|
| 1 | Foreign Reference | CN102608238A.pdf | 351046<br>3d013b643a3f2fcfd7ccba060d2ad640f91a7204 | no | 7 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 2 | Foreign Reference | JPD1503434.pdf | 181544<br>78a5b5a9a4a36fb69d998726398dcc7ece65629e | no | 2 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 3 | Foreign Reference | JPD1665028.pdf | 816565<br>0c592756d59dcec9e7c89ec9d46e5621daf6225a | no | 7 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 4 | Transmittal Letter | 066749-2584-IDS_Transmittal.pdf | 47105<br>663136a70185a2dda0f578268e8157ffc3962019 | no | 3 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 5 | Information Disclosure Statement (IDS) Form (SB08) | 066749-2584-SB08.pdf | 95198<br>4e77aeec8b7c6fe1a484371a26f15262ca06df5d | no | 3 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| This is not an USPTO supplied IDS fillable form | | | | | |
| 6 | Fee Worksheet (SB06) | fee-info.pdf | 30681<br>30595ceb7f9c943f881844fc88a52191a43c7c5a | no | 2 |
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Espacenet

# Bibliographic data: CN102608238 (A) — 2012-07-25

## Method for measuring interception amount in filter tip to benzo(a)pyrene in main stream smoke of cigarette

**Inventor(s):** BIN PENG; KEJIAN LIU; JIZHAO GUO; QUANPING YAN; YAQIONG QIN; XIANG LI; CONG NIE ± (PENG BIN, ; LIU KEJIAN, ; GUO JIZHAO, ; YAN QUANPING, ; QIN YAQIONG, ; LI XIANG, ; NIE CONG)

**Applicant(s):** ZHENGZHOU TOBACCO RES CNTC ± (ZHENGZHOU TOBACCO RESEARCH INSTITUTE OF CNTC)

**Classification:** **- international:** ***G01N30/06; G01N30/72***
**- cooperative:**

**Application number:** CN20121070389 20120317 Global Dossier

**Priority number(s):** CN20121070389 20120317

## Abstract of CN102608238 (A)

The invention provides a method for measuring the interception in a filter tip to benzo(a)pyrene in a main stream smoke of a cigarette, which is characterized by comprising the following steps of: 1) selecting an extracting agent; (2) heating and gasifying the extracting agent, so as to enable condensed liquid of the gasified extracting agent to flow through the filter tip to extract the benzo(a)pyrene in the filter tip; 3) purifying extracted liquid by using a purifying material, and then heating and gasifying again; (4) circularly heating, gasifying, extracting and purifying; and 5) carrying out GC-MS (Gas Chromatograph-Mass Spectrometer) quantitative analysis the final extracted liquid. According to the principles disclosed by the invention, a boiling point of the benzo(a)pyrene is higher than that of the extracting agent, and therefore, the extracting agent in the extracted liquid is heated and gasified again, and the benzo(a)pyrene is remained. After the operations are carried out in a circulating way for a while, the benzo(a)pyrene in the filter tip is entirely extracted and a residual extracting agent is finally gasified out. Finally, the GC-MS quantitative analysis is carried out on concentrated liquid. The method disclosed by the invention integrates extraction, purification and concentration, has few operation steps and is simple and liable to operate.



Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2003 - Page 410
Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products
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代理人 姜振东

(51)Int.Cl.
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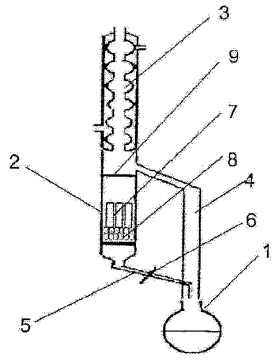
权利要求书 1 页 说明书 3 页 附图 1 页

(54)发明名称

测定滤嘴对卷烟主流烟气中苯并[a]芘截留量的方法

(57)摘要

一种测定滤嘴对卷烟主流烟气中苯并[a]芘截留量的方法，其特征在于：包括以下步骤：1)选择提取剂；2)加热气化提取剂，使气化后的提取剂冷凝液流过滤嘴，对其中的苯并[a]芘进行提取；3)利用净化材料对提取液进行净化后，再次被加热气化；4)循环加热气化、提取净化过程；5)对最终提取液进行GC-MS定量分析。本发明原理在于：由于苯并[a]芘的沸点高于提取剂的沸点，因此提取液中仅提取剂被再次被加热气化，苯并[a]芘则被保留下来，如此循环一段时间，待滤嘴中的苯并[a]芘完全被提取，最后将多余的提取剂气化出去，最后对浓缩液进行GC-MS定量分析。本发明集提取、净化和浓缩一体，操作步骤少，简单易行。




CN 102608238 A

1. 一种测定滤嘴对卷烟主流烟气中苯并 [a] 芘截留量的方法，其特征在于：包括以下步骤：

1）选择沸点低于苯并 [a] 芘的提取剂；

加热气化提取剂，使气化后的提取剂冷凝液流过滤嘴，对滤嘴中的苯并 [a] 芘进行提取，得到提取液；

利用净化材料对提取液进行净化后，除去苯并 [a] 芘以外的中等极性和极性较强的物质，如色素类化合物，再次被加热气化；

循环加热气化、提取净化过程，直至滤嘴中的苯并 [a] 芘完全被提取；

对步骤 4）中的最终提取液进行 GC-MS 定量分析。

2. 根据权利要求 1 所述的测定滤嘴对卷烟主流烟气中苯并 [a] 芘截留量的方法，其特征在于：提取剂为正己烷或环己烷。

3. 根据权利要求 1 所述的测定滤嘴对卷烟主流烟气中苯并 [a] 芘截留量的方法，其特征在于：所用净化材料为已干燥的、粒径为 30-500μm 的球形硅胶；最佳为 50μm 球形硅胶。

4. 根据权利要求 1 所述的测定滤嘴对卷烟主流烟气中苯并 [a] 芘截留量的方法，其特征在于：所述的加热气化温度为 75 ～ 95℃，通过水浴加热方式进行。

5. 根据权利要求 1 所述的测定滤嘴对卷烟主流烟气中苯并 [a] 芘截留量的方法，其特征在于：所述的冷凝温度为 5 ～ 15℃。

6. 根据权利要求 1 所述的测定滤嘴对卷烟主流烟气中苯并 [a] 芘截留量的方法，其特征在于：所述的循环提取时间为 1 ～ 4h，最佳为 2 小时。



Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2003 - Page 412
Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products
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# 测定滤嘴对卷烟主流烟气中苯并 [a] 芘截留量的方法

[0001]

## 技术领域

[0002] 本发明涉及一种苯并 [a] 芘的测定方法，更具体说是涉及一种测定滤嘴对卷烟主流烟气中苯并 [a] 芘截留量的方法。

[0003]

## 背景技术

[0004] 滤嘴作为抽烟者与主流烟气之间的桥梁，可以有效地滤除烟气中的部分有害成分，因而得到了广泛的重视与应用。测定滤嘴对卷烟主流烟气中有害成分的截留量，可以为科学设计卷烟滤嘴提供技术支撑。

[0005] 目前，对于卷烟主流烟气中苯并 [a] 芘释放量的测定方法比较成熟，我国已经有了相关的标准方法（《GB/T 21130-2007 卷烟 烟气总粒相物中苯并 [a] 芘的测定》）。然而，对于滤嘴中截留的苯并 [a] 芘没有相关的标准方法。已有的研究报道例如《卷烟烟气中稠环芳烃的分析研究》中介绍的测定滤嘴从卷烟主流烟气中截留的苯并 [a] 芘的方法都是先用溶剂将滤嘴中的苯并 [a] 芘萃取出来后，再经过净化处理，最后利用浓缩装置对样品进行浓缩、富集，然后采用气质或者液质进行定量分析。

[0006]

## 发明内容

[0007] 本发明的目的正是针对上述已有测定方法存在的提取、净化和浓缩分别进行操作的问题，而提供的一种可同时实现提取、净化和浓缩的方法，对滤嘴中截留的苯并 [a] 芘进行测定。

[0008] 本发明的目的是通过以下技术方案来实现的：

本发明的测定滤嘴对卷烟主流烟气中苯并 [a] 芘截留量的方法，包括以下步骤：

1）选择沸点低于苯并 [a] 芘的提取剂；

2）加热气化提取剂，使气化后的提取剂冷凝液流过滤嘴，对滤嘴中的苯并 [a] 芘进行提取，得到提取液；

3）利用净化材料对提取液进行净化后，除去苯并 [a] 芘以外的中等极性和极性较强的物质，如色素类化合物，再次被加热气化；

4）循环加热气化、提取净化过程，直至滤嘴中的苯并 [a] 芘完全被提取；

5）对步骤 4）中的最终提取液进行 GC-MS 定量分析。

[0009] 所述提取剂为正己烷或环己烷。

[0010] 所用净化材料为已干燥的、粒径为 30-500μm 的球形硅胶；最佳为 50μm 球形硅胶。

[0011] 所述的加热气化温度为 75 ～ 95℃，通过水浴加热方式进行；所述的冷凝温度为



Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2003 - Page 413
Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products
IPR2024-01401

5 ～ 15℃。

[0012] 所述的循环提取时间为 1 ～ 4h，最佳为 2 小时。

[0013] 滤嘴的数量可为 10-20 个。

[0014] 本发明所述的 GC-MS 定量分析方法与《GB/T 21130-2007 卷烟 烟气总粒相物中苯并 [a] 芘的测定》所述仪器与条件相同。

[0015] 本发明所用的提取装置包括水浴加热收集瓶、提取净化腔体和设置在提取净化腔体上方的冷凝管构成，提取净化腔体中设置有待测滤嘴，净化材料铺设在滤嘴下面，提取净化腔体底部设有与收集瓶连通的提取液回流管并由阀门控制，收集瓶上端口设有通入提取净化腔体的气化管，该气化管出口位置位于冷凝管与待测滤嘴之间。工作时，关闭阀门，水浴加热收集瓶中的提取剂，待冷凝下来的提取剂浸没滤嘴后，调节阀门，使冷凝下来的提取剂和回流管流出的提取液速度基本一致，循环气化提取一段时间(约 2 小时)后，滤嘴中的苯并 [a] 芘完全被提取，关闭阀门，继续水浴加热，待收集瓶中的提取液浓缩至 1-2 毫升，即可进行 GC-MS 定量分析。

[0016] 本发明所依据的科学原理在于：由于苯并 [a] 芘的沸点高于提取剂的沸点，因此提取液中仅提取剂被再次被加热气化，苯并 [a] 芘则被保留下来，如此循环一段时间，待滤嘴中的苯并 [a] 芘完全被提取，最后将多余的提取剂气化出去，最后对浓缩液进行 GC-MS 定量分析。

[0017] 本发明与现有的一些分析方法相比较，集提取、净化和浓缩一体，操作步骤少，简单易行。

[0018]

## 附图说明

[0019] 图 1 为本发明所用提取装置的结构示意图。

[0020] 图中：1. 收集瓶，2. 提取净化腔体，3. 冷凝管，4. 气化管，5. 回流管，6. 阀门，7. 滤嘴，8. 净化材料，9. 定位刻线。

[0021]

## 具体实施方式

[0022] 本发明以下结合实施例做进一步说明：

实施例 1

按附图接好实验装置，放入 5g 已干燥的、粒径约为 50μm 的球形硅胶和 10 个 28mm 长抽吸后的滤嘴，以 50ml 正己烷作为提取剂，关闭阀门，85℃水浴加热，待冷凝下来的提取剂浸没滤嘴后，调节阀门，使冷凝回流的速度与提取液流出的速度一致，提取 2h 后，关闭阀门，继续水浴加热，待冷凝液面至提取净化腔体上的定位刻线位置(本实验中，刻线至阀门的空腔体积为 60ml)，取下收集瓶，此时收集瓶内提取液的体积约为 1 ～ 2ml，按《GB/T 21130-2007 卷烟 烟气总粒相物中苯并 [a] 芘的测定》所述仪器与条件定量分析苯并 [a] 芘。

[0023] 表 1 滤嘴苯并 [a] 芘含量测定结果



Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2003 - Page 414
Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products
IPR2024-01401

| 每个滤嘴的含量 | 平行测定 | | | |
|---|---|---|---|---|
| | 1 | 2 | 3 | 4 |
| 苯并[a]芘 (ng) | 3.08 | 3.39 | 3.51 | 3.67 |

实施例 2

加标回收率实验。

[0024] 按附图接好实验装置，放入 7g 已干燥的、粒径约为 50μm 的球形硅胶和 10 个 28mm 长添加了已知量的苯并 [a] 芘的滤嘴，以 50ml 环己烷作为提取剂，关闭阀门，95℃水浴加热，待冷凝下来的提取剂浸没滤嘴后，调节阀门，使冷凝回流的速度与提取液流出的速度一致，提取 2.5h 后，关闭阀门，继续水浴加热，待冷凝液面至提取净化腔体的定位刻线位置（本实验中，刻线至阀门的空腔体积为 60ml），取下收集瓶，此时收集瓶内提取液的体积约为 1 ～ 2ml，按《GB/T 21130-2007 卷烟 烟气总粒相物中苯并 [a] 芘的测定》所述仪器与条件定量分析苯并 [a] 芘。根据实际加入量和测定结果，计算加标回收率。

[0025] 表 2 苯并 [a] 芘回收率

| 标准物质加入量 (ng) | 40.21 | | | | |
|---|---|---|---|---|---|
| 实测值 (ng) | 37.59 | 38.87 | 38.91 | 37.19 | 37.02 |
| 回收率 (%) | 93.5 | 96.7 | 96.8 | 92.5 | 92.1 |



Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2003 - Page 415
Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products
IPR2024-01401

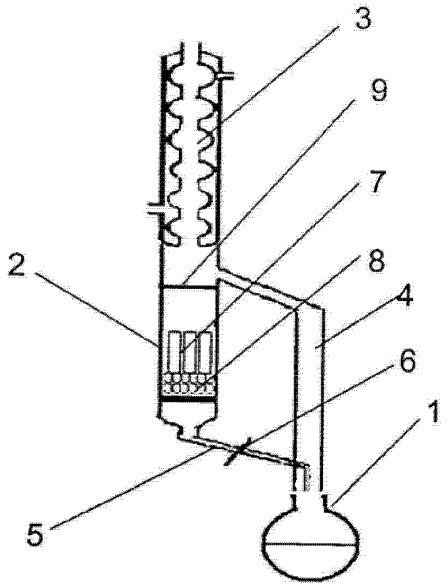



图 1



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Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products
IPR2024-01401

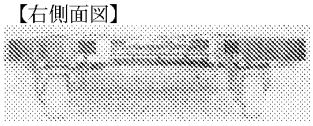
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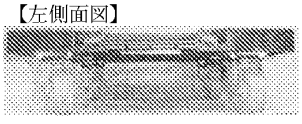
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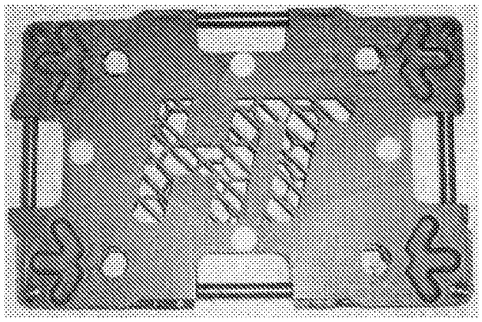
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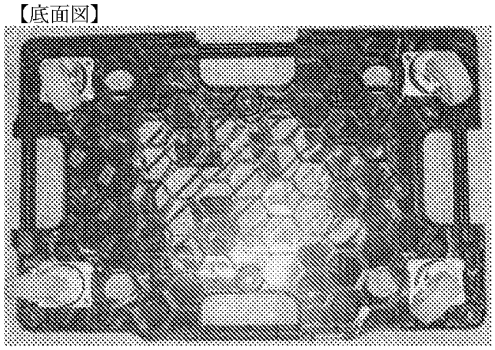
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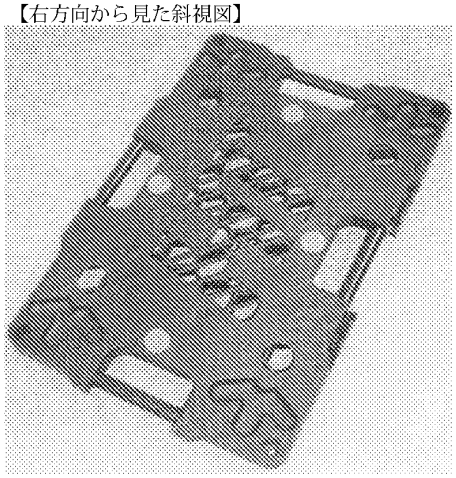
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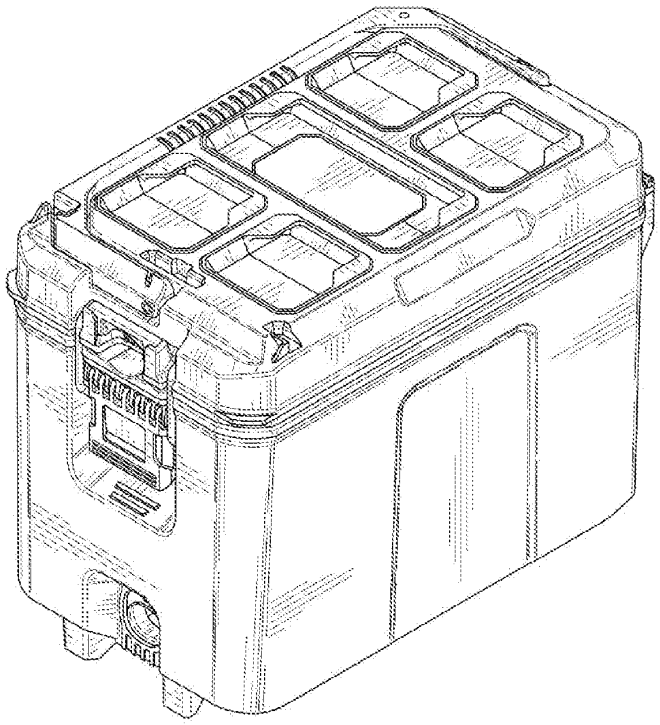


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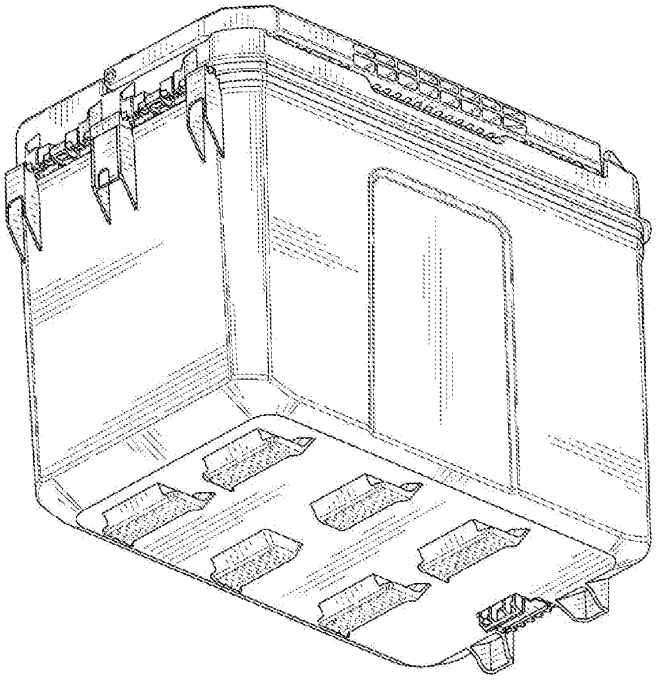


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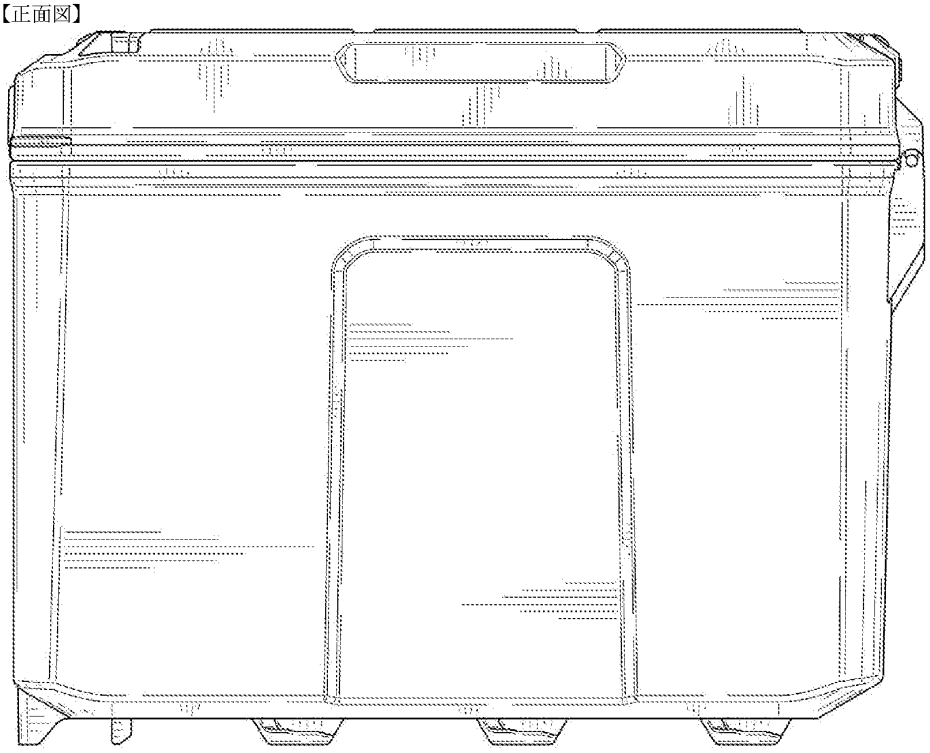
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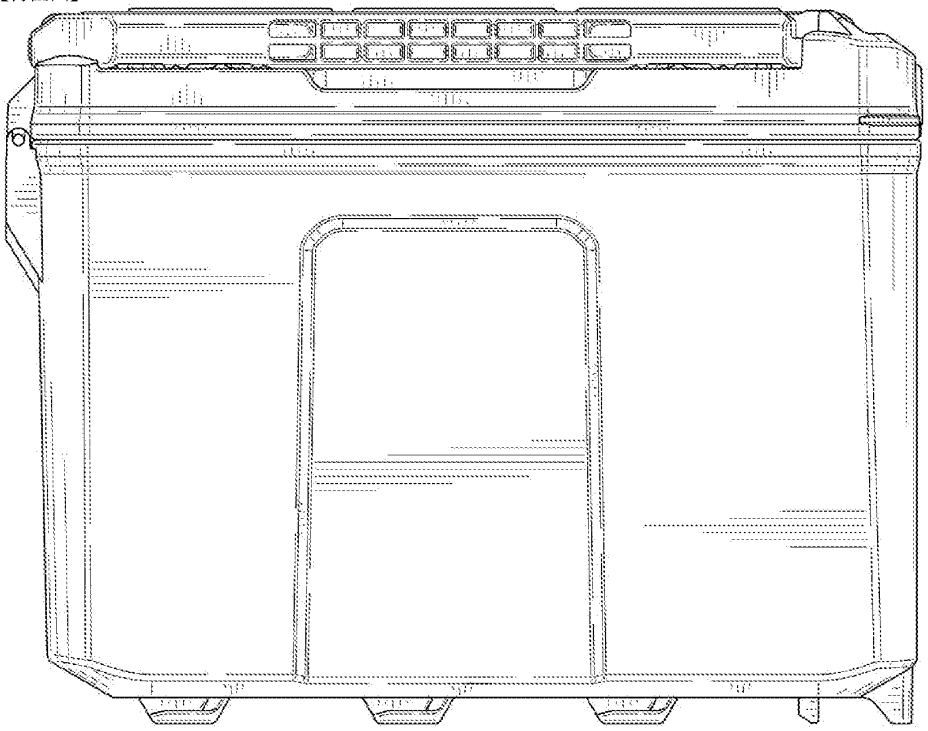
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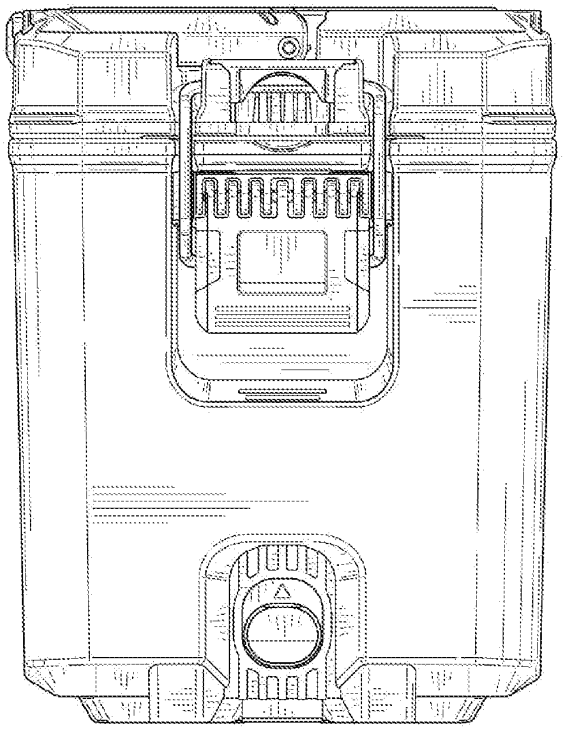
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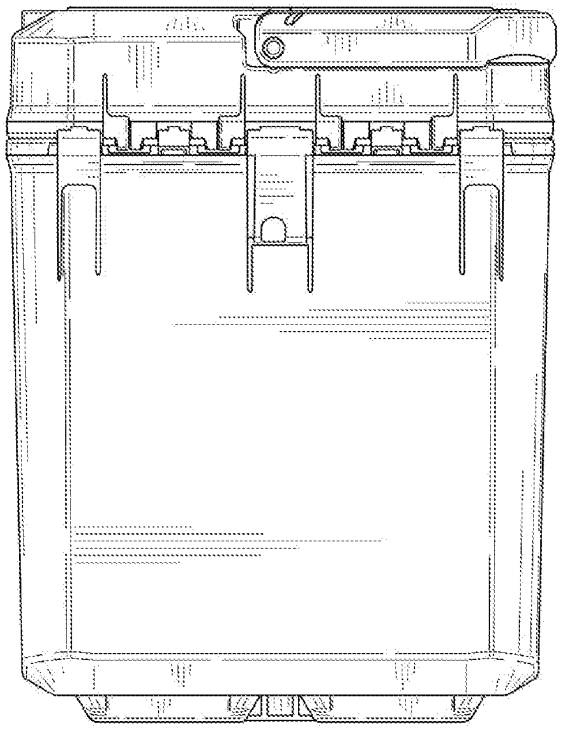
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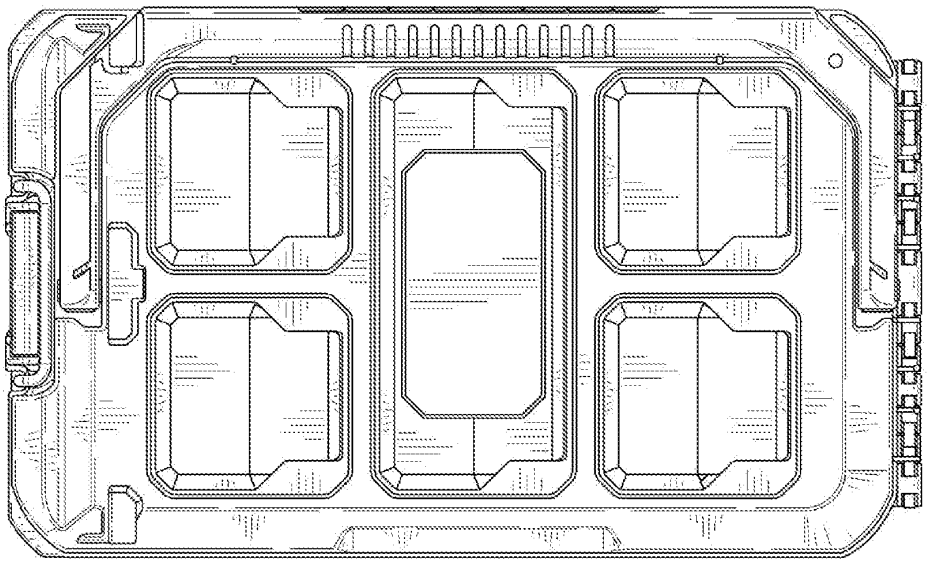
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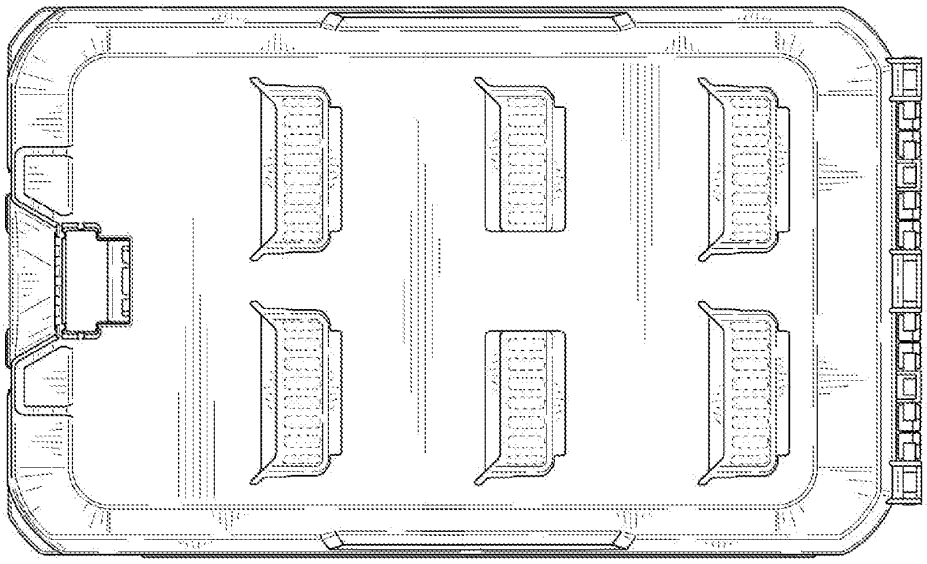
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【平面図】



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（５６）【参考文献】意登１６１３０５８　意登１６１３０６１

*IN THE UNITED STATES PATENT AND TRADEMARK OFFICE*

| | |
|---|---|
| Applicant: | Milwaukee Electric Tool Corporation |
| Title: | Utility Assembly and Coupling Mechanism |
| Appl. No.: | 16/752,441 |
| Filing Date: | January 24, 2020 |
| Examiner: | WEINERTH, GIDEON R. |
| Art Unit: | 3736 |
| Confirmation Number: | 9540 |

**INFORMATION DISCLOSURE STATEMENT UNDER 37 CFR §1.56**

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Submitted herewith on Form PTO/SB/08 is a listing of the documents known to Applicants in order to comply with Applicants' duty of disclosure pursuant to 37 CFR § 1.56.

A copy of each non-U.S. patent document and each non-patent document is being submitted to comply with the provisions of 37 CFR § 1.97 and §1.98.

The submission of any document herewith, which is not a statutory bar, is not intended as an admission that such document constitutes prior art against the claims of the present application or that such document is considered material to patentability as defined in 37 CFR §1.56(b). Applicants do not waive any rights to take any action which would be appropriate to



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**Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products**
**IPR2024-01401**

antedate or otherwise remove as a competent reference any document which is determined to be a *prima facie* art reference against the claims of the present application.

## TIMING OF THE DISCLOSURE

The listed documents are being submitted in compliance with 37 CFR §1.97(c), before the mailing date of any of a final action under 37 CFR § 1.113, a notice of allowance under 37 CFR §1.311, or an action that otherwise closes prosecution in the application.

## FEES

The IDS Fee of $260.00 under 37 CFR 1.17(p) is being paid via Deposit Account No. 18-0882 via EFS-web.

## RELEVANCE OF EACH DOCUMENT

The relevance of the foreign-language document(s) is shown in the figures of foreign-language documents, in the accompanying English language search report/office action from a related foreign application, and/or are described in the English-language abstract and/or machine translation submitted herewith, where available. An English non-machine translation of the foreign-language document is not readily available. However, the absence of such translation does not relieve the PTO from its duty to consider the submitted foreign language document (37 CFR §1.98 and MPEP §609).

Applicants respectfully request that each listed document be considered by the Examiner and be made of record in the present application and that an initialed copy of Form PTO/SB/08 be returned in accordance with MPEP §609.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 18-0882. If any extensions of time are needed for timely acceptance of papers submitted herewith, applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 18-0882.



**Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2003 - Page 427**
**Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products**
**IPR2024-01401**

Respectfully submitted,

Date November 12, 2020

By /Derek H. Campbell/

Reinhart Boerner Van Deuren s.c.
Customer Number: 142078
Telephone: (414) 298-8374
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Derek H. Campbell
Attorney for Applicant
Registration No. 70,608



**Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2003 - Page 428**
**Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products**
**IPR2024-01401**

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 16/752,441 | 01/24/2020 | Yaron Brunner | 066749-2584 | 9540 |

142078 7590 09/25/2020

Reinhart (Milwaukee Tool)
ATTN: TRAVIS MCDONNELL, PARALEGAL
1000 NORTH WATER STREET
SUITE 2100
MILWAUKEE, WI 53202

| EXAMINER | |
|---|---|
| WEINERTH, GIDEON R | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 3736 | |

| NOTIFICATION DATE | DELIVERY MODE |
|---|---|
| 09/25/2020 | ELECTRONIC |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

IPAdmin@reinhartlaw.com

| *Office Action Summary* | **Application No.** 16/752,441 | **Applicant(s)** Brunner et al. | |
|---|---|---|---|
| | **Examiner** GIDEON R WEINERTH | **Art Unit** 3736 | **AIA (FITF) Status** Yes |

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

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☐ Responsive to communication(s) filed on _____.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL.** 2b) ☑ This action is non-final.

3)☐ 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.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims***

5) ☑ Claim(s) 1-20 is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6) ☐ Claim(s) _____ is/are allowed.

7) ☑ Claim(s) 1-20 is/are rejected.

8) ☐ Claim(s) _____ is/are objected to.

9) ☐ Claim(s) _____ are subject to restriction and/or election requirement

* If any claims have been determined allowable, 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.**

**Application Papers**

10)☐ The specification is objected to by the Examiner.

11)☑ The drawing(s) filed on 24 January 2020 is/are: a)☑ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

**Priority under 35 U.S.C. § 119**

12)☐ 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)).

** See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☑ Notice of References Cited (PTO-892)

2) ☑ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date 9/16,/20, 5/28/20, 5/7/20, 3/31/20, 1/24/20.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

4) ☑ Other: Double Patenting Claim Comparison charts.



**Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2003 - Page 430**
**Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products**
**IPR2024-01401**

## DETAILED ACTION

### *Notice of Pre-AIA or AIA Status*

1. The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

### *Double Patenting*

2. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on nonstatutory double patenting provided the reference application or patent either is shown to be commonly owned with the examined application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement. See MPEP § 717.02 for applications subject to examination under the first inventor to file

provisions of the AIA as explained in MPEP § 2159. See MPEP § 2146 *et seq.* for applications not subject to examination under the first inventor to file provisions of the AIA. A terminal disclaimer must be signed in compliance with 37 CFR 1.321(b).

The USPTO Internet website contains terminal disclaimer forms which may be used. Please visit www.uspto.gov/patent/patents-forms. The filing date of the application in which the form is filed determines what form (e.g., PTO/SB/25, PTO/SB/26, PTO/AIA/25, or PTO/AIA/26) should be used. A web-based eTerminal Disclaimer may be filled out completely online using web-screens. An eTerminal Disclaimer that meets all requirements is auto-processed and approved immediately upon submission. For more information about eTerminal Disclaimers, refer to www.uspto.gov/patents/process/file/efs/guidance/eTD-info-I.jsp.

3. Claims 1-20 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1-12 of U.S. Patent No. 10583962. Although the claims at issue are not identical, they are not patentably distinct from each other because the claims recite an identical structure with no functional difference. Also, the structure is substantially duplicated in US 10703534 and Application 15826201/US Publication 2018/0161975.

4. The claims, if allowed, would improperly extend the “right to exclude” already granted in the patent.

The subject matter claimed in the instant application is fully disclosed in the patent and is covered by the patent since the patent and the application are claiming common subject matter, as follows: The single rib and latching lock structure is

structurally identical and is drawn to the same embodiment as US 10583962 and what is claimed in US 2018/0161975.

Furthermore, there is no apparent reason why applicant was prevented from presenting claims corresponding to those of the instant application during prosecution of the application which matured into a patent. See *In re Schneller*, 397 F.2d 350, 158 USPQ 210 (CCPA 1968). See also MPEP § 804.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to GIDEON R. WEINERTH whose telephone number is (571)270-5121. The examiner can normally be reached on Monday-Friday 10AM-6PM EST.

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, Greg Pickett can be reached on (571) 272-4560. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see https://ppair-my.uspto.gov/pair/PrivatePair. Should you have questions on access to the Private

PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/GIDEON R WEINERTH/
Examiner, Art Unit 3736

| Notice of References Cited | Application/Control No. 16/752,441 | Applicant(s)/Patent Under Reexamination Brunner et al. | |
|---|---|---|---|
| | Examiner GIDEON R WEINERTH | Art Unit 3736 | Page 1 of 1 |

**U.S. PATENT DOCUMENTS**

| * | | Document Number Country Code-Number-Kind Code | Date MM-YYYY | Name | CPC Classification | US Classification |
|---|---|---|---|---|---|---|
| * | A | US-20200165036-A1 | 05-2020 | Squiers; Grant T. | A45C13/02 | 1/1 |
| * | B | US-20200147781-A1 | 05-2020 | Squiers; Grant T. | A45C7/0045 | 1/1 |
| * | C | US-D896518-S | 09-2020 | Brunner; Yaron | | D3/294 |
| * | D | US-D896517-S | 09-2020 | Brunner; Yaron | | D3/294 |
| * | E | US-D895967-S | 09-2020 | Brunner; Yaron | | D3/294 |
| * | F | US-D895966-S | 09-2020 | Brunner; Yaron | | D3/294 |
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**FOREIGN PATENT DOCUMENTS**

| * | | Document Number Country Code-Number-Kind Code | Date MM-YYYY | Country | Name | CPC Classification |
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| | N | | | | | |
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**NON-PATENT DOCUMENTS**

| * | | Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages) |
|---|---|---|
| | U | |
| | V | |
| | W | |
| | X | |

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

| Index of Claims | Application/Control No. | Applicant(s)/Patent Under Reexamination |
|---|---|---|
| | 16/752,441 | Brunner et al. |
| | Examiner | Art Unit |
| | GIDEON R WEINERTH | 3736 |

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| ✓ | 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 | 09/22/2020 | | | | | | | | |
| | 1 | ✓ | | | | | | | | |
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Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2003 - Page 436
Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products
IPR2024-01401

| Search Notes | Application/Control No. | Applicant(s)/Patent Under Reexamination |
|---|---|---|
| | 16/752,441 | Brunner et al. |
| | Examiner | Art Unit |
| | GIDEON R WEINERTH | 3736 |

| CPC - Searched* | | |
|---|---|---|
| Symbol | Date | Examiner |
| | | |

| CPC Combination Sets - Searched* | | |
|---|---|---|
| Symbol | Date | Examiner |
| | | |

| US Classification - Searched* | | | |
|---|---|---|---|
| Class | Subclass | Date | Examiner |
| | | | |

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

| Search Notes | | |
|---|---|---|
| Search Notes | Date | Examiner |
| Update searches from 15826201, 15826232, 16216724, See search history | 09/16/2020 | GW |

| Interference Search | | | |
|---|---|---|---|
| US Class/CPC Symbol | US Subclass/CPC Group | Date | Examiner |
| | | | |

| /GIDEON R WEINERTH/<br>Examiner, Art Unit 3736 | |
|---|---|



Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2003 - Page 437
Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products
IPR2024-01401

**EAST Search History**

**EAST Search History (Prior Art)**

| Ref # | Hits | Search Query | DBs | Default Operator | Plurals | Time Stamp |
|---|---|---|---|---|---|---|
| L1 | 13 | (US-20170138382-$ or US-20150274362-$ or US-20190225371-$ or US-20180161975-$ or US-20190106244-$).did. or (US-9506489-$ or US-D816334-$ or US-8979100-$ or US-9701443-$ or US-10583962-$ or US-D895967-$ or US-5608603-$ or US-9725209-$).did. | US-PGPUB; USPAT | OR | OFF | 2020/09/22 09:58 |
| L3 | 1 | "16777181" | US-PGPUB; USPAT | OR | OFF | 2020/09/22 10:00 |
| L4 | 0 | ("2020/0165036").URPN. | USPAT | OR | OFF | 2020/09/22 10:00 |
| L5 | 61 | (grant near2 squiers).inv. | US-PGPUB; USPAT; USOCR | OR | OFF | 2020/09/22 10:01 |
| L6 | 6 | (US-20200165036-$ or US-20200147781-$).did. or (US-D896518-$ or US-D896517-$ or US-D895967-$ or US-D895966-$).did. | US-PGPUB; USPAT | OR | OFF | 2020/09/22 10:02 |
| L22 | 360 | (US-20200055534-$ or US-20190031222-$ or US-20180153312-$ or US-20170349013-$ or US-20150274362-$ or US-20140076759-$ or US-20130154218-$ or US-20130068903-$ or US-20090236482-$ or US-20150376917-$ or US-20090026901-$ or US-20190225371-$ or US-20190106244-$ or US-20190039781-$ or US-20190002004-$ or US-20180290288-$ or US-20180220758-$ or US-20180161975-$ or US-20180044059-$ or US-20170318927-$ or US-20170266804-$ or US-20170257958-$ or US-20170239808-$ or US-20170217464-$ or US-20170174392-$ or US-20170166352-$).did. or (US-20170165828-$ or US-20170138382-$ or US-20170121056-$ or US-20160168880-$ or US-20160144500-$ or US-20160130034-$ or US-20160023349-$ or US-20140166516-$ or US-20140161518-$ or US-20130223971-$ or US-20130127129-$ or US-20130121783-$ or US-20130031732-$ or US-20130031731-$ or US-20130024468-$ or US-20120326406-$ or US-20120207571-$ or US-20120180250-$ or US-20120160886-$ or US-20110220531-$ or US-20110181008-$ or US- | US-PGPUB; USPAT; USOCR | OR | OFF | 2020/09/22 10:03 |

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|---|---|---|---|---|---|---|
| | | 20110155613-$ or US-20110139665-$ or US-20110073516-$ or US-20100219193-$ or US-20100147642-$ or US-20100139566-$).did. or (US-20100052276-$ or US-20090178946-$ or US-20090145913-$ or US-20090145866-$ or US-20090145790-$ or US-20090071990-$ or US-20080308369-$ or US-20080277221-$ or US-20080271280-$ or US-20080169739-$ or US-20080134607-$ or US-20080121547-$ or US-20080115312-$ or US-20080104921-$ or US-20070194543-$ or US-20070145700-$ or US-20070090616-$ or US-20070068757-$ or US-20060254946-$ or US-20060186624-$ or US-20060119060-$ or US-20060038367-$ or US-20060027475-$ or US-20060006770-$ or US-20050139745-$ or US-20050104308-$ or US-20050062244-$).did. or (US-20040206656-$ or US-20040195793-$ or US-20040103494-$ or US-20030205877-$ or US-20030184034-$ or US-20030146589-$ or US-20030115715-$ or US-20020171228-$ or US-20020000440-$).did. or (US-D871013-$ or US-D828671-$ or US-7779764-$ or US-D456972-$ or US-D437669-$ or US-5538213-$ or US-0349013-$ or US-0274362-$ or US-0236482-$ or US-0154218-$ or US-0153312-$ or US-0076759-$ or US-0068903-$ or US-0055534-$ or US-0031222-$ or US-D826510-$ or US-D816334-$ or US-9511491-$ or US-D738106-$ or US-8979100-$ or US-8567796-$ or US-8505729-$ or US-D661858-$ or US-D653832-$ or US-D395533-$ or US-10434638-$).did. or (US-5429260-$ or US-5301829-$ or US-5240264-$ or US-5105947-$ or US-5035445-$ or US-4168076-$ or US-3974898-$ or US-3506321-$ or US-3117692-$ or US-2970358-$ or US-2608238-$ or US-2430200-$ or US-2042387-$ or US-1477050-$ or US-1276744-$ or US-0326406-$ or US-0320243-$ or US-0318927-$ or US-0308369-$ or US-0290288-$ or US-0277221-$ or US-0271616-$ or US-0271280-$ or US-0266804-$ or US-0257958-$ or US-0254946-$ or US-0239808-$).did. or (US-0225371-$ or US-0223971-$ or US-0220758-$ or US-0220531-$ or US-0219193-$ or US- | | | | |

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| | | 0217464-$ or US-0207571-$ or US-0206656-$ or US-0205877-$ or US-0195793-$ or US-0194543-$ or US-0186624-$ or US-0184034-$ or US-0181008-$ or US-0180250-$ or US-0178946-$ or US-0174392-$ or US-0171228-$ or US-0169739-$ or US-0168880-$ or US-0166516-$ or US-0166352-$ or US-0165828-$ or US-0161975-$ or US-0161518-$ or US-0160886-$ or US-0155613-$).did. or (US-0147642-$ or US-0146589-$ or US-0145913-$ or US-0145866-$ or US-0145790-$ or US-0145700-$ or US-0144500-$ or US-0139745-$ or US-0139665-$ or US-0139566-$ or US-0138382-$ or US-0134607-$ or US-0130034-$ or US-0127129-$ or US-0121783-$ or US-0121547-$ or US-0121056-$ or US-0119060-$ or US-0115715-$ or US-0115312-$ or US-0106244-$ or US-0104921-$ or US-0104308-$ or US-0103494-$ or US-0090616-$ or US-0073516-$ or US-0071990-$).did. or (US-0068757-$ or US-0062244-$ or US-0052276-$ or US-0044059-$ or US-0039781-$ or US-0038367-$ or US-0031732-$ or US-0031731-$ or US-0027475-$ or US-0024468-$ or US-0023349-$ or US-0006770-$ or US-0002004-$ or US-0000440-$ or US-9872562-$ or US-9750543-$ or US-9701443-$ or US-9643629-$ or US-9616562-$ or US-9566990-$ or US-9506489-$ or US-9132543-$ or US-8985922-$ or US-8875888-$ or US-8813960-$ or US-8714355-$ or US-8689396-$).did. or (US-D701696-$ or US-8677661-$ or US-8459495-$ or US-8454033-$ or US-8191910-$ or US-8177463-$ or US-8132819-$ or US-8028845-$ or US-7841144-$ or US-7780026-$ or US-7658887-$ or US-7503569-$ or US-7367571-$ or US-7263742-$ or US-7212840-$ or US-7147243-$ or US-7066475-$ or US-7044484-$ or US-6983946-$ or US-6948691-$ or US-6945546-$ or US-6641013-$ or US-6637707-$ or US-6619772-$ or US-6601930-$ or US-6547347-$ or US-6431580-$).did. or (US-6371320-$ or US-6367631-$ or US-6347847-$ or US- | | | | |

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| | | 6176559-$ or US-6109627-$ or US-6085925-$ or US-6050660-$ or US-5988473-$ or US-5951037-$ or US-5797617-$ or US-5628443-$ or US-5608603-$ or US-5595228-$).did. or (US-0349013-$ or US-0274362-$ or US-0236482-$ or US-0154218-$ or US-0153312-$ or US-0076759-$ or US-0068903-$ or US-0055534-$ or US-0031222-$ or US-3506321-$ or US-3117692-$ or US-2970358-$ or US-2608238-$ or US-2430200-$ or US-2042387-$ or US-1477050-$ or US-1276744-$ or US-0326406-$ or US-0320243-$ or US-0318927-$ or US-0308369-$ or US-0290288-$ or US-0277221-$ or US-0271616-$ or US-0271280-$ or US-0266804-$).did. or (US-0257958-$ or US-0254946-$ or US-0239808-$ or US-0225371-$ or US-0223971-$ or US-0220758-$ or US-0220531-$ or US-0219193-$ or US-0217464-$ or US-0207571-$ or US-0206656-$ or US-0205877-$ or US-0195793-$ or US-0194543-$ or US-0186624-$ or US-0184034-$ or US-0181008-$ or US-0180250-$ or US-0178946-$ or US-0174392-$ or US-0171228-$ or US-0169739-$ or US-0168880-$ or US-0166516-$ or US-0166352-$ or US-0165828-$ or US-0161975-$).did. or (US-0161518-$ or US-0160886-$ or US-0155613-$ or US-0147642-$ or US-0146589-$ or US-0145913-$ or US-0145866-$ or US-0145790-$ or US-0145700-$ or US-0144500-$ or US-0139745-$ or US-0139665-$ or US-0139566-$ or US-0138382-$ or US-0134607-$ or US-0130034-$ or US-0127129-$ or US-0121783-$ or US-0121547-$ or US-0121056-$ or US-0119060-$ or US-0115715-$ or US-0115312-$ or US-0106244-$ or US-0104921-$ or US-0104308-$ or US-0103494-$).did. or (US-0090616-$ or US-0073516-$ or US-0071990-$ or US-0068757-$ or US-0062244-$ or US-0052276-$ or US-0044059-$ or US-0039781-$ or US-0038367-$ or US-0031732-$ or US-0031731-$ or US-0027475-$ or US-0024468-$ or US-0023349-$ or US- | | | | |

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|---|---|---|---|---|---|---|
| | | 0006770-$ or US-0002004-$ or US-0000440-$).did. | | | | |
| L23 | 6 | L6 not L22 | US-PGPUB; USPAT; USOCR | OR | OFF | 2020/09/22 10:03 |
| S1 | 2 | (("5240264") or ("7503569") or ("20020000440") or ("20040195793") or ("20110139665") or ("20110155613") or ("20130127129")).PN. | USPAT; USOCR | OR | OFF | 2018/04/05 19:40 |
| S2 | 7 | (("5240264") or ("7503569") or ("20020000440") or ("20040195793") or ("20110139665") or ("20110155613") or ("20130127129")).PN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 19:41 |
| S3 | 1 | ("20100163562").PN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 19:44 |
| S4 | 22 | ("5699925" \| "6959507" \| "20090139892" \| "20090236255" \| "5469961" \| "20030155267" \| "20080308641" \| "3182856" \| "5353948" \| "3581928" \| "4351448" \| "20090178989" \| "2634020" \| "3387732" \| "5755180" \| "6761266" \| "7246718" \| "7246718" \| "5606820" \| "4351448" \| "20090236255" \| "20050224494" \| "5469961").PN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 19:51 |
| S5 | 134 | ("2733830" \| "2746081" \| "3077282" \| "3285464" \| "3315796" \| "3376046" \| "3381844" \| "3405836" \| "4109821" \| "4302866" \| "4401312" \| "4431114" \| "4844263" \| "5062539" \| "5096084" \| "5312011").PN. OR ("5699925").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 19:52 |
| S6 | 23 | ("20030155267" \| "20050224494" \| "20080308641" \| "20090139892" \| "20090178989" \| "20090236255" \| "2634020" \| "3182856" \| "3387732" \| "3581928" \| "4351448" \| "5353948" \| "5469961" \| "5606820" \| "5699925" \| "5755180" \| "6761266" \| "6959507" \| "7246718").PN. OR ("8590704").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 19:54 |
| S7 | 42 | ("3098686" \| "4391478" \| "4452003" \| "4662515" \| "4768651" \| "4901664" \| "5176281" \| "5244265" \| "5344339" \| "5624029" \| "5685421" \| "5699925" \| "5938023").PN. OR ("6193062").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 19:57 |
| S8 | 165 | (KETER adj PLASTIC).as. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 20:00 |

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|---|---|---|---|---|---|---|
| S9 | 38 | (("BRUNNER") near3 ("Yaron")).INV. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 20:01 |
| S10 | 1,031 | 206/508.ccls. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 20:06 |
| S11 | 206 | S10 and (spring resilient) | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 20:07 |
| S12 | 121 | S10 and (spring bias biasing biased) | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 20:08 |
| S13 | 33 | ("3145870").URPN. | USPAT | OR | OFF | 2018/04/05 20:11 |
| S14 | 66 | ("0353600" \| "0888611" \| "2111884" \| "2256024" \| "2670892" \| "3145870" \| "3341053" \| "3343670" \| "3353665" \| "3369658" \| "3419176").PN. OR ("3933268").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 20:12 |
| S15 | 41 | ("3933268" \| "4303158" \| "4383721" \| "4592601" \| "4733703" \| "4768651" \| "4782619" \| "5203618" \| "5244265").PN. OR ("5482162").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 20:13 |
| S16 | 26 | ("2812099" \| "2980751" \| "3147151" \| "3167458" \| "3338452" \| "3341053" \| "3745048" \| "3767468" \| "3933268" \| "3944074" \| "4113926").PN. OR ("4339049").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 20:14 |
| S17 | 2,166 | 206/508,511,504.ccls. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 20:18 |
| S18 | 121 | 206/503.ccls. and (spring) | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 20:19 |
| S19 | 22 | ("2807387" \| "3182856" \| "4724756" \| "5083664" \| "5375709" \| "5445269").PN. OR ("5934466").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 20:21 |
| S20 | 3,773 | 280/47.18,47.19,47.26,79.2.ccls. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 20:30 |
| S21 | 891 | 280/47.18,47.19,47.26,79.2.ccls. and (spring) | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 20:30 |
| S22 | 1 | ("2004/0183266").URPN. | USPAT | OR | OFF | 2018/04/05 20:34 |
| S23 | 2 | (("20020014488") or ("4113214") or ("3845968")).PN. | USPAT; USOCR | OR | OFF | 2018/04/05 20:35 |

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|---|---|---|---|---|---|---|
| S24 | 3 | (("20020014488") or ("4113214") or ("3845968")).PN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 20:35 |
| S25 | 8 | ("2002/0014488").URPN. | USPAT | OR | OFF | 2018/04/05 20:36 |
| S32 | 138 | S21 and (stack stacked stacking) | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 21:01 |
| S33 | 29 | ("1014475" \| "1408400" \| "1636682" \| "1815825" \| "4717168" \| "5139278").PN. OR ("5294137").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 21:03 |
| S34 | 23 | ("2606652" \| "2677483" \| "2736452" \| "3258091" \| "3308911" \| "3376046" \| "3401933" \| "4066156").PN. OR ("4220343").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 21:08 |
| S35 | 39 | ("20020175172" \| "20040112906" \| "20050051549" \| "20090308883" \| "20100108556" \| "20100140890" \| "20110139805" \| "20110248458" \| "20110278879" \| "20120012596" \| "20130181419" \| "20150040606" \| "3117692" \| "3376046" \| "3999775" \| "4091953" \| "4093070" \| "4220343" \| "4828112" \| "5011240" \| "5069466" \| "5287966" \| "5427394" \| "6520514" \| "6964348" \| "7086551" \| "7134552" \| "7544915" \| "7950679" \| "8322530" \| "8360447" \| "8465030" \| "8596655" \| "8690170" \| "8777043" \| "8936260" \| "9205951").PN. OR ("9669930").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 21:08 |
| S36 | 226 | B65D21/0224.cpc. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 21:11 |
| S37 | 20 | B65D21/02.cpc. and spring | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 21:12 |
| S38 | 31 | ("2626025" \| "3331529" \| "3346137" \| "3749273" \| "3811747" \| "3836043").PN. OR ("4813542").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 21:13 |
| S39 | 43 | ("4545487" \| "4813542" \| "5617953" \| "5864467" \| "5949653").PN. OR ("6085925").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 21:14 |
| S40 | 60 | (french adj cleat) | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 21:16 |
| S41 | 25 | ("3361293").URPN. | USPAT | OR | OFF | 2018/04/05 21:21 |

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|---|---|---|---|---|---|---|
| S42 | 32 | ("2483269" \| "3219400" \| "3361293" \| "3512696" \| "3565624" \| "3763980" \| "4190172" \| "4322118" \| "4389078" \| "4624383" \| "4660725" \| "5016946" \| "5038937" \| "5105962" \| "5310071" \| "6047827" \| "6056377" \| "6276550" \| "D330128" \| "D332745").PN. OR ("7152752").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 21:22 |
| S43 | 11 | ("20070145864" \| "20100254757" \| "20110085853" \| "3944282" \| "4900090" \| "4995176" \| "6612078" \| "6830236" \| "6877824" \| "7152752" \| "8464408").PN. OR ("9506489").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 21:23 |
| S44 | 16 | ("3469331" \| "4716666").PN. OR ("4995176").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 21:24 |
| S45 | 22 | ("3131829" \| "3194426" \| "3338452" \| "4258847" \| "4328902" \| "4428479" \| "5016946" \| "5050755" \| "5310071" \| "5316159" \| "5503288" \| "5845790").PN. OR ("6276550").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 21:25 |
| S46 | 7 | ("1849659").URPN. | USPAT | OR | OFF | 2018/04/05 21:29 |
| S47 | 46 | ("1849659" \| "2774511" \| "2916293" \| "2994457" \| "3053397" \| "3100582" \| "3113680" \| "3219232" \| "3282458" \| "3647112" \| "4000817" \| "4176747" \| "Re26758" \| "Re27649").PN. OR ("4550837").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 21:30 |
| S48 | 1,066 | B65D21/0217,0219,0222,0228,023.cpc. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 21:33 |
| S49 | 92 | B65D21/0217,0219,0222,0228,023.cpc. and spring | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 21:33 |
| S50 | 0 | ("2017/0121056").URPN. | USPAT | OR | OFF | 2018/04/05 21:37 |
| S51 | 4 | ("20110139777" \| "5301829" \| "5427265" \| "8602217").PN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 21:37 |
| S52 | 16 | ("20080000899" \| "20120312812" \| "20130127129" \| "3379482" \| "3811559" \| "4118048" \| "4619363" \| "5125697" \| "5904269" \| "6082539" \| "6371320" \| "6874634" \| "6889838" \| "7387350" \| "7516842").PN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 21:39 |
| S53 | 2 | ("2012/0024739").URPN. | USPAT | OR | OFF | 2018/04/05 21:43 |

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|---|---|---|---|---|---|---|
| S54 | 4 | ("2011/0168599").URPN. | USPAT | OR | OFF | 2018/04/05 21:44 |
| S55 | 22 | ("5699925" \| "6959507" \| "20090139892" \| "3182856" \| "20030155267" \| "20080308641" \| "3182856" \| "5353948" \| "3581928" \| "4351448" \| "20090178989" \| "2634020" \| "3387732" \| "5755180" \| "6761266" \| "20050224494" \| "7246718" \| "5606820" \| "20090236255" \| "5469961").PN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 21:45 |
| S56 | 237 | 206/501.ccls. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 21:46 |
| S57 | 2 | ("2010/0219193").URPN. | USPAT | OR | OFF | 2018/04/05 21:50 |
| S58 | 72 | ("0879455" \| "20040134390" \| "20040178208" \| "20060254946" \| "20060254947" \| "20080017650" \| "20100219193" \| "2695115" \| "2849151" \| "3103278" \| "3117692" \| "3383009" \| "3391824" \| "3407758" \| "3419184" \| "3481502" \| "3616943" \| "3754645" \| "3756396" \| "3759416" \| "3811747" \| "3916803" \| "3926321" \| "3968879" \| "4287997" \| "4618059" \| "4655360" \| "4765252" \| "4832200" \| "4848605" \| "4889235" \| "5054617" \| "5203494" \| "5392945" \| "5404829" \| "5454477" \| "5641090" \| "5718350" \| "5769230" \| "5779051" \| "5974981" \| "6021916" \| "6085467" \| "6186345" \| "6237758" \| "6308858" \| "6371364" \| "6446563" \| "6457599" \| "6585090" \| "6622642" \| "6662950" \| "6698362" \| "7163122" \| "D236326" \| "D333094" \| "D361715" \| "D446017" \| "D500924").PN. OR ("8851287").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 21:50 |
| S59 | 36 | ("20020096844" \| "4066155" \| "4813542" \| "5099968" \| "5564805" \| "5906291" \| "D439739").PN. OR ("6585090").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 21:52 |
| S60 | 73 | ("20030029750" \| "20030123965" \| "20050072642" \| "20050077136" \| "20060119060" \| "20070012694" \| "20070068757" \| "2497173" \| "3061057" \| "3452846" \| "3532355" \| "3572253" \| "3650216" \| "3861703" \| "3891230" \| "4081061" \| "4118048" \| "4122925" \| "4350194" \| "4621716" \| "4657135" \| "4693345" \| "4738340" \| "4792025" \| "4813521" \| "4951818" \| "5038842" \| | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 21:53 |

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|---|---|---|---|---|---|---|
| | | "5048649" \| "5109961" \| "5142445" \| "5178244" \| "5186290" \| "5197579" \| "5339934" \| "5373104" \| "5379870" \| "5407039" \| "5447216" \| "5484045" \| "5484046" \| "5632496" \| "5713439" \| "5890571" \| "5927361" \| "6073737" \| "6116390" \| "6164425" \| "6213266" \| "6401890" \| "6520327" \| "6585090" \| "6634496" \| "6758334" \| "6976566" \| "7077252" \| "7232018" \| "7380685" \| "7398868" \| "7726483" \| "7780002" \| "7942282" \| "D294775" \| "D453623").PN. OR ("8561769").URPN. | | | | |
| S61 | 44 | ("20040007574" \| "20050036847" \| "20050199459" \| "20070130731" \| "20090178946" \| "20120292867" \| "3419184" \| "3987829" \| "4287997" \| "4452555" \| "5058746" \| "5085448" \| "5186330" \| "5564805" \| "5709008" \| "5785328" \| "6116390" \| "6983946" \| "7011214" \| "7044528" \| "7163122" \| "7350789" \| "7482928" \| "7530580" \| "7537119" \| "7714708" \| "7780026" \| "7854321" \| "7883096" \| "7938412" \| "8132819" \| "8146771" \| "8256242" \| "8561769" \| "8567796" \| "D358765" \| "D401412" \| "D467424" \| "D467425" \| "D467426" \| "RE44656").PN. OR ("9550605").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 21:59 |
| S62 | 10 | ("20050199623" \| "5765707" \| "5829595" \| "6024223" \| "7337908").PN. OR ("8146771").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 22:03 |
| S63 | 42 | ("0621601" \| "2761582" \| "3113690" \| "3616943" \| "3643993" \| "3823973" \| "3828964" \| "3977558" \| "4000704" \| "4042111" \| "4416374" \| "4678084" \| "4887731" \| "5011036" \| "5022546" \| "5105967").PN. OR ("5186330").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 22:05 |
| S64 | 74 | ("0879455" \| "2849151" \| "3005282" \| "3371816" \| "3393858" \| "3481502").PN. OR ("3616943").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 22:08 |
| S65 | 36 | ("1234730" \| "20020145022" \| "20030010799" \| "20040207225" \| "20090212584" \| "2578238" \| "2883764" \| "3002650" \| "3131829" \| "3351228" \| "3374914" \| "3616943" \| "4754883" \| "4838745" \| "4941784" \| "5025964" \| "5392945" \| "5469999" \| "5538153" \| "5671511" \| "5676251" \| "5687895" \| "5855310" \| "6471278" \| "7159730" \| | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 22:09 |

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|---|---|---|---|---|---|---|
| | | "7329451" \| "7537119" \| "D264014" \| "D333094").PN. OR ("9738198").URPN. | | | | |
| S66 | 75 | ("0879455" \| "20040178208" \| "20060254947" \| "2695115" \| "2849151" \| "2939603" \| "3103278" \| "3117692" \| "3383009" \| "3391824" \| "3419184" \| "3481502" \| "3616943" \| "3754645" \| "3756396" \| "3759416" \| "3811747" \| "3968879" \| "4287997" \| "4655360" \| "4671411" \| "4765252" \| "4832200" \| "4848605" \| "5042674" \| "5203494" \| "5392945" \| "5454477" \| "5566824" \| "5641090" \| "5718350" \| "5769230" \| "5779051" \| "6021916" \| "6085467" \| "6186345" \| "6237758" \| "6308858" \| "6367630" \| "6371364" \| "6457599" \| "6585090" \| "6662950" \| "7163122" \| "D333094" \| "D361715" \| "D446017" \| "D500924").PN. OR ("7537119").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 22:10 |
| S67 | 45 | ("0491865" \| "1142932" \| "1665238" \| "20060016812" \| "20070108080" \| "20080264820" \| "20100084119" \| "3144016" \| "3259263" \| "3369691" \| "3384259" \| "3828964" \| "4109789" \| "4655360" \| "4760921" \| "4901380" \| "5086926" \| "5203494" \| "5461755" \| "5564583" \| "5671856" \| "5699925" \| "5769230" \| "6024223" \| "6085467" \| "6186345" \| "6237758" \| "6273258" \| "6457599" \| "6715627" \| "6840378" \| "6851566" \| "7510096" \| "7537119" \| "8056722" \| "RE37518").PN. OR ("8813960").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 22:11 |
| S68 | 32 | ("4506798" \| "4626155" \| "4741449" \| "5109985" \| "5123541" \| "5190179" \| "5722328" \| "5862917").PN. OR ("6024223").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 22:12 |
| S69 | 4 | ("1665238").URPN. | USPAT | OR | OFF | 2018/04/05 22:15 |
| S70 | 39 | ("2885135" \| "3376046" \| "3539071" \| "3568879" \| "3987829" \| "4174950" \| "4765252" \| "4844263" \| "D248015").PN. OR ("D333094").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 22:17 |
| S71 | 53 | ("2761582" \| "3117692" \| "3360162" \| "3379341" \| "3392875" \| "3419184" \| "3675815" \| "3759416" \| "3979016" \| "4093071" \| "4106624" \| "4189052" \| "4379508").PN. OR ("4832200").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 22:19 |
| S72 | 79 | ("3117692").URPN. | USPAT | OR | OFF | 2018/04/05 22:22 |

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|---|---|---|---|---|---|---|
| S73 | 45 | ("1762635" \| "2531671" \| "2614399" \| "3117692" \| "3498494" \| "3501044" \| "3502241" \| "3667647" \| "3751852").PN. OR ("4279354").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 22:24 |
| S74 | 13 | ("20060186186" \| "20070209962" \| "20080202976" \| "2328689" \| "2828059" \| "3811566" \| "4279354" \| "4293071" \| "6315126").PN. OR ("8684222").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 22:25 |
| S75 | 45 | ("1762635" \| "2531671" \| "2614399" \| "3117692" \| "3498494" \| "3501044" \| "3502241" \| "3667647" \| "3751852").PN. OR ("4279354").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 22:26 |
| S76 | 110 | ("2457842" \| "2483464" \| "2664219" \| "2702142" \| "3073466" \| "3130855" \| "3140007" \| "3586204" \| "3828964").PN. OR ("4287997").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 22:30 |
| S77 | 63 | ("2461526" \| "3078484" \| "3114486" \| "3233803" \| "3749294" \| "3902640" \| "3915189" \| "4082208" \| "4287997" \| "4307826" \| "4366922" \| "4424841" \| "4491258" \| "4545414" \| "4673070" \| "4790432" \| "4813542" \| "4884731" \| "5131576" \| "5184763" \| "5321904" \| "5419473").PN. OR ("5628443").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 22:33 |
| S78 | 151 | ("1409838" \| "20010040080" \| "20020074332" \| "20020130005" \| "20020185350" \| "20030034215" \| "20030034636" \| "20040000457" \| "20040004332" \| "20040026199" \| "20040074725" \| "20040163910" \| "20040211634" \| "20040238303" \| "20050077133" \| "20050077706" \| "20050098402" \| "20050103590" \| "20050150733" \| "20050258621" \| "20050285359" \| "20060010644" \| "20060086583" \| "20060102677" \| "20060163305" \| "20060175170" \| "20060196743" \| "20060207848" \| "20080060953" \| "20080136133" \| "20080223679" \| "20080236972" \| "20080308369" \| "20080308370" \| "20090057082" \| "20090139813" \| "20090160147" \| "20090218187" \| "20100000805" \| "20100025174" \| "20100095480" \| "20100108452" \| "20100147642" \| "20100263977" \| "20100307879" \| "20100308563" \| "20110247910" \| "20120160617" \| "20120261223" \| "20150091264" \| "20160045000" \| "2454438" \| "2602675" \| "3131829" \| "3178197" \| "3317081" \| | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 22:34 |

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| | | "3659867" \| "3842953" \| "3891230" \| "3974898" \| "4087102" \| "4314624" \| "4335895" \| "4575109" \| "4588055" \| "4673070" \| "4917392" \| "4953257" \| "4969660" \| "5072958" \| "5105962" \| "5127662" \| "5263727" \| "5310071" \| "5348325" \| "5533231" \| "5628443" \| "5630601" \| "5749503" \| "5803471" \| "5815843" \| "5873145" \| "5984154" \| "5984327" \| "6016893" \| "6042127" \| "6047442" \| "6141841" \| "6179176" \| "6182981" \| "6186295" \| "6196366" \| "6196560" \| "6213266" \| "6213267" \| "6237734" \| "6260871" \| "6279705" \| "6289554" \| "6305587" \| "6360400" \| "6367602" \| "6401888" \| "6401890" \| "6409412" \| "6454065" \| "6471019" \| "6474524").PN. OR ("6484362" \| "6530507" \| "6533086" \| "6575493" \| "6591950" \| "6604617" \| "6609271" \| "6736073" \| "6769701" \| "6832670" \| "6880685" \| "6923352" \| "6961976" \| "6964420" \| "7066311" \| "7070190" \| "7073694" \| "7093700" \| "7097181" \| "7097183" \| "7143912" \| "7226073" \| "7232018" \| "7237660" \| "7281616" \| "7284304" \| "7318507" \| "7328779" \| "7350648" \| "7374183" \| "7426985" \| "7441785" \| "7478803" \| "7594569" \| "7597341" \| "7780026" \| "8607947").PN. OR ("9888752").URPN. | | | | |
| S79 | 6 | ("2008/0308369").URPN. | USPAT | OR | OFF | 2018/04/05 22:35 |
| S80 | 45 | ("0672173" \| "1084360" \| "20020144376" \| "20040084269" \| "20040173427" \| "20040238241" \| "20050077136" \| "20050092568" \| "20080308369" \| "20090095588" \| "20090101461" \| "20100059322" \| "20100170761" \| "20100236886" \| "20100270116" \| "20110168507" \| "20130037364" \| "20130175129" \| "20130213753" \| "20130220754" \| "2581417" \| "4836343" \| "5099968" \| "5355980" \| "5560458" \| "5671832" \| "5829559" \| "5927450" \| "5988334" \| "6347693" \| "6533086" \| "6536568" \| "7322477" \| "7322585" \| "7503569" \| "7909149" \| "8087513" \| "D516869" \| "D671316").PN. OR ("9027722").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 22:36 |

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| S81 | 35 | ("0922567" \| "1084360" \| "1567461" \| "2372845" \| "2428906" \| "2801666" \| "2858957" \| "3837447" \| "4098312" \| "4122925" \| "4142563" \| "4257463" \| "4286639" \| "4673070" \| "4744446").PN. OR ("4836343").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 22:39 |
| S82 | 51 | ("0778785" \| "1567461" \| "2372845" \| "2428906" \| "2989998" \| "3631572" \| "3696850" \| "4122925" \| "4128194" \| "4256245" \| "4424841").PN. OR ("4673070").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 22:40 |
| S83 | 33 | ("0842498" \| "1689399" \| "3114486" \| "3698045" \| "4231135" \| "4673070" \| "4799298" \| "4934573" \| "5205448" \| "5259093" \| "5465425" \| "5604958" \| "5632071" \| "5724707" \| "5815843" \| "6108816" \| "7080430" \| "7251867").PN. OR ("7526842").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 22:41 |
| S84 | 23 | ("2428906" \| "2707035" \| "3225951" \| "3319744" \| "3696850" \| "3958731").PN. OR ("4122925").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 22:43 |
| S85 | 33 | ("1973819" \| "2007696" \| "3373911").PN. OR ("4142563").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 22:46 |
| S86 | 12 | ("2858957").URPN. | USPAT | OR | OFF | 2018/04/05 22:48 |
| S87 | 12 | ("20060071581" \| "20080060964" \| "2858957" \| "3346137" \| "3568879" \| "4258847" \| "4592601" \| "4685565" \| "4863222" \| "7311202").PN. OR ("9724820").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 22:49 |
| S88 | 43 | ("2128854" \| "3743372").PN. OR ("4863222").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 22:49 |
| S89 | 73 | ("2842420" \| "2998128" \| "3032381" \| "3294463" \| "3501044" \| "3552817").PN. OR ("3743372").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 22:51 |
| S90 | 36 | ("2011962" \| "3514170" \| "3552817" \| "3743372" \| "3851936" \| "3999818" \| "4198777" \| "4238032" \| "4353470" \| "4589546" \| "4744612" \| "4782619" \| "4874210" \| "4907703" \| "5046789" \| "5137340" \| "5176435" \| "5191983" \| "5344024" \| "5399004" \| "5454634").PN. OR ("6050657").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 22:53 |
| S91 | 17 | ("3131829" \| "3429632" \| "3552579" \| "3707023" \| "4062302" \| "4239306" \| "5246284").PN. OR ("5454634").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 22:55 |

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| S92 | 55 | ("0511617" \| "1890000" \| "2492697" \| "2557630" \| "2807387" \| "3203744" \| "3283915" \| "3514170" \| "3743372" \| "3758181" \| "3918781" \| "3999818" \| "4026615" \| "4056295" \| "4120549").PN. OR ("4243279").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 22:59 |
| S93 | 45 | ("2593998" \| "2653072" \| "2730423" \| "3131829" \| "3219400" \| "3514170" \| "3552817" \| "3563624" \| "3743372" \| "3814489").PN. OR ("3999818").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 23:03 |
| S94 | 14 | ("2593998").URPN. | USPAT | OR | OFF | 2018/04/05 23:06 |
| S95 | 52 | ("4081061" \| "4621716" \| "5316159" \| "6213266" \| "6213267" \| "7976024" \| "1084360" \| "3749273" \| "4570799" \| "4995436" \| "5779051" \| "D447944" \| "3103278" \| "3374917" \| "5000713" \| "6585090" \| "5098328" \| "D359315" \| "20030132184" \| "20050199459" \| "4813542" \| "0480709" \| "5062539" \| "5186290" \| "6276550" \| "D346627" \| "5310071" \| "20040222059" \| "3583590" \| "3836043" \| "4287997" \| "4656840" \| "5167336" \| "5392945" \| "6257381" \| "20040000458" \| "4573595" \| "7644828" \| "D483200" \| "7648407" \| "3811747" \| "20010027902" \| "5099968" \| "5485920" \| "5709304" \| "5735422" \| "3346137").PN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 23:14 |
| S96 | 22 | ("3131829" \| "3194426" \| "3338452" \| "4258847" \| "4328902" \| "4428479" \| "5016946" \| "5050755" \| "5310071" \| "5316159" \| "5503288" \| "5845790").PN. OR ("6276550").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 23:16 |
| S97 | 41 | ("2454438" \| "2495132" \| "3131829" \| "3194426" \| "3297196" \| "3317081" \| "3343705" \| "3404805" \| "3851936" \| "4192422").PN. OR ("4328902").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 23:18 |
| S98 | 43 | ("1092651" \| "2565969" \| "2891639" \| "3028207" \| "3032381" \| "3506321").PN. OR ("3974898").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 23:29 |
| S99 | 11 | ("0907507" \| "1626482" \| "2343525" \| "3974898" \| "4065014").PN. OR ("4423687").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/05 23:30 |
| S100 | 32 | ("3481502").URPN. | USPAT | OR | OFF | 2018/04/05 23:38 |
| S101 | 8 | (("1112943") or ("2255513") or ("2849151") or ("3371816")).PN. | USPAT; USOCR | OR | OFF | 2018/04/05 23:41 |

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|---|---|---|---|---|---|---|
| S102 | 16 | ("2849151").URPN. | USPAT | OR | OFF | 2018/04/05 23:41 |
| S103 | 8 | (("0993866") or ("1342909") or ("1514512") or ("1640368")).PN. | USPAT; USOCR | OR | OFF | 2018/04/05 23:42 |
| S104 | 21 | ("1112943").URPN. | USPAT | OR | OFF | 2018/04/05 23:43 |
| S105 | 16 | ("2849151").URPN. | USPAT | OR | OFF | 2018/04/06 12:32 |
| S106 | 8 | (("0993866") or ("1342909") or ("1514512") or ("1640368")).PN. | USPAT; USOCR | OR | OFF | 2018/04/06 12:33 |
| S107 | 22 | ("879455").URPN. | USPAT | OR | OFF | 2018/04/06 12:34 |
| S108 | 16 | ("2849151").URPN. | USPAT | OR | OFF | 2018/04/06 13:10 |
| S109 | 8 | (("0993866") or ("1342909") or ("1514512") or ("1640368")).PN. | USPAT; USOCR | OR | OFF | 2018/04/06 13:11 |
| S110 | 37 | ("3899229" \| "4431237" \| "4519655" \| "4828341" \| "4889254" \| "5191983").PN. OR ("5469961").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/06 13:11 |
| S111 | 25 | ("20030155267" \| "20050224494" \| "20080308641" \| "20090139892" \| "20090178989" \| "20090236255" \| "2634020" \| "3182856" \| "3387732" \| "3581928" \| "4351448" \| "5353948" \| "5469961" \| "5606820" \| "5699925" \| "5755180" \| "6761266" \| "6959507" \| "7246718").PN. OR ("8677661").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/06 13:12 |
| S112 | 24 | ("1226708" \| "2833137" \| "2834121" \| "2843943" \| "3139744" \| "3220229" \| "3545235" \| "3824813" \| "4507942" \| "4551996" \| "4663948" \| "4680948" \| "4821535" \| "4972687" \| "4989426" \| "5469961" \| "5653416").PN. OR ("5951130").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/06 13:13 |
| S113 | 118 | (US-20130127129-$ or US-20110155613-$ or US-20110139665-$ or US-20040195793-$ or US-20020000440-$ or US-20120292213-$ or US-20070012694-$ or US-20150336710-$ or US-20020134700-$ or US-20100270764-$ or US-20100000893-$ or US-20050062244-$ or US-20040183266-$ or US-20020014488-$ or US-20020113386-$ or US-20030196860-$ or US-20170259956-$ or US-20160144500-$ or US-20160130034-$ or US-20150274362-$ or US-20110168599-$ or US-20090178989-$ or US-20100219193-$ or US-20060254946-$ or US-20070068757- | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/06 18:03 |

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| | | $ or US-20090178946-$).did. or (US-20050199459-$ or US-20080308369-$ or US-20050077136-$).did. or (US-7503569-$ or US-9022234-$ or US-8875888-$ or US-8657307-$ or US-8590704-$ or US-3182856-$ or US-8459495-$ or US-7097036-$ or US-6193062-$ or US-9393684-$ or US-6637592-$ or US-D730088-$ or US-5833065-$ or US-5482162-$ or US-5244265-$ or US-4244509-$ or US-9643629-$ or US-7780026-$ or US-9132543-$ or US-8567796-$ or US-8226092-$ or US-8201837-$ or US-8132819-$ or US-7997594-$ or US-3010775-$ or US-9669930-$).did. or (US-4813542-$ or US-6585090-$ or US-6085925-$ or US-D776106-$ or US-6839238-$ or US-9609964-$ or US-7152752-$ or US-9506489-$ or US-3944282-$ or US-5241765-$ or US-4389078-$ or US-1849659-$ or US-4405057-$ or US-9802741-$ or US-8851287-$ or US-8763836-$ or US-8561769-$ or US-D808164-$ or US-9550605-$ or US-4887731-$ or US-9738198-$ or US-7537119-$ or US-8813960-$ or US-9669968-$ or US-6024223-$ or US-1665238-$ or US-D333094-$).did. or (US-3376046-$ or US-4832200-$ or US-D364558-$ or US-3419184-$ or US-3117692-$ or US-8684222-$ or US-2328689-$ or US-4287997-$ or US-5628443-$ or US-9888752-$ or US-9027722-$ or US-4673070-$ or US-7526842-$ or US-5465839-$ or US-9724820-$ or US-4863222-$ or US-3743372-$ or US-6050657-$ or US-5454634-$ or US-3851936-$ or US-5602721-$ or US-3999818-$ or US-5271515-$ or US-4243279-$ or US-6276550-$ or US-4328902-$ or US-7350648-$).did. or (US-5407074-$ or US-3481502-$ or US-2849151-$ or US-3616943-$ or US-5469961-$ or US-8677661-$ or US-5951130-$).did. or (US-3117692-$ or US-2593998-$).did. | | | | |
| S115 | 286 | B65D21/0223.cpc. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/06 18:05 |

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|---|---|---|---|---|---|---|
| S116 | 226 | B65D21/0224.cpc. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/06 18:05 |
| S117 | 2,198 | B25H3/021,022,023,04,06.cpc. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/06 18:07 |
| S118 | 436 | A47B47/00.cpc. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/06 18:10 |
| S119 | 1,076 | A47B87/02,007,0276.cpc. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/06 18:10 |
| S120 | 550 | A47B67/04.cpc. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/06 18:11 |
| S121 | 770 | Y10T403/7045.cpc. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/06 18:12 |
| S122 | 9 | ("7451578" \| "6209278" \| "4599841" \| "6363677" \| "6955020" \| "7040068" \| "6588166" \| "6804926" \| "6658808").PN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/06 18:14 |
| S123 | 102 | ("0890436" \| "2740167" \| "3310919" \| "3988187" \| "5295341" \| "5630304" \| "6023907" \| "1854396" \| "2381469" \| "20030029116" \| "3040388" \| "3192574" \| "3347048" \| "3526420" \| "4599841" \| "6098365" \| "5899038" \| "20020112433" \| "20030029115" \| "2381469" \| "3673751" \| "4599841" \| "4819932" \| "5086599" \| "5363616" \| "6029416" \| "6216409" \| "6324809" \| "6546691" \| "6606834" \| "6647690" \| "20030029115" \| "3902291" \| "5295341" \| "5630304" \| "6421970" \| "6763643" \| "0753791" \| "20030029116" \| "2430200" \| "3579941" \| "5283102" \| "6209278" \| "6647690" \| "6854235" \| "20030024201" \| "3579941" \| "3673751" \| "4426820" \| "4741136" \| "5860267" \| "6023907" \| "6122879" \| "6769835" \| "0338653" \| "1776188" \| "1854396" \| "20030024201" \| "3172508" \| "3175476" \| "3902291" \| "4094090" \| "5706621" \| "6122879" \| "6397548" \| "2740167" \| "20020112433" \| "3175476" \| "4416097" \| "5797237" \| "6029416" \| "6182410" \| "6397548" \| "0890436" \| "0623562" \| "3040388" \| "3192574" \| "3347048" \| "4426820" \| "5860267" \| "6098365" \| "6490836" \| "20050210810" \| "3310919" \| "4819932" \| "5086599" \| "5283102" \| | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/06 18:15 |

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| S124 | 373 | ("2740167").URPN. | USPAT | OR | OFF | 2018/04/06 18:16 |
| S125 | 477 | ("0087853" \| "0108068" \| "0124228" \| "0213740" \| "0274354" \| "0316176" \| "0634581" \| "0861911" \| "1194636" \| "1723306" \| "1743492" \| "1809393" \| "1902716" \| "20010024707" \| "20020031646" \| "20020069611" \| "20020092263" \| "20020170258" \| "20020170259" \| "20020178674" \| "20020178680" \| "20020189190" \| "20020194807" \| "20030009971" \| "20030024199" \| "20030037504" \| "20030084636" \| "20030094230" \| "20030101681" \| "20030145549" \| "20030180091" \| "20030188504" \| "20030196405" \| "20040016196" \| "20040031227" \| "20040049999" \| "20040060255" \| "20040068954" \| "20040123548" \| "20040128934" \| "20040139676" \| "20040139678" \| "20040159066" \| "20040168392" \| "20040177584" \| "20040182033" \| "20040182036" \| "20040200175" \| "20040211143" \| "20040244325" \| "20040250492" \| "20040261348" \| "20050003132" \| "20050028474" \| "20050050827" \| "20050160694" \| "20050166514" \| "20050205161" \| "20050210810" \| "20050235593" \| "20050252130" \| "20050268570" \| "20060053724" \| "20060070333" \| | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/06 18:17 |

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| S126 | 100 | ("2732706").URPN. | USPAT | OR | OFF | 2018/04/06 18:21 |
| S127 | 16 | (("1351133") or ("1459189") or ("1465421") or ("1652421") or ("1652305") or ("1667160") or ("2201110") or ("2460330")).PN. | USPAT; USOCR | OR | OFF | 2018/04/06 18:22 |
| S128 | 6 | (("0935402") or ("1925070") or ("2453918")).PN. | USPAT; USOCR | OR | OFF | 2018/04/06 18:23 |
| S129 | 3 | ("3351366").URPN. | USPAT | OR | OFF | 2018/04/06 18:39 |

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| S132 | 7 | ("20100314271" \| "8991599" \| "5799787" \| "7686180" \| "8695795" \| "8991599" \| "20100314271" \| "5797508" \| "3862689").PN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/06 18:46 |
| S133 | 2 | ("20080236562" \| "7723655").PN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/06 18:47 |
| S134 | 6 | (matthew near3 vargo).inv. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/06 18:49 |
| S135 | 75 | (Hoppe near2 Christopher).inv. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/06 18:49 |
| S136 | 14 | B65D25/2823.cpc. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/06 18:54 |
| S137 | 351 | B65D25/06.cpc. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/06 18:54 |
| S138 | 73 | (Milwaukee adj Electric).as. and (stack box) | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/06 19:01 |
| S139 | 8 | (Milwaukee adj Electric).as. and ("220" "206" "215").clas. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/06 19:02 |

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| S140 | 8 | (Milwaukee and tool).as. and ("220" "206" "215").clas. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/06 19:02 |
| S141 | 84 | (Milwaukee and tool).as. and latch | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/06 19:03 |
| S142 | 37 | (Milwaukee and tool).as. and (stack stacked stacking) | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/06 19:04 |
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| S144 | 325 | B65D21/0212.cpc. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/06 19:09 |
| S145 | 27 | ("4212415" \| "4664283" \| "4823955" \| "4896926" \| "5246105").PN. OR ("5544751").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/06 19:11 |
| S146 | 44 | ("1699130" \| "2072672" \| "2551814" \| "2633285" \| "2736487" \| "3010638" \| "3361322" \| "3623650" \| "3632037" \| "3713579" \| "3905478" \| "3905541" \| "3921896" \| "4002261" \| "4023617" \| "4187977" \| "4230233" \| "4245773" \| "4251006" \| "4277015" \| "4291830" \| "4389013" \| "4482074" \| "4643314" \| "4685610" \| "4762270" \| "4763833" \| "4828894" \| "4884739" \| "4911356" \| "4948039" \| "4993623" \| "5038998" \| "5116290" \| "5190213").PN. OR ("5429260").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/06 19:12 |
| S147 | 0 | ("1140005").URPN. | USPAT | OR | OFF | 2018/04/06 19:30 |

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|---|---|---|---|---|---|---|
| S148 | 119 | ("1267650" \| "1999162" \| "3163268" \| "3379482" \| "3419184" \| "3425471" \| "3498689" \| "3642168" \| "3700137" \| "3979016" \| "3987829" \| "4161261" \| "4293073" \| "4303158" \| "4523692" \| "4664347" \| "4799503" \| "4804092" \| "4819795" \| "4915913" \| "4982863" \| "4984687" \| "5011013" \| "5024471" \| "5040834" \| "5042674" \| "5065885" \| "5065887" \| "5080250" \| "5103994" \| "5117979" \| "5123564" \| "5176281" \| "5186330" \| "5190152" \| "5193706" \| "5244265" \| "5319937" \| "D237135" \| "D237611" \| "D238148" \| "D239695" \| "D246872" \| "D248280" \| "D257934" \| "D258721" \| "D277797" \| "D286937" \| "D292711" \| "D302774" \| "D312573" \| "D316516" \| "D319016" \| "D321090" \| "D321091" \| "D322164" \| "D325323" \| "D325324" \| "D326775" \| "D326815" \| "D327646" \| "D328425" \| "D328818" \| "D328819" \| "D329331" \| "D329747" \| "D330161" \| "D330162" \| "D330329" \| "D331317" \| "D335960" \| "D336366" \| "D339471" \| "D342364").PN. OR ("5564805").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/06 20:05 |
| S149 | 62 | ("0198092" \| "0564782" \| "1063046" \| "1268124" \| "1740470" \| "1987822" \| "2011197" \| "2094805" \| "2122969" \| "2504722" \| "2759507" \| "2786500" \| "2791251" \| "2799306" \| "3018355" \| "3615087" \| "3746210" \| "3851756" \| "4061323" \| "4239195" \| "4256294" \| "4278243" \| "4303158" \| "4378828" \| "4460085" \| "4909491" \| "4911296" \| "5011013" \| "5117979" \| "5193706" \| "D253212" \| "D263533" \| "D288867").PN. OR ("5595228").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/06 22:03 |
| S150 | 15 | ("2587829" \| "2610761" \| "2740517" \| "4252239" \| "4733703" \| "5329929" \| "5595228").PN. OR ("6206063").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/06 22:04 |
| S151 | 6 | ("4466659" \| "4967944" \| "5207470" \| "6193118" \| "6554169" \| "7000810").PN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/07 00:38 |
| S152 | 96 | ("1032326" \| "1503894" \| "1926162" \| "2612200" \| "2629644" \| "2724595" \| "2735597" \| "2754079" \| "2979190" \| "3229946" \| "3640423" \| "3642168" \| "3664704" \| "3727971" \| "3759416" \| "3791547" \| "3854621" \| "3940009" \| "3987829" \| "4190281" \| "4213539" \| | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/07 00:38 |

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| | | "4215896" \| "4288011" \| "4403786" \| "4458570" \| "4488669" \| "4499998" \| "4522326" \| "4531774" \| "4580827" \| "4593816" \| "4623071" \| "4674665" \| "D259413" \| "D285673").PN. OR ("4967944").URPN. | | | | |
| S153 | 25 | ("2967080" \| "2987358" \| "4844305" \| "4967944" \| "5419476" \| "5667115").PN. OR ("5988473").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/07 00:40 |
| S154 | 10 | ("2987358").URPN. | USPAT | OR | OFF | 2018/04/07 00:41 |
| S155 | 4 | ("2009/0315285").URPN. | USPAT | OR | OFF | 2018/04/07 00:46 |
| S156 | 223 | ("5072918" \| "5390943" \| "5871219" \| "6739605" \| "0875476" \| "6086073" \| "4743040" \| "6109628" \| "1427388" \| "20040129658" \| "20050023786" \| "20050057011" \| "20060232033" \| "20060237091" \| "3472392" \| "3999775" \| "4699270" \| "4786122" \| "5072955" \| "5743607" \| "5876047" \| "6123346" \| "6545863" \| "7232136" \| "D396023" \| "6497423" \| "D153654" \| "2155769" \| "3313498" \| "3870177" \| "4391422" \| "4763799" \| "4923202" \| "4998023" \| "5509671" \| "5915646" \| "6073919" \| "6095156" \| "6170839" \| "6264216" \| "D188099" \| "D460235" \| "D461941" \| "D469235" \| "5921566" \| "D415867" \| "20030047895" \| "20030218308" \| "5183372" \| "5275349" \| "5465988" \| "5913528" \| "6276471" \| "6752281" \| "7114733" \| "7134673" \| "7144020" \| "4743040" \| "3379431" \| "4457527" \| "5316232" \| "5566961" \| "6572123" \| "D153654" \| "D415867" \| "6497423" \| "D485037" \| "20060066064" \| "3698735" \| "3908749" \| "4895068" \| "6138558" \| "6251113" \| "6267080" \| "6471010" \| "6497424" \| "7207449" \| "4901937" \| "5308012" \| "6270094" \| "D463646" \| "D474570" \| "D485410" \| "5921566" \| "D273242" \| "D474570" \| "1149639" \| "2413164" \| "2575661" \| "2819908" \| "20050001395" \| "20060006621" \| "20060157944" \| "4099735" \| "4688860" \| "5048857" \| "5224531" \| "5452908" \| "7017603" \| "7156475" \| "7204374" \| "7296808" \| "5887878" \| "1126544" \| "2705114" \| "20050280228" \| "20050284697" \| "5285981" \| "6116533" \| | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/07 00:50 |

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|---|---|---|---|---|---|---|
| | | "D302064" \| "D361187" \| "D381168" \| "D424321" \| "D487604" \| "D504000" \| "D469235" \| "1200008" \| "1471446" \| "1562089" \| "2623642" \| "2845780" \| "20010045718" \| "20020084607" \| "20020096844" \| "20060076306" \| "3965969" \| "4138504" \| "4165088" \| "4373761" \| "4880248" \| "6539831" \| "7044569" \| "5154544" \| "20040065989" \| "20040227315" \| "3212645" \| "4179080" \| "4759560" \| "5188308" \| "5362078" \| "5495951" \| "5687928" \| "5839739" \| "5971512" \| "6497423" \| "6669214" \| "D336183" \| "D471687" \| "6086073" \| "D302064" \| "D336183" \| "20020060438" \| "20040056439" \| "20060208440" \| "4518208" \| "4832355" \| "5221132" \| "5375860" \| "5873585" \| "6022088" \| "6101831" \| "6206385" \| "D140635" \| "4380293" \| "6109437" \| "3610431" \| "4743040" \| "5269545" \| "5848798" \| "6241181" \| "6315376" \| "D391032" \| "D395108" \| "D403826" \| "D468881" \| "D471688" \| "D485037" \| "20030122331" \| "4923202" \| "1487856" \| "20030107195" \| "3606445" \| "3873114" \| "5011240" \| "5634649" \| "5716116" \| "5941229" \| "6578938" \| "6783563" \| "6910710" \| "D469235" \| "4815394" \| "1660521" \| "3759538" \| "4564152" \| "4585130" \| "5016948" \| "5123666" \| "5595395" \| "6102497" \| "6109628" \| "6322061" \| "6615973" \| "D361188" \| "D153654" \| "1649065" \| "20020064478" \| "20030121874" \| "20050127627" \| "3722700" \| "4019793" \| "5282678" \| "6857644" \| "D147135").PN. | | | | |
| S157 | 18 | ("1193809" \| "1268124" \| "1521310" \| "3696850" \| "4724976" \| "4756394" \| "4787488" \| "5209279" \| "5219423" \| "5314046" \| "5971119" \| "0622263" \| "0695149").PN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/07 00:56 |
| S158 | 31 | ("0783059" \| "2878928" \| "3245528" \| "3319685" \| "3386607" \| "3605374" \| "3835992" \| "3992810" \| "4320846" \| "4627595" \| "4799590" \| "4890741" \| "5135823" \| "5370255").PN. OR ("5676274").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/07 16:50 |
| S159 | 26 | ("1101357" \| "1149266" \| "1862868" \| "2702116" \| "3145871" \| "4154362" \| | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/07 16:53 |

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|---|---|---|---|---|---|---|
| | | "4503955" \| "4705316" \| "4896926" \| "4998616").PN. OR ("5415255").URPN. | | | | |
| S160 | 37 | ("3182856" \| "3565146" \| "4951812" \| "4998616" \| "5036980" \| "5040681" \| "5060851" \| "5117979").PN. OR ("5325966").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/07 16:55 |
| S161 | 6 | ("3412888" \| "4204609" \| "5409126" \| "5499715" \| "5769229").PN. OR ("6467681").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/07 17:17 |
| S162 | 173 | (US-20130127129-$ or US-20110155613-$ or US-20110139665-$ or US-20040195793-$ or US-20020000440-$ or US-20120292213-$ or US-20070012694-$ or US-20150336710-$ or US-20020134700-$ or US-20100270764-$ or US-20100000893-$ or US-20050062244-$ or US-20040183266-$ or US-20020014488-$ or US-20020113386-$ or US-20030196860-$ or US-20170259956-$ or US-20160144500-$ or US-20160130034-$ or US-20150274362-$ or US-20110168599-$ or US-20090178989-$ or US-20100219193-$ or US-20060254946-$ or US-20070068757-$ or US-20090178946-$).did. or (US-20050199459-$ or US-20080308369-$ or US-20050077136-$ or US-20080104921-$ or US-20160153200-$ or US-20080134613-$ or US-20080134607-$ or US-20070193178-$ or US-20170266804-$ or US-20140075650-$ or US-20090145866-$ or US-20170217464-$ or US-20170174392-$ or US-20170166352-$ or US-20160023349-$ or US-20140166516-$ or US-20120326406-$ or US-20110121695-$ or US-20070194543-$ or US-20070170671-$ or US-20110049824-$ or US-20130056378-$ or US-20120312812-$ or US-20120187013-$ or US-20120080432-$ or US-20120061930-$ or US-20050280228-$).did. or (US-20060027475-$ or US-20050155889-$ or US-20160168880-$).did. or (US-7503569-$ or US-9022234-$ or US-8875888-$ or US-8657307-$ or US-8590704-$ or US-3182856-$ or US-8459495-$ or US-7097036-$ or US-6193062-$ or US-9393684-$ or US-6637592-$ or US-D730088-$ or US-5833065-$ or US-5482162-$ or US-5244265-$ or US-4244509-$ or US-9643629-$ or US-7780026-$ or US-9132543-$ or US-8567796-$ or US- | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/09 01:25 |

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|---|---|---|---|---|---|---|
| | | 8226092-$ or US-8201837-$ or US-8132819-$ or US-7997594-$ or US-3010775-$ or US-9669930-$).did. or (US-4813542-$ or US-6585090-$ or US-6085925-$ or US-D776106-$ or US-6839238-$ or US-9609964-$ or US-7152752-$ or US-9506489-$ or US-3944282-$ or US-5241765-$ or US-4389078-$ or US-1849659-$ or US-4405057-$ or US-9802741-$ or US-8851287-$ or US-8763836-$ or US-8561769-$ or US-D808164-$ or US-9550605-$ or US-4887731-$ or US-9738198-$ or US-7537119-$ or US-8813960-$ or US-9669968-$ or US-6024223-$ or US-1665238-$ or US-D333094-$).did. or (US-3376046-$ or US-4832200-$ or US-D364558-$ or US-3419184-$ or US-3117692-$ or US-8684222-$ or US-2328689-$ or US-4287997-$ or US-5628443-$ or US-9888752-$ or US-9027722-$ or US-4673070-$ or US-7526842-$ or US-5465839-$ or US-9724820-$ or US-4863222-$ or US-3743372-$ or US-6050657-$ or US-5454634-$ or US-3851936-$ or US-5602721-$ or US-3999818-$ or US-5271515-$ or US-4243279-$ or US-6276550-$ or US-4328902-$ or US-7350648-$).did. or (US-5407074-$ or US-3481502-$ or US-2849151-$ or US-3616943-$ or US-5469961-$ or US-8677661-$ or US-5951130-$ or US-7451578-$ or US-6122879-$ or US-3526420-$ or US-2740167-$ or US-9803375-$ or US-9663940-$ or US-7841144-$ or US-9616562-$ or US-5544751-$ or US-5429260-$ or US-7946609-$ or US-6578708-$ or US-6176559-$ or US-5927837-$ or US-5564805-$ or US-5595228-$ or US-6206063-$ or US-7000810-$ or US-4967944-$ or US-5988473-$).did. or (US-6641013-$ or US-2987358-$ or US-4576423-$ or US-4756394-$ or US-4896926-$ or US-5325966-$ or US-5697500-$ or US-6467681-$).did. or (US-3117692-$ or US-2593998-$).did. | | | | |
| S163 | 3 | (("20170166352") or ("20110139665") or ("5628443")).PN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/09 01:26 |

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|---|---|---|---|---|---|---|
| S164 | 28 | (US-20170166352-$ or US-20110139665-$ or US-20170266804-$ or US-20170217464-$ or US-20170174392-$ or US-20160168880-$ or US-20160144500-$ or US-20160130034-$ or US-20140166516-$ or US-20120326406-$ or US-20100219193-$ or US-20090145866-$ or US-20070194543-$ or US-20070068757-$ or US-20060254946-$ or US-20060027475-$).did. or (US-5628443-$ or US-9132543-$ or US-9506489-$ or US-8813960-$ or US-8677661-$ or US-8459495-$ or US-8132819-$ or US-6641013-$ or US-6085925-$ or US-5988473-$ or US-5595228-$ or US-3117692-$).did. | US-PGPUB; USPAT | OR | OFF | 2018/04/09 01:36 |
| S165 | 7 | (("5240264") or ("7503569") or ("20020000440") or ("20040195793") or ("20110139665") or ("20110155613") or ("20130127129")).PN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/09 01:37 |
| S166 | 27 | S164 not S165 | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/04/09 01:37 |
| S167 | 1 | ("2011/0139665").URPN. | USPAT | OR | OFF | 2018/11/21 18:13 |
| S168 | 56 | ("1932429" \| "20060016811" \| "20060070906" \| "20060237341" \| "20070080089" \| "20080110190" \| "20080112782" \| "20080121253" \| "20080128414" \| "20090178989" \| "20090184021" \| "20110139665" \| "2178091" \| "2259041" \| "5271515" \| "5429260" \| "5531517" \| "5544751" \| "5549241" \| "5860527" \| "6062388" \| "6581772" \| "6880705" \| "6991106" \| "7044483" \| "7063210" \| "7516854" \| "7661549" \| "8342329" \| "8640871" \| "8973811" \| "8997993" \| "9056694" \| "9101212" \| "D277532" \| "D277723" \| "D277819" \| "D347130" \| "D385306" \| "D406478" \| "D470641" \| "D529755" \| "D538571" \| "D543030" \| "D589723" \| "D590021" \| "D645902" \| "D654726" \| "D664034" \| "D689718" \| "D709716" \| "D773217" \| "D781625").PN. OR ("D815471").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/11/21 18:13 |
| S169 | 5 | (("20160144500") or ("0784114") or ("20110073516") or ("20150274362")).PN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/11/21 18:16 |

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|---|---|---|---|---|---|---|
| S170 | 4 | (("20160144500") or ("7841144") or ("20110073516") or ("20150274362")).PN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/11/21 18:17 |
| S171 | 554 | ("0124228" \| "0213740" \| "0714987" \| "0753791" \| "1124228" \| "1194636" \| "1371856" \| "1407679" \| "1454250" \| "1468288" \| "1477813" \| "1510924" \| "1540128" \| "1575821" \| "1602256" \| "1602267" \| "1615096" \| "1622103" \| "1622104" \| "1637634" \| "1644710" \| "1660480" \| "1714738" \| "1718702" \| "1723306" \| "1734826" \| "1743492" \| "1764331" \| "1778069" \| "1787027" \| "1790178" \| "1809393" \| "1823039" \| "1859667" \| "1898364" \| "1902716" \| "1906411" \| "1925070" \| "1929871" \| "1940377" \| "1953306" \| "1986739" \| "1988201" \| "1995264" \| "20010029720" \| "20020007608" \| "20020007609" \| "20020014047" \| "20020020127" \| "20020031646" \| "20020046528" \| "20020056245" \| "20020069611" \| "20020083673" \| "20020092263" \| "20020100231" \| "20020160610" \| "20020178673" \| "20020178674" \| "20020178682" \| "20030009971" \| "20030009972" \| "20030024199" \| "20030033777" \| "20030033784" \| "20030037504" \| "20030041545" \| "20030084636" \| "20030101674" \| "20030101681" \| "20030115812" \| "20030115821" \| "20030180091" \| "20030188504" \| "20030196405" \| "20030221387" \| "20030233809" \| "20040016196" \| "20040031227" \| "20040035078" \| "20040035079" \| "20040060255" \| "20040068954" \| "20040115921" \| "20040139678" \| "20040168392" \| "20040177584" \| "20040182036" \| "20040200175" \| "20040206036" \| "20040211143" \| "20040241374" \| "20040255541" \| "20050034404" \| "20050034405" \| "20050097860" \| "20050102937" \| "20050108970" \| "20050138881" \| "20050160694" \| "20050161468" \| "20050166516" \| "20050193677" \| "20050208255").PN. OR ("20050210810" \| "20050235593" \| "20050252130" \| "20050268570" \| "20060032168" \| "20060048474" \| "20060070333" \| "20060073320" \| "20060075713" \| | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/11/21 18:17 |

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| | | "20060101769" \| "20060117696" \| "20060179773" \| "20060196139" \| "20060236642" \| "20060260254" \| "20060283127" \| "20070006543" \| "20070028547" \| "20070119110" \| "20070151189" \| "20070193178" \| "20080000186" \| "20080010931" \| "20080010937" \| "20080028707" \| "20080034708" \| "20080066415" \| "20080104921" \| "20080110125" \| "20080134607" \| "20080134613" \| "20080134614" \| "20080295432" \| "20090193748" \| "2015813" \| "2026511" \| "2044216" \| "2088238" \| "2089075" \| "2204675" \| "2266464" \| "2276071" \| "2303745" \| "2324628" \| "2398632" \| "2430200" \| "2495862" \| "2596280" \| "2732706" \| "2740167" \| "2780253" \| "2851740" \| "2865058" \| "2894292" \| "2947040" \| "3023681" \| "3045294" \| "3100556" \| "3120083" \| "3125138" \| "3182769" \| "3200553" \| "3203149" \| "3247638" \| "3267630" \| "3282010" \| "3301147" \| "3310919" \| "3347048" \| "3377931" \| "3378958" \| "3387422" \| "3436888" \| "3460304" \| "3481810" \| "3508523" \| "3512324" \| "3517927" \| "3526071" \| "3526420" \| "3535844" \| "3538665" \| "3548559" \| "3553919" \| "3554850" \| "3555762" \| "3572224" \| "3579941" \| "3694983" \| "3714747" \| "3731445" \| "3742669" \| "3759007" \| "3768846" \| "3786608" \| "3842562" \| "3849235" \| "3857749" \| "3859000" \| "3902293" \| "3908053" \| "3919820" \| "3936551" \| "3988187" \| "4037377" \| "4082129" \| "4084996" \| "4090338" \| "4099358" \| "4100710" \| "4107892" \| "4113399" \| "4169688").PN. OR ("4196554" \| "4227430" \| "4242390" \| "4299070" \| "4304083" \| "4426820" \| "4471012" \| "4489115" \| "4501102" \| "4561233" \| "4567706" \| "4599841" \| "4612074" \| "4612745" \| "4641469" \| "4643237" \| "4646494" \| "4648165" \| "4653242" \| "4703597" \| "4715162" \| "4716700" \| "4738071" \| "4769963" \| "4819932" \| "4822440" \| "4831806" \| "4845907" \| "4905442" \| "5029425" \| "5113632" \| "5117603" \| "5148850" \| "5165816" \| "5179812" \| "5182892" \| "5216861" \| "5247773" \| "5253464" \| "5271564" \| "5286545" \| "5295341" \| "5344700" \| | | | |

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| | | "5349796" \| "5390457" \| "5433806" \| "5465546" \| "5474831" \| "5497589" \| "5502939" \| "5540025" \| "5560569" \| "5567497" \| "5570554" \| "5597024" \| "5598682" \| "5613894" \| "5618602" \| "5630304" \| "5634309" \| "5653099" \| "5671575" \| "5695875" \| "5706621" \| "5755068" \| "5768850" \| "5797237" \| "5823240" \| "5827592" \| "5860267" \| "5899038" \| "5900099" \| "5925211" \| "5935668" \| "5943239" \| "5968625" \| "5987839" \| "6006486" \| "6023907" \| "6029416" \| "6052960" \| "6094882" \| "6101778" \| "6119423" \| "6134854" \| "6148884" \| "6173548" \| "6182410" \| "6203653" \| "6205639" \| "6209278" \| "6216403" \| "6216409" \| "6247285" \| "6314701" \| "6324803" \| "6332733" \| "6339908" \| "6345481" \| "6358842" \| "6363677" \| "6385936" \| "6397547" \| "6421970" \| "6438919" \| "6446405" \| "6446413" \| "6490836" \| "6497079" \| "6505452" \| "6510665" \| "6516579" \| "6526719" \| "6532709" \| "6536178" \| "6553724" \| "6584747" \| "6591568" \| "6601359" \| "6606834" \| "6647689" \| "6647690" \| "6670019" \| "6672030" \| "6684592").PN. OR ("6715253" \| "6722809" \| "6763643" \| "6769218" \| "6769219" \| "6854235" \| "6862857" \| "6874292" \| "6933043" \| "7003924" \| "7003925" \| "7022189" \| "7040068" \| "7051486" \| "7275350" \| "7377081" \| "7568322" \| "7584583" \| "7614197").PN. OR ("7841144").URPN. | | | | |
| S172 | 969 | Y10S292/38,53.cpc. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/11/21 18:25 |
| S173 | 35 | E04F2201/013.cpc. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/11/21 18:25 |
| S174 | 1,351 | E04F2201/0146,023,05.cpc. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/11/21 18:26 |
| S175 | 514 | B25H3/02.cpc. | USPAT | OR | OFF | 2018/11/21 18:45 |
| S176 | 1,041 | B25H3/02.cpc. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/11/21 18:45 |

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|---|---|---|---|---|---|---|
| S177 | 165 | B25H3/021.cpc. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/11/21 18:45 |
| S178 | 0 | ("2018/0213934").URPN. | USPAT | OR | OFF | 2018/11/21 18:46 |
| S179 | 369 | A47B88/90.cpc. | USPAT | OR | OFF | 2018/11/21 18:46 |
| S180 | 81 | A47B2210/19.cpc. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/11/21 18:47 |
| S181 | 29 | ("2614016" \| "2676080" \| "3001564" \| "3079037" \| "3974898" \| "4040538" \| "4119204" \| "4239309" \| "4287997" \| "4293072" \| "4865404" \| "5190156").PN. OR ("5407074").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/11/21 18:50 |
| S182 | 27 | ("0224486" \| "1472676" \| "2975930" \| "3159436" \| "3424334" \| "3506321" \| "3584738" \| "3737031" \| "4155452").PN. OR ("4293072").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/11/21 18:51 |
| S183 | 48 | ("3506321").URPN. | USPAT | OR | OFF | 2018/11/21 18:54 |
| S184 | 46 | ("1092651" \| "2565969" \| "2891639" \| "3028207" \| "3032381" \| "3506321").PN. OR ("3974898").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/11/21 18:56 |
| S185 | 520 | B65D21/0204.cpc. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/11/21 19:01 |
| S186 | 868 | A47B87/02.cpc. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/11/21 19:02 |
| S187 | 2,232 | 312/107,111.ccls. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/11/21 19:02 |
| S188 | 703 | A47B88/90.cpc. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/11/21 19:15 |
| S189 | 50 | (("BRUNNER") near3 ("Yaron")).INV. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/11/21 19:23 |
| S190 | 34 | ("0455883" \| "0484121" \| "0918297" \| "20060175945" \| "20100052276" \| "20110279956" \| "20120086319" \| "20130134850" \| "2341434" \| "2431830" \| "2441728" \| "3058320" \| "3135570" \| "3326203" \| "3712697" \| "4590709" \| "5011240" \| "5026130" \| "5048902" \| "5145245" \| "5673984" \| "6068356" \| | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/11/21 19:24 |

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|---|---|---|---|---|---|---|
| | | "6164738" \| "8201900" \| "D322875").PN. OR ("9872562").URPN. | | | | |
| S191 | 45 | ("1223455" \| "2123803" \| "2704699" \| "3272581" \| "3316045" \| "3796474" \| "4155611" \| "4505526" \| "4577773" \| "4848588" \| "5205595" \| "5246105" \| "5299688" \| "5344226" \| "5358321" \| "5426885").PN. OR ("5603559").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/11/21 19:27 |
| S192 | 36 | ("1253546" \| "1619761" \| "1857640" \| "2004900" \| "3133771" \| "3409162" \| "3529878" \| "3606506" \| "3729242" \| "3758181").PN. OR ("5246105").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/11/21 19:28 |
| S193 | 16 | ("20080000899" \| "20120312812" \| "20130127129" \| "3379482" \| "3811559" \| "4118048" \| "4619363" \| "5125697" \| "5904269" \| "6082539" \| "6371320" \| "6874634" \| "6889838" \| "7387350" \| "7516842").PN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/11/21 20:02 |
| S194 | 75 | ("0440957" \| "1933637" \| "2511949" \| "2789828" \| "2981549" \| "3055723" \| "3349924" \| "3379482" \| "3891230" \| "3905662").PN. OR ("4118048").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/11/21 20:03 |
| S195 | 45 | ("0273398" \| "0325555" \| "0825642" \| "0953715" \| "0953815" \| "1143711" \| "1365098" \| "1495046" \| "1611034" \| "2055657" \| "2565969" \| "2714433" \| "3828899" \| "3891230" \| "3974898" \| "3987875" \| "4066155" \| "4118048" \| "4139084" \| "4202586" \| "4389078" \| "4693345").PN. OR ("4813521").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/11/21 20:04 |
| S196 | 29 | ("2472491" \| "2925283" \| "3057636").PN. OR ("3891230").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/11/21 20:05 |
| S197 | 143 | ("0344661" \| "0687619" \| "1424819" \| "20010052681" \| "20020014488" \| "20020067027" \| "20020074905" \| "20020113386" \| "20020185831" \| "20030001348" \| "20030146589" \| "20040265104" \| "20050062244" \| "20050104308" \| "20050258610" \| "20050275178" \| "20060006619" \| "20060012139" \| "20060038367" \| "20070080512" \| "20070194543" \| "20070273114" \| "20080084036" \| "20080121547" \| "20080128305" \| "20080143069" \| "20090020528" \| "20090026901" \| "20090096181" \| "20090309323" \| "20100052276" \| "20100290877" \| "20100327562" \| "20110049824" \| "20110181008" \| | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/11/21 20:05 |

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|---|---|---|---|---|---|---|
| | | "20120160886" \| "20120326406" \| "20140001719" \| "20140023221" \| "20140375181" \| "2554091" \| "2588830" \| "2901262" \| "2964328" \| "3168329" \| "3393951" \| "3734526" \| "3804432" \| "3891230" \| "3990653" \| "4169607" \| "4363496" \| "4448434" \| "4619363" \| "4884689" \| "4936594" \| "4984704" \| "5104135" \| "5123666" \| "5207723" \| "5333885" \| "5362078" \| "5378005" \| "5464104" \| "5474312" \| "5595395" \| "5626352" \| "5634649" \| "5720535" \| "5799958" \| "5845915" \| "5906381" \| "5913527" \| "5931483" \| "5934466" \| "5938396" \| "6000713" \| "6050660" \| "6079719" \| "6082539" \| "6109627" \| "6113129" \| "6123344" \| "6131926" \| "6135466" \| "6176559" \| "6254112" \| "6347847" \| "6357063" \| "6371320" \| "6394471" \| "6398235" \| "6474930" \| "6561528" \| "6601930" \| "6616152" \| "6659476" \| "6666465" \| "6874634" \| "6889838" \| "6945546" \| "7063339" \| "7066475" \| "7108131" \| "7168715" \| "7188846" \| "7188847" \| "7210689" \| "7263742" \| "7328905" \| "7367571" \| "7500681").PN. OR ("7503569" \| "7686260" \| "7703776" \| "7819407" \| "7823893" \| "7845653" \| "7883096" \| "7905502" \| "7938412" \| "8132819" \| "8226092" \| "8567796" \| "8657307" \| "8668209" \| "9132543" \| "D437484" \| "D542496" \| "D640869" \| "D653832" \| "D654241").PN. OR ("9566990").URPN. | | | | |
| S198 | 18 | ("2042387" \| "2528872" \| "3401420" \| "3891230" \| "4989291" \| "5915438" \| "6230361" \| "7000287").PN. OR ("7263742").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/11/21 20:07 |
| S199 | 37 | ("5013055" \| "5207723" \| "5378005").PN. OR ("5799958").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/11/21 20:08 |
| S201 | 2,395 | 280/47.26,47.28,652.ccls. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/11/21 20:09 |
| S202 | 1,975 | 280/47.26,47.28.ccls. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/11/21 20:10 |
| S203 | 518 | 280/652.ccls. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/11/21 20:10 |

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|---|---|---|---|---|---|---|
| S204 | 1 | "15826201" | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/11/22 00:33 |
| S205 | 12 | (US-0271616-$ \| US-0320243-$ \| US-1276744-$ \| US-1477050-$ \| US-15826201-$ \| US-20080308369-$ \| US-3616562-$ \| US-3875888-$).DID. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/11/22 03:39 |
| S206 | 2 | (("8875888") or ("9616562") or ("20080308369")).PN. | USPAT; USOCR | OR | OFF | 2018/11/22 03:40 |
| S207 | 3 | (("8875888") or ("9616562") or ("20080308369")).PN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/11/22 03:40 |
| S208 | 64 | ("20020113387" \| "20070194543" \| "20080079227" \| "20080084036" \| "20110049824" \| "3522955" \| "4118048" \| "4119044" \| "4281843" \| "5176281" \| "5193706" \| "5244265" \| "5378005" \| "5634649" \| "5641170" \| "5680932" \| "5799958" \| "5906381" \| "5938396" \| "5950828" \| "6131926" \| "6170839" \| "6176559" \| "6264220" \| "6347847" \| "6371320" \| "6601930" \| "6761366" \| "6817623" \| "7367571" \| "7467801" \| "7503569" \| "7628406" \| "7845653" \| "7883096" \| "7938412" \| "D404916" \| "D437484" \| "D462168" \| "D462170").PN. OR ("8132819").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/11/22 19:37 |
| S209 | 269 | ("20020014507" \| "20020043534" \| "20020074332" \| "20020125160" \| "20030075468" \| "20040112777" \| "20050109650" \| "20060017293" \| "20060124505" \| "20060144732" \| "20060201834" \| "20070137960" \| "20070194543" \| "20070241113" \| "20080017537" \| "20080035508" \| "20080035510" \| "20080067206" \| "20080152944" \| "20080164842" \| "20080169739" \| "20080230416" \| "20090080809" \| "20090211932" \| "20090236810" \| "20090250365" \| "20100012538" \| "20100012655" \| "20100033325" \| "20100224527" \| "20100258465" \| "20110084075" \| "20110094910" \| "20110132046" \| "20110174648" \| "20110268374" \| "20120018330" \| "20120152944" \| "20120206907" \| "20120257379" \| "20120267374" \| "20120292213" \| "20120312708" \| "20120317933" \| "20120318792" \| "20120326406" \| "20120326669" \| "20130007979" \| | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/11/22 19:39 |

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|---|---|---|---|---|---|---|
| | | "20130186795" \| "20140102928" \| "2125856" \| "2145143" \| "2799306" \| "2883184" \| "3177023" \| "3259411" \| "3394955" \| "3817419" \| "3851756" \| "3924844" \| "4105112" \| "4278187" \| "4353182" \| "4890414" \| "5042193" \| "5165148" \| "5295742" \| "5379887" \| "5386907" \| "5429287" \| "5470000" \| "5501379" \| "5518139" \| "5562208" \| "5580137" \| "5595228" \| "5620212" \| "5660276" \| "5672145" \| "5732987" \| "5755311" \| "5762411" \| "5915553" \| "5915554" \| "5924533" \| "6006906" \| "6015064" \| "6038747" \| "6073766" \| "6081695" \| "6082538" \| "6167680" \| "6176559" \| "6203075" \| "6206063" \| "6213296" \| "6230887" \| "6244485" \| "6244486" \| "6343708" \| "6343815" \| "6347847" \| "6371320" \| "6405864" \| "6415924" \| "6478463" \| "6502882" \| "6527309").PN. OR ("6533138" \| "6561402" \| "6614337" \| "6622856" \| "6675965" \| "6675967" \| "6695142" \| "6698609" \| "6722524" \| "6755302" \| "6755448" \| "6761366" \| "6789670" \| "6860059" \| "6915902" \| "6955381" \| "6978890" \| "7008031" \| "7021637" \| "7048133" \| "7108131" \| "7121407" \| "7158376" \| "7225923" \| "7228983" \| "7237673" \| "7237688" \| "7246704" \| "7316309" \| "7322470" \| "7326428" \| "7334680" \| "7357250" \| "7357268" \| "7367451" \| "7370891" \| "7401698" \| "7401700" \| "7418846" \| "7540364" \| "7552560" \| "7552950" \| "7600640" \| "7661530" \| "7837053" \| "7845653" \| "7854321" \| "7874328" \| "7883096" \| "7938412" \| "7984820" \| "8056943" \| "8061536" \| "8132819" \| "8152037" \| "8191910" \| "8210387" \| "8267245" \| "8267247" \| "8272628" \| "8327576" \| "8328247" \| "8376177" \| "8434617" \| "8469195" \| "8505729" \| "8657307" \| "D259154" \| "D272203" \| "D309981" \| "D326815" \| "D333215" \| "D333487" \| "D347731" \| "D355849" \| "D368159" \| "D370619" \| "D374772" \| "D375834" \| "D377118" \| "D378247" \| "D385110" \| "D386903" \| "D390358" \| "D402106" \| "D405956" \| "D414038" \| "D418977" \| "D437684" \| "D447340" \| "D447630" \| "D448162" \| "D449442" \| "D449738" \| "D451275" \| "D452071" \| "D453624" \| "D455263" \| | | | |

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|---|---|---|---|---|---|---|
| | | "D459073" \| "D462168" \| "D465923" \| "D467070" \| "D470659" \| "D471360" \| "D472774" \| "D480867" \| "D505548" \| "D509656" \| "D516310" \| "D516808" \| "D516812" \| "D520746" \| "D563669" \| "D572479" \| "D572480" \| "D588811" \| "D589703" \| "D599112" \| "D600015" \| "D600912" \| "D601797" \| "D605403" \| "D608094" \| "D609911" \| "D609913").PN. OR ("D616200" \| "D618911" \| "D624317" \| "D627968" \| "D629607" \| "D630435" \| "D630851" \| "D635769" \| "D636996" \| "D637812" \| "D639554" \| "D641552" \| "D647301" \| "D648532" \| "D648533" \| "D649350" \| "D649783" \| "D661858" \| "D661903" \| "D664354" \| "D668867" \| "D668868" \| "D668869" \| "D670500" \| "D672555" \| "D673774" \| "D701696" \| "D744750" \| "D750890").PN. OR ("9539722").URPN. | | | | |
| S210 | 15 | ("2007/0194543").URPN. | USPAT | OR | OFF | 2018/11/22 19:40 |
| S211 | 56 | ("1478913" \| "20010035704" \| "20050159784" \| "20050269792" \| "20060006621" \| "20060144732" \| "20070194543" \| "20070235959" \| "20080128305" \| "20090301913" \| "20100289236" \| "20100295430" \| "20110127736" \| "20120292870" \| "20130118818" \| "3861703" \| "3874531" \| "4435115" \| "4726602" \| "4822116" \| "4846485" \| "4858940" \| "4976450" \| "4993551" \| "5174447" \| "5378005" \| "5452908" \| "5573089" \| "5743607" \| "5799958" \| "5893572" \| "6027128" \| "6170839" \| "6439585" \| "6446987" \| "6702168" \| "6935641" \| "6945546" \| "7044569" \| "7083174" \| "7314134" \| "7328905" \| "7431313" \| "7434819" \| "7503569" \| "7661685" \| "7905502" \| "8226092" \| "8376376" \| "8668209" \| "D182716").PN. OR ("8915504").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/11/22 19:40 |
| S212 | 2 | ("2012/0292870").URPN. | USPAT | OR | OFF | 2018/11/22 19:41 |
| S213 | 52 | ("6264083" \| "6666362" \| "7204374" \| "20120247044" \| "4249684" \| "6264220" \| "6935641" \| "7048320" \| "7165702" \| "20040194333" \| "20040251227" \| "20070210021" \| "20100300996" \| "20120199708" \| "4944416" \| "7487981" \| "6615973" \| "6786374" \| "20070137532" \| | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/11/22 19:46 |

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|---|---|---|---|---|---|---|
| | | "5628534" \| "7017254" \| "6932406" \| "20040051016" \| "20050006539" \| "20080296245" \| "7740329" \| "20060021985" \| "5913380" \| "6736265" \| "20020100396" \| "20120131872" \| "3610429" \| "6629654" \| "4535897" \| "6581920" \| "20110107704" \| "0332360" \| "5406894" \| "6474245" \| "20050269792" \| "5582269" \| "20070012636" \| "5687856" \| "5899544" \| "6247720" \| "6814362" \| "20040222176" \| "20110168651" \| "4630739" \| "4961295" \| "5730414").PN. | | | | |
| S214 | 39 | ("2320387" \| "3052484" \| "3179270" \| "3734526" \| "4281843" \| "4363496" \| "4790549" \| "5464104" \| "5465987" \| "5474312" \| "5595395" \| "5671933").PN. OR ("6131926").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/11/22 23:52 |
| S215 | 1 | "12736715" | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/11/23 01:36 |
| S216 | 1 | ("2011/0139665").URPN. | USPAT | OR | OFF | 2018/11/23 01:36 |
| S217 | 20 | ("2807387" \| "20060220503" \| "3219400" \| "3424334" \| "4293072" \| "4643494" \| "4782619" \| "4996628" \| "5184726" \| "5246105" \| "5427394" \| "5544751" \| "5699925" \| "5901998" \| "5924778" \| "6367631" \| "6983946").PN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/11/23 01:37 |
| S218 | 36 | ("1253546" \| "1619761" \| "1857640" \| "2004900" \| "3133771" \| "3409162" \| "3529878" \| "3606506" \| "3729242" \| "3758181").PN. OR ("5246105").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/11/23 01:38 |
| S219 | 13 | ("3379482").URPN. | USPAT | OR | OFF | 2018/11/23 02:28 |
| S220 | 0 | ("2012/0152800").URPN. | USPAT | OR | OFF | 2018/11/23 02:30 |
| S221 | 12 | ("20080060964" \| "3568879" \| "4592601" \| "4685565" \| "20060071581" \| "4258847" \| "4863222" \| "2858957" \| "7311202" \| "3346137").PN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/11/23 02:30 |
| S222 | 1,041 | B25H3/02.cpc. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/11/23 02:39 |
| S223 | 140 | S222 and (snap) | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/11/23 02:39 |

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|---|---|---|---|---|---|---|
| S224 | 67 | (US-20170166352-$ or US-20110139665-$ or US-20170266804-$ or US-20170217464-$ or US-20170174392-$ or US-20160168880-$ or US-20160144500-$ or US-20160130034-$ or US-20140166516-$ or US-20120326406-$ or US-20100219193-$ or US-20090145866-$ or US-20070194543-$ or US-20070068757-$ or US-20060254946-$ or US-20060027475-$ or US-20150274362-$ or US-20110073516-$ or US-20090193748-$ or US-20080134607-$ or US-20080104921-$ or US-20180313094-$ or US-20180213934-$ or US-20150102717-$ or US-20180161975-$ or US-20140305829-$).did. or (US-20120312812-$ or US-20180290288-$ or US-20180162592-$ or US-20170239808-$ or US-20170121056-$ or US-20130127129-$ or US-20060038367-$ or US-20160114822-$ or US-20080308369-$ or US-20080169739-$ or US-20120292870-$).did. or (US-5628443-$ or US-9132543-$ or US-9506489-$ or US-8813960-$ or US-8677661-$ or US-8459495-$ or US-8132819-$ or US-6641013-$ or US-6085925-$ or US-5988473-$ or US-5595228-$ or US-3117692-$ or US-5429260-$ or US-7841144-$ or US-5407074-$ or US-4293072-$ or US-3506321-$ or US-3974898-$ or US-6109707-$ or US-4423687-$ or US-9872562-$ or US-6547347-$ or US-4619363-$ or US-4118048-$ or US-3891230-$ or US-9566990-$).did. or (US-5799958-$ or US-9616562-$ or US-5184726-$).did. or (US-2430200-$).did. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/11/23 14:36 |
| S225 | 3 | ("20080308369" \| "8875888" \| "9616562").PN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/11/23 14:37 |
| S226 | 28 | (US-20170266804-$ or US-20170217464-$ or US-20170174392-$ or US-20170166352-$ or US-20160168880-$ or US-20160144500-$ or US-20160130034-$ or US-20140166516-$ or US-20120326406-$ or US-20100219193-$ or US-20090145866-$ or US-20070194543-$ or US-20070068757-$ or US-20060254946-$ or US-20060027475-$ or US-20110139665-$).did. or (US-9506489-$ or US-9132543-$ or US-8813960-$ or US-8677661-$ or US-8459495-$ or US-8132819-$ or US-6641013-$ or US-6085925-$ or US- | US-PGPUB; USPAT | OR | OFF | 2018/11/23 14:37 |

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|---|---|---|---|---|---|---|
| | | 5988473-$ or US-5628443-$ or US-5595228-$ or US-3117692-$).did. | | | | |
| S227 | 37 | S224 not (S225 S226) | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/11/23 14:37 |
| S228 | 1 | "20170174392".pn. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/11/23 14:54 |
| S229 | 14 | (US-20180290288-$ or US-20180161975-$ or US-20170239808-$ or US-20170121056-$ or US-20080169739-$ or US-20080134607-$ or US-20080104921-$ or US-20060038367-$).did. or (US-9872562-$ or US-9566990-$ or US-7841144-$ or US-6547347-$ or US-5429260-$).did. or (US-2430200-$).did. | US-PGPUB; USPAT; USOCR | OR | OFF | 2018/11/23 21:07 |
| S230 | 716 | ((("MILWAUKEE") near3 ("ELECTRIC") near3 ("TOOL") near3 ("CORPORATION"))).AS,AANM. | USPAT | OR | OFF | 2019/01/16 16:21 |
| S231 | 51 | ((("Brunner") near3 ("Yaron"))).INV. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/16 16:21 |
| S232 | 33 | ((("Squiers") near3 ("Grant") near3 ("T"))).INV. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/16 16:21 |
| S233 | 56 | ((("Hoppe") near3 ("Christopher") near3 ("S"))).INV. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/16 16:21 |
| S234 | 114 | ((("Hyma") near3 ("Steven") near3 ("W"))).INV. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/16 16:21 |
| S235 | 0 | ("2017/0166352").URPN. | USPAT | OR | OFF | 2019/01/16 16:23 |
| S236 | 1 | (("2012312812") or ("4974740")).PN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/16 16:25 |
| S237 | 0 | "2012312812".pn. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/16 16:26 |
| S238 | 1 | "20120312812".pn. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/16 16:26 |
| S239 | 4 | ("2012/0312812").URPN. | USPAT | OR | OFF | 2019/01/16 16:26 |
| S240 | 0 | ("2018/0161975").URPN. | USPAT | OR | OFF | 2019/01/16 16:29 |

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|---|---|---|---|---|---|---|
| S241 | 0 | ("2018/0044059").URPN. | USPAT | OR | OFF | 2019/01/16 16:29 |
| S242 | 68 | ("6082539" \| "6874634" \| "8875888" \| "7503569" \| "D462519" \| "D467424" \| "D753394" \| "D753395" \| "D753396" \| "20010030403" \| "20120152944" \| "6761366" \| "D437484" \| "D439407" \| "D449738" \| "D564216" \| "D629607" \| "D636994" \| "D668048" \| "D700777" \| "D709697" \| "D753397" \| "6371320" \| "20140102928" \| "D415894" \| "D520237" \| "D613560" \| "D643217" \| "D701697" \| "7905353" \| "20110181008" \| "D348152" \| "D647300" \| "D663952" \| "D674605" \| "D710098" \| "D713639" \| "20110049824" \| "20110139666" \| "5022546" \| "D467426" \| "D527181" \| "D572479" \| "D630851" \| "D701696" \| "D711105" \| "5437369" \| "D693121" \| "20070273114" \| "20090145790" \| "8602217" \| "8789699" \| "8851282" \| "D630435" \| "D702044" \| "D703437" \| "D709287" \| "9393684" \| "8505729" \| "20040134818" \| "D493284" \| "D600912" \| "D649350" \| "D653832" \| "D694522" \| "D703436" \| "D710100" \| "D719352").PN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/16 16:30 |
| S243 | 46 | ("20030062232" \| "20040211634" \| "20060012139" \| "20060027475" \| "5011013" \| "5209384" \| "5240264" \| "5664652" \| "5833065" \| "6126003" \| "6176559" \| "6347847" \| "6371320" \| "6601930" \| "6761366" \| "7004481" \| "7210689").PN. OR ("7503569").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/16 16:34 |
| S244 | 23 | ("1192847" \| "1891811" \| "2053969" \| "2828023").PN. OR ("5022546").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/16 16:37 |
| S245 | 14 | ("2053969").URPN. | USPAT | OR | OFF | 2019/01/16 16:38 |
| S246 | 19 | ("2053969" \| "3014604" \| "3061134" \| "3162320" \| "3734308" \| "4109789" \| "4616752" \| "6024223").PN. OR ("6840378").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/16 16:39 |
| S247 | 22 | ("20040000550" \| "2705575" \| "3346137" \| "4293072" \| "5628443" \| "5704625" \| "6840378").PN. OR ("7780026").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/16 16:39 |
| S248 | 21 | ("3081120" \| "3162320" \| "3653521").PN. OR ("3734308").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/16 16:41 |

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|---|---|---|---|---|---|---|
| S249 | 34 | ("3015407" \| "3493258" \| "3501193" \| "3552557" \| "3633777" \| "3677599" \| "3691595" \| "3712661" \| "3734308" \| "3888536" \| "3980185" \| "4093090" \| "4149747" \| "4341495" \| "4356145" \| "4630856" \| "4648645" \| "5163726" \| "5931617" \| "6135524" \| "7014234").PN. OR ("8177463").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/16 16:41 |
| S250 | 65 | ("2053969" \| "3014604" \| "3691595" \| "3712661").PN. OR ("3980185").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/16 16:42 |
| S251 | 23 | ("0610816" \| "20080099622" \| "2357182" \| "2431194" \| "3380602" \| "3765711" \| "3980185" \| "4128267" \| "4341495" \| "4881601" \| "5161705" \| "5328133" \| "5344203" \| "5593113" \| "5836548" \| "7014234" \| "7549687" \| "7887011" \| "8177463").PN. OR ("9440741").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/16 16:42 |
| S252 | 28 | ("2876726" \| "3004772" \| "3057315" \| "3107024" \| "3162320" \| "3711902" \| "3734308" \| "3799100" \| "3805721" \| "3818854" \| "3822667" \| "3872555" \| "3938461" \| "3980185" \| "4290382" \| "4294185").PN. OR ("4695184").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/16 16:44 |
| S253 | 899 | B60P7/13,06.cpc. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/16 16:46 |
| S254 | 110 | 410/84.ccls. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/16 16:47 |
| S255 | 7 | ("6077006" \| "7056081" \| "6490766" \| "8342786" \| "8523501" \| "7056061" \| "8523401").PN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/16 16:47 |
| S256 | 2 | ("1751571").PN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/16 16:49 |
| S257 | 38 | ("3034256" \| "3159368" \| "3334953" \| "3618795" \| "4249684" \| "4303367" \| "4325531" \| "4737055" \| "4805859" \| "4901961" \| "5161700" \| "5205602" \| "5240214" \| "5511842" \| "5588631" \| "5609451" \| "5653366" \| "5730414" \| "5855310" \| "5899544").PN. OR ("6666362").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/16 16:50 |
| S258 | 25 | ("3334953" \| "4249684" \| "4938398" \| "4993771" \| "5255832" \| "5395019").PN. OR ("5653366").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/16 16:51 |

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|---|---|---|---|---|---|---|
| S259 | 17 | ("2696962" \| "4929973" \| "5035389" \| "5040712" \| "5129613" \| "5282554" \| "5332183" \| "5356105" \| "5653366" \| "5730348" \| "5730406" \| "6036071" \| "6315182" \| "7225958" \| "8020821").PN. OR ("8448829").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/16 16:51 |
| S260 | 37 | ("1252207" \| "20060186290" \| "20070097617" \| "20070170336" \| "20070230102" \| "20080105803" \| "2174140" \| "5730406" \| "5833189" \| "5850996" \| "6173931" \| "6315255" \| "6371424" \| "6431510" \| "6702604" \| "6758454" \| "6877641" \| "7261264" \| "7334762" \| "7455271" \| "7499272" \| "7673838").PN. OR ("8020821").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/16 16:52 |
| S261 | 10 | ("20050139745" \| "4660793" \| "5035389" \| "5433416" \| "5452874" \| "5608603" \| "5924790" \| "6237886" \| "6520463" \| "6637707").PN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/16 16:52 |
| S262 | 10 | ("5356104" \| "5639522" \| "5662375" \| "5694123" \| "5943208" \| "5947440" \| "6349911" \| "6402106" \| "6446915" \| "6710828").PN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/16 16:53 |
| S263 | 12 | ("5284311" \| "5428502").PN. OR ("5608603").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/16 16:54 |
| S264 | 788 | 248/224.7,225.21.ccls. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/16 16:56 |
| S265 | 21 | ("1862466" \| "2979300" \| "3110467" \| "3669035" \| "4056250" \| "4076204" \| "4085867").PN. OR ("4660793").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/16 16:57 |
| S266 | 25 | ("3334953" \| "4249684" \| "4938398" \| "4993771" \| "5255832" \| "5395019").PN. OR ("5653366").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/16 17:01 |
| S267 | 38 | ("3454250" \| "3456929" \| "4065092" \| "4230248" \| "4249684" \| "4444427" \| "4848629" \| "4974766" \| "4984837" \| "5007568" \| "5046652" \| "5181639" \| "5275320" \| "5285942").PN. OR ("5395019").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/16 17:02 |
| S268 | 42 | ("2680000" \| "2897928" \| "3631572" \| "3881677" \| "4346868" \| "4618081" \| "4948085" \| "5181774").PN. OR ("5332183").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/16 17:05 |
| S269 | 71 | ("2708088" \| "3878589" \| "3915189" \| "3931893" \| "4450989" \| "4461445" \| "4858869" \| "5026016" \| "5035389" \| | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/16 17:45 |

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|---|---|---|---|---|---|---|
| | | "5078279" \| "5344032" \| "5356038" \| "5433416" \| "5435511" \| "5452874" \| "5765699" \| "5915572" \| "D329192" \| "D386298" \| "D386304").PN. OR ("6637707").URPN. | | | | |
| S270 | 32 | ("2103106" \| "2703912" \| "2879561" \| "3237779" \| "3399374" \| "3403641" \| "4029038" \| "4068332" \| "4266882" \| "4340199" \| "4376593" \| "4389133" \| "4430947").PN. OR ("4565465").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/16 17:55 |
| S271 | 570 | 220/4.27.ccls. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/16 21:12 |
| S272 | 319 | B65D21/0223.cpc. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/16 21:12 |
| S273 | 1,937 | A45C5/14.cpc. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/16 21:12 |
| S274 | 69 | A45C7/005.cpc. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/16 21:12 |
| S275 | 2,987 | A45C13/02.cpc. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/16 21:13 |
| S277 | 357 | A45F3/10.cpc. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/16 21:13 |
| S278 | 850 | B25H1/04.cpc. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/16 21:14 |
| S279 | 1,194 | B25H3/02,021.cpc. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/16 21:14 |
| S280 | 1,052 | B62B1/14.cpc. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/16 21:14 |
| S281 | 437 | B65D21/0209.cpc. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/16 21:14 |
| S282 | 164 | B65D21/0228.cpc. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/16 21:15 |
| S283 | 320 | A45C7/0045.cpc. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/16 21:15 |

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|---|---|---|---|---|---|---|
| S284 | 436 | B25H3/023.cpc. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/16 21:15 |
| S285 | 752 | B62B5/067.cpc. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/16 21:16 |
| S286 | 23 | B65D2255/00.cpc. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/16 21:16 |
| S287 | 177 | B65H2701/533.cpc. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/16 21:16 |
| S288 | 121 | (US-0000440-$ \| US-0027475-$ \| US-0038367-$ \| US-0068757-$ \| US-0104921-$ \| US-0121056-$ \| US-0127129-$ \| US-0130034-$ \| US-0134607-$ \| US-0139665-$ \| US-0144500-$ \| US-0145866-$ \| US-0155613-$ \| US-0161975-$ \| US-0166352-$ \| US-0166516-$ \| US-0168880-$ \| US-0169739-$ \| US-0174392-$ \| US-0194543-$ \| US-0195793-$ \| US-0217464-$ \| US-0219193-$ \| US-0239808-$ \| US-0254946-$ \| US-0266804-$ \| US-0271616-$ \| US-0290288-$ \| US-0308369-$ \| US-0320243-$ \| US-0326406-$ \| US-1276744-$ \| US-1477050-$ \| US-2430200-$ \| US-20020000440-$ \| US-20040195793-$ \| US-20060027475-$ \| US-20060038367-$ \| US-20060254946-$ \| US-20070068757-$ \| US-20070194543-$ \| US-20080104921-$ \| US-20080134607-$ \| US-20080169739-$ \| US-20080308369-$ \| US-20090145866-$ \| US-20100219193-$ \| US-20110139665-$ \| US-20110155613-$ \| US-20120326406-$ \| US-20130127129-$ \| US-20140166516-$ \| US-20160130034-$ \| US-20160144500-$ \| US-20160168880-$ \| US-20170121056-$ \| US-20170166352-$ \| US-20170174392-$ \| US-20170217464-$ \| US-20170239808-$ \| US-20170266804-$ \| US-20180161975-$ \| US-20180290288-$ \| US-2608238-$ \| US-3117692-$ \| US-5240264-$ \| US-5429260-$ \| US-5595228-$ \| US-5628443-$ \| US-5988473-$ \| US-6085925-$ \| US-6547347-$ \| US-6641013-$ \| US-7503569-$ \| US-7841144-$ \| US-8132819-$ \| US-8459495-$ \| US-8677661-$ \| US-8813960-$ \| US-8875888-$ \| US-9132543-$ \| US-9506489-$ \| US-9566990-$ \| US-9616562-$ \| US-9872562-$).DID. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/16 21:23 |

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|---|---|---|---|---|---|---|
| S289 | 4 | (CN-2608238-$ \| JP-1276744-$ \| JP-1477050-$ \| KR-300271616-$ \| KR-300320243-$ \| TW-135074-$ \| TW-168686-$ \| TW-174412-$ \| VA-223131450-$ \| WO-2016142935-$ \| WO-2017028845-$).DID. | FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2019/01/16 21:24 |
| S290 | 0 | (15/826201).APP. | FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2019/01/16 21:25 |
| S291 | 0 | ("150826201").APP. | FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2019/01/16 21:25 |
| S292 | 0 | "150826201" | FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2019/01/16 21:25 |
| S293 | 45 | ("1699130" \| "2072672" \| "2551814" \| "2633285" \| "2736487" \| "3010638" \| "3361322" \| "3623650" \| "3632037" \| "3713579" \| "3905478" \| "3905541" \| "3921896" \| "4002261" \| "4023617" \| "4187977" \| "4230233" \| "4245773" \| "4251006" \| "4277015" \| "4291830" \| "4389013" \| "4482074" \| "4643314" \| "4685610" \| "4762270" \| "4763833" \| "4828894" \| "4884739" \| "4911356" \| "4948039" \| "4993623" \| "5038998" \| "5116290" \| "5190213").PN. OR ("5429260").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/16 21:39 |
| S294 | 2 | "2430200".pn. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/16 21:43 |
| S295 | 70 | ("3861703" \| "4738340" \| "4951818" \| "5038842" \| "5048649" \| "5178244" \| "D294775" \| "5373104" \| "6213266" \| "20030123965" \| "3061057" \| "3532355" \| "4350194" \| "5407039" \| "6634496" \| "6758334" \| "7077252" \| "20020104725" \| "20050077136" \| "4081061" \| "4118048" \| "4813521" \| "5484045" \| "20070068757" \| "5927361" \| "7232018" \| "4693345" \| "4122925" \| "5484046" \| "20060119060" \| "20050072642" \| "4792025" \| "D453623" \| "5186290" \| "5890571" \| "6073737" \| "7380685" \| "5109961" \| "20070012694" \| "3452846" \| "4657135" \| "5339934" \| "5379870" \| "5447216" \| "6116390" \| "6401890" \| "5142445" \| "7398868" \| "7726483" \| "6164425" \| "6520327" \| | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/16 21:50 |

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|---|---|---|---|---|---|---|
| | | "6976566" \| "3650216" \| "2497173" \| "20010027902" \| "20030029750" \| "4621716" \| "5197579" \| "5632496" \| "5713439" \| "7780002" \| "7942282" \| "3572253" \| "6585090" \| "3891230").PN. | | | | |
| S296 | 70 | ("3861703" \| "4738340" \| "4951818" \| "5038842" \| "5048649" \| "5178244" \| "D294775" \| "5373104" \| "6213266" \| "20030123965" \| "3061057" \| "3532355" \| "4350194" \| "5407039" \| "6634496" \| "6758334" \| "7077252" \| "20020104725" \| "20050077136" \| "4081061" \| "4118048" \| "4813521" \| "5484045" \| "20070068757" \| "5927361" \| "7232018" \| "4693345" \| "4122925" \| "5484046" \| "20060119060" \| "20050072642" \| "4792025" \| "D453623" \| "5186290" \| "5890571" \| "6073737" \| "7380685" \| "5109961" \| "20070012694" \| "3452846" \| "4657135" \| "5339934" \| "5379870" \| "5447216" \| "6116390" \| "6401890" \| "5142445" \| "7398868" \| "7726483" \| "6164425" \| "6520327" \| "6976566" \| "3650216" \| "2497173" \| "20010027902" \| "20030029750" \| "4621716" \| "5197579" \| "5632496" \| "5713439" \| "7780002" \| "7942282" \| "3572253" \| "6585090" \| "3891230").PN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/16 21:51 |
| S297 | 40 | ("20020096844" \| "4066155" \| "4813542" \| "5099968" \| "5564805" \| "5906291" \| "D439739").PN. OR ("6585090").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/16 21:53 |
| S298 | 29 | ("2472491" \| "2925283" \| "3057636").PN. OR ("3891230").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/16 21:55 |
| S299 | 59 | ("3194426" \| "3338452" \| "3441033" \| "3862683" \| "4426056" \| "4523680" \| "4589430" \| "4804773").PN. OR ("4889254").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/16 21:59 |
| S300 | 0 | ("2018/0127007").URPN. | USPAT | OR | OFF | 2019/01/17 20:57 |
| S301 | 3 | ("20110220531" \| "5890613" \| "6925834").PN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/17 20:58 |
| S302 | 4 | ("20110139777" \| "5301829" \| "5427265" \| "8602217").PN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/17 21:07 |
| S303 | 1 | ("2014/0326693").URPN. | USPAT | OR | OFF | 2019/01/17 21:08 |

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|---|---|---|---|---|---|---|
| S304 | 4 | ("20110139777" \| "5301829" \| "5427265" \| "8602217").PN. OR ("9701443").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/17 21:09 |
| S305 | 22 | ("3521764").URPN. | USPAT | OR | OFF | 2019/01/17 21:15 |
| S306 | 0 | ("2016/0082585").URPN. | USPAT | OR | OFF | 2019/01/17 21:21 |
| S307 | 11 | ("4887751" \| "20080169739" \| "20050045640" \| "20090250470" \| "20050211586" \| "20140353191" \| "4688674" \| "20040016666" \| "20080197756" \| "4403638" \| "5653337").PN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/17 21:22 |
| S308 | 13 | ("2414708" \| "4720021" \| "4365725" \| "5011013" \| "4997090" \| "5353948" \| "5967322" \| "7780036" \| "0520505" \| "4161261" \| "4714158").PN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/17 21:24 |
| S309 | 8 | ("6761366" \| "0968633" \| "6761366" \| "0968633" \| "5575401" \| "20020030425" \| "5575401" \| "20050224384" \| "20070012694" \| "6371320").PN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/17 21:26 |
| S310 | 12 | ("2006/0027475").URPN. | USPAT | OR | OFF | 2019/01/17 21:29 |
| S311 | 18 | ("1193809" \| "1268124" \| "1521310" \| "3696850" \| "4724976" \| "4756394" \| "4787488" \| "5209279" \| "5219423" \| "5314046" \| "5971119" \| "0622263" \| "0695149").PN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/17 21:29 |
| S312 | 1 | "20110073516".pn. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/19 21:16 |
| S313 | 71 | (US-20180290288-$ or US-20180161975-$ or US-20170239808-$ or US-20170121056-$ or US-20080169739-$ or US-20080134607-$ or US-20080104921-$ or US-20060038367-$ or US-20190002004-$ or US-20120312812-$ or US-20180044059-$ or US-20110181008-$ or US-20090145790-$ or US-20130121783-$ or US-20030034654-$ or US-20080105803-$ or US-20050139745-$ or US-20170174392-$ or US-20060254946-$ or US-20170318927-$ or US-20170259956-$ or US-20100147642-$ or US-20150274362-$ or US-20140262885-$ or US-20130127129-$ or US-20120152800-$).did. or (US-20060027475-$ or US-20030094392-$ or US-20080277221-$ or US-20110073516-$).did. or (US-9872562-$ or US-9566990-$ | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/19 21:16 |

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|---|---|---|---|---|---|---|
| | | or US-7841144-$ or US-6547347-$ or US-5429260-$ or US-9725209-$ or US-8789699-$ or US-7503569-$ or US-5022546-$ or US-6840378-$ or US-3980185-$ or US-7780026-$ or US-8657307-$ or US-8177463-$ or US-9440741-$ or US-4341495-$ or US-5183375-$ or US-4695184-$ or US-3734308-$ or US-8342786-$ or US-6666362-$ or US-5653366-$ or US-8448829-$ or US-8020821-$ or US-5608603-$ or US-4660793-$).did. or (US-5395019-$ or US-9056586-$ or US-8387940-$ or US-5332183-$ or US-8398315-$ or US-5129613-$ or US-6637707-$ or US-4565465-$ or US-2053969-$ or US-6585090-$ or US-8561769-$ or US-3891230-$ or US-4889254-$ or US-9701443-$).did. or (US-2430200-$).did. | | | | |
| S314 | 121 | (US-20180290288-$ or US-20180161975-$ or US-20170266804-$ or US-20170239808-$ or US-20170217464-$ or US-20170174392-$ or US-20170166352-$ or US-20170121056-$ or US-20160168880-$ or US-20160144500-$ or US-20160130034-$ or US-20140166516-$ or US-20130127129-$ or US-20120326406-$ or US-20110155613-$ or US-20110139665-$ or US-20100219193-$ or US-20090145866-$ or US-20080308369-$ or US-20080169739-$ or US-20080134607-$ or US-20080104921-$ or US-20070194543-$ or US-20070068757-$ or US-20060254946-$ or US-20060038367-$).did. or (US-20060027475-$ or US-20040195793-$ or US-20020000440-$).did. or (US-9872562-$ or US-9616562-$ or US-9566990-$ or US-9506489-$ or US-9132543-$ or US-8875888-$ or US-8813960-$ or US-8677661-$ or US-8459495-$ or US-8132819-$ or US-7841144-$ or US-7503569-$ or US-6641013-$ or US-6547347-$ or US-6085925-$ or US-5988473-$ or US-5628443-$ or US-5595228-$ or US-5429260-$ or US-5240264-$ or US-3117692-$ or US-2608238-$ or US-2430200-$ or US-1477050-$ or US-1276744-$ or US-0326406-$).did. or (US-0320243-$ or US-0308369-$ or US-0290288-$ or US-0271616-$ or US-0266804-$ or US- | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/19 21:16 |

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|---|---|---|---|---|---|---|
| | | 0254946-$ or US-0239808-$ or US-0219193-$ or US-0217464-$ or US-0195793-$ or US-0194543-$ or US-0174392-$ or US-0169739-$ or US-0168880-$ or US-0166516-$ or US-0166352-$ or US-0161975-$ or US-0155613-$ or US-0145866-$ or US-0144500-$ or US-0139665-$ or US-0134607-$ or US-0130034-$ or US-0127129-$ or US-0121056-$ or US-0104921-$ or US-0068757-$).did. or (US-0038367-$ or US-0027475-$ or US-0000440-$).did. or (US-3117692-$ or US-2608238-$ or US-2430200-$ or US-1477050-$ or US-1276744-$ or US-0326406-$ or US-0320243-$ or US-0308369-$ or US-0290288-$ or US-0271616-$ or US-0266804-$ or US-0254946-$ or US-0239808-$ or US-0219193-$ or US-0217464-$ or US-0195793-$ or US-0194543-$ or US-0174392-$ or US-0169739-$ or US-0168880-$ or US-0166516-$ or US-0166352-$ or US-0161975-$ or US-0155613-$ or US-0145866-$ or US-0144500-$).did. or (US-0139665-$ or US-0134607-$ or US-0130034-$ or US-0127129-$ or US-0121056-$ or US-0104921-$ or US-0068757-$ or US-0038367-$ or US-0027475-$ or US-0000440-$).did. | | | | |
| S315 | 52 | S313 not S314 | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/01/19 21:17 |
| S316 | 1 | "20120207571".pn. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/06/06 19:39 |
| S317 | 1 | "20080115312".pn. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/06/06 19:47 |
| S318 | 13 | (US-0023349-$ \| US-0115312-$ \| US-0186624-$ \| US-0207571-$ \| US-20060186624-$ \| US-20080115312-$ \| US-20120207571-$ \| US-20160023349-$ \| US-6848980-$).DID. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/06/06 20:25 |
| S319 | 2,000 | A45C5/14.cpc. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/06/09 16:14 |

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|---|---|---|---|---|---|---|
| S320 | 380 | A45C7/0045,005.cpc. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/06/09 16:15 |
| S321 | 700 | F16B12/24,44.cpc. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/06/09 16:34 |
| S322 | 13 | ("7534065" \| "9506489" \| "20100254757" \| "3944282" \| "4995176" \| "6612078" \| "20110085853" \| "4900090" \| "6830236" \| "6877824" \| "8464408" \| "20070145864" \| "7152752").PN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/06/09 16:36 |
| S355 | 14 | (US-20110073516-$ or US-20190002004-$ or US-20180044059-$ or US-20170318927-$ or US-20130121783-$ or US-20110181008-$ or US-20100147642-$ or US-20090145790-$ or US-20080277221-$ or US-20050139745-$ or US-20080115312-$ or US-20170138382-$ or US-20070145864-$).did. or (US-9506489-$).did. | US-PGPUB; USPAT | OR | OFF | 2019/06/09 21:00 |
| S356 | 14 | ("20050139745" \| "20080277221" \| "20090145790" \| "20100147642" \| "20110073516" \| "20110181008" \| "20130121783" \| "20170318927" \| "20180044059" \| "20190002004" \| "5608603" \| "6637707" \| "8177463" \| "9701443").PN. | US-PGPUB; USPAT | OR | OFF | 2019/06/09 21:00 |
| S357 | 4 | S355 not S356 | US-PGPUB; USPAT | OR | OFF | 2019/06/09 21:01 |
| S359 | 11 | ("20070145864" \| "20100254757" \| "20110085853" \| "3944282" \| "4900090" \| "4995176" \| "6612078" \| "6830236" \| "6877824" \| "7152752" \| "8464408").PN. OR ("9506489").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/09/03 21:43 |
| S380 | 1 | (US-20170138382-$).did. | US-PGPUB | OR | OFF | 2019/09/04 13:40 |
| S381 | 1 | (US-20170138382-$).did. | US-PGPUB | OR | OFF | 2019/09/04 13:42 |
| S382 | 1 | (US-20170138382-$).did. | US-PGPUB; USPAT; USOCR | OR | OFF | 2019/09/04 13:42 |
| S386 | 1 | "16752441" | US-PGPUB; USPAT; USOCR | OR | OFF | 2020/09/17 21:31 |
| S387 | 30 | (US-0031222-$ \| US-0055534-$ \| US-0068903-$ \| US-0076759-$ \| US-0153312-$ \| US-0154218-$ \| US-0236482-$ \| US-0274362-$ \| US-0349013-$ \| US- | US-PGPUB; USPAT; USOCR | OR | OFF | 2020/09/17 21:38 |

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|---|---|---|---|---|---|---|
| | | 20090236482-$ \| US-20130068903-$ \| US-20130154218-$ \| US-20140076759-$ \| US-20150274362-$ \| US-20170349013-$ \| US-20180153312-$ \| US-20190031222-$ \| US-20200055534-$ \| US-5538213-$ \| US-7779764-$ \| US-D871013-$).DID. | | | | |
| S388 | 7 | (("7779764") or ("20090236482") or ("2011174939") or ("20130154218") or ("D437669") or ("D456972") or ("D828671") or ("D871013")).PN. or ((2013/0068903) or (2013/146551) or (2014/0076759) or (2015/0274362) or (2017/0349013) or (2018/0153312) or (2019/0031222) or (2020/0055534)).CCLS. | US-PGPUB; USPAT; USOCR | OR | OFF | 2020/09/17 21:41 |
| S389 | 14 | (("7779764") or ("20090236482") or ("2011174939") or ("20130154218") or ("20130068903") or ("2013146551") or ("20140076759") or ("20150274362") or ("20170349013") or ("20180153312") or ("20190031222") or ("20200055534") or ("D437669") or ("D456972") or ("D828671") or ("D871013")).PN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2020/09/17 21:41 |
| S390 | 2 | (("D668869") or ("D815831")).PN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2020/09/17 21:43 |
| S391 | 980 | ((("MILWAUKEE") near3 ("ELECTRIC") near3 ("TOOL") near3 ("CORPORATION"))).AS,AANM. | USPAT | OR | OFF | 2020/09/17 21:48 |
| S392 | 67 | ((("Brunner") near3 ("Yaron"))).INV. | US-PGPUB; USPAT; USOCR | OR | OFF | 2020/09/17 21:48 |
| S393 | 55 | ((("Squiers") near3 ("Grant") near3 ("T"))).INV. | US-PGPUB; USPAT; USOCR | OR | OFF | 2020/09/17 21:48 |
| S394 | 89 | ((("Hoppe") near3 ("Christopher") near3 ("S"))).INV. | US-PGPUB; USPAT; USOCR | OR | OFF | 2020/09/17 21:48 |
| S395 | 162 | ((("Hyma") near3 ("Steven") near3 ("W"))).INV. | US-PGPUB; USPAT; USOCR | OR | OFF | 2020/09/17 21:48 |
| S396 | 12 | (("8505729") or ("8567796") or ("8979100") or ("9511491") or ("20090026901") or ("20150376917") or ("D395533") or ("D653832") or ("D661858") or ("D738106") or ("D816334") or ("D826510")).PN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2020/09/17 21:51 |

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|---|---|---|---|---|---|---|
| S397 | 262 | (US-0000440-$ \| US-0002004-$ \| US-0006770-$ \| US-0023349-$ \| US-0024468-$ \| US-0027475-$ \| US-0031731-$ \| US-0031732-$ \| US-0038367-$ \| US-0039781-$ \| US-0044059-$ \| US-0052276-$ \| US-0062244-$ \| US-0068757-$ \| US-0071990-$ \| US-0073516-$ \| US-0090616-$ \| US-0103494-$ \| US-0104308-$ \| US-0104921-$ \| US-0106244-$ \| US-0115312-$ \| US-0115715-$ \| US-0119060-$ \| US-0121056-$ \| US-0121547-$ \| US-0121783-$ \| US-0127129-$ \| US-0130034-$ \| US-0134607-$ \| US-0138382-$ \| US-0139566-$ \| US-0139665-$ \| US-0139745-$ \| US-0144500-$ \| US-0145700-$ \| US-0145790-$ \| US-0145866-$ \| US-0145913-$ \| US-0146589-$ \| US-0147642-$ \| US-0155613-$ \| US-0160886-$ \| US-0161518-$ \| US-0161975-$ \| US-0165828-$ \| US-0166352-$ \| US-0166516-$ \| US-0168880-$ \| US-0169739-$ \| US-0171228-$ \| US-0174392-$ \| US-0178946-$ \| US-0180250-$ \| US-0181008-$ \| US-0184034-$ \| US-0186624-$ \| US-0194543-$ \| US-0195793-$ \| US-0205877-$ \| US-0206656-$ \| US-0207571-$ \| US-0217464-$ \| US-0219193-$ \| US-0220531-$ \| US-0220758-$ \| US-0223971-$ \| US-0225371-$ \| US-0239808-$ \| US-0254946-$ \| US-0257958-$ \| US-0266804-$ \| US-0271280-$ \| US-0271616-$ \| US-0277221-$ \| US-0290288-$ \| US-0308369-$ \| US-0318927-$ \| US-0320243-$ \| US-0326406-$ \| US-10434638-$ \| US-1276744-$ \| US-1477050-$ \| US-2042387-$ \| US-2430200-$ \| US-2970358-$ \| US-20020000440-$ \| US-20020171228-$ \| US-20030115715-$ \| US-20030146589-$ \| US-20030184034-$ \| US-20030205877-$ \| US-20040103494-$ \| US-20040195793-$ \| US-20040206656-$ \| US-20050062244-$ \| US-20050104308-$ \| US-20050139745-$ \| US-20060006770-$ \| US-20060027475-$ \| US-20060038367-$ \| US-20060119060-$ \| US-20060186624-$ \| US-20060254946-$ \| US-20070068757-$ \| US-20070090616-$ \| US-20070145700-$ \| US-20070194543-$ \| US-20080104921-$ \| US-20080115312-$ \| US-20080121547-$ \| US-20080134607-$ \| US-20080169739-$ \| US-20080271280-$ \| US-20080277221-$ \| US-20080308369-$ \| US-20090071990-$ \| US-20090145790-$ \| US-20090145866-$ \| US-20090145913-$ \| US-20090178946-$ \| US-20100052276-$ \| US-20100139566-$ \| US- | US-PGPUB; USPAT; USOCR | OR | OFF | 2020/09/17 21:53 |

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|---|---|---|---|---|---|---|
| | | 20100147642-$ \| US-20100219193-$ \| US-20110073516-$ \| US-20110139665-$ \| US-20110155613-$ \| US-20110181008-$ \| US-20110220531-$ \| US-20120160886-$ \| US-20120180250-$ \| US-20120207571-$ \| US-20120326406-$ \| US-20130024468-$ \| US-20130031731-$ \| US-20130031732-$ \| US-20130121783-$ \| US-20130127129-$ \| US-20130223971-$ \| US-20140161518-$ \| US-20140166516-$ \| US-20140000-$ \| US-20160023349-$ \| US-20160130034-$ \| US-20160144500-$ \| US-20160168880-$ \| US-20170121056-$ \| US-20170138382-$ \| US-20170165828-$ \| US-20170166352-$ \| US-20170174392-$ \| US-20170217464-$ \| US-20170239808-$ \| US-20170257958-$ \| US-20170266804-$ \| US-20170318927-$ \| US-20180044059-$ \| US-20180161975-$ \| US-20180220758-$ \| US-20180290288-$ \| US-20190002004-$ \| US-20190039781-$ \| US-20190106244-$ \| US-20190225371-$ \| US-2608238-$ \| US-3117692-$ \| US-3506321-$ \| US-3974898-$ \| US-4168076-$ \| US-5035445-$ \| US-5105947-$ \| US-5240264-$ \| US-5301829-$ \| US-5429260-$).DID. | | | | |
| S398 | 53 | (US-5595228-$ \| US-5608603-$ \| US-5628443-$ \| US-5797617-$ \| US-5951037-$ \| US-5988473-$ \| US-6050660-$ \| US-6085925-$ \| US-6109627-$ \| US-6176559-$ \| US-6347847-$ \| US-6367631-$ \| US-6371320-$ \| US-6431580-$ \| US-6547347-$ \| US-6601930-$ \| US-6619772-$ \| US-6637707-$ \| US-6641013-$ \| US-6945546-$ \| US-6948691-$ \| US-6983946-$ \| US-7044484-$ \| US-7066475-$ \| US-7147243-$ \| US-7263742-$ \| US-7367571-$ \| US-7503569-$ \| US-7658887-$ \| US-7780026-$ \| US-7841144-$ \| US-7212840-$ \| US-8028845-$ \| US-8132819-$ \| US-8177463-$ \| US-8191910-$ \| US-8454033-$ \| US-8459495-$ \| US-8677661-$ \| US-8689396-$ \| US-8714355-$ \| US-8813960-$ \| US-8875888-$ \| US-8985922-$ \| US-9132543-$ \| US-9506489-$ \| US-9566990-$ \| US-9616562-$ \| US-9643629-$ \| US-9701443-$ \| US-9872562-$ \| US-9750543-$ \| US-D701696-$).DID. | US-PGPUB; USPAT; USOCR | OR | OFF | 2020/09/17 21:53 |
| S399 | 570 | 220/4.27.ccls. | US-PGPUB; USPAT; USOCR | OR | OFF | 2020/09/17 22:01 |

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| S400 | 392 | B65D21/0223.cpc. | US-PGPUB; USPAT; USOCR | OR | OFF | 2020/09/17 22:01 |
| S401 | 2,201 | A45C5/14,0045.cpc. | US-PGPUB; USPAT; USOCR | OR | OFF | 2020/09/17 22:02 |
| S402 | 3,330 | A45C13/02.cpc. | US-PGPUB; USPAT; USOCR | OR | OFF | 2020/09/17 22:02 |
| S403 | 423 | A45F3/10.cpc. | US-PGPUB; USPAT; USOCR | OR | OFF | 2020/09/17 22:02 |
| S404 | 923 | B25H1/04.cpc. | US-PGPUB; USPAT; USOCR | OR | OFF | 2020/09/17 22:02 |
| S405 | 1,163 | B25H3/02.cpc. | US-PGPUB; USPAT; USOCR | OR | OFF | 2020/09/17 22:02 |
| S406 | 197 | B25H3/021.cpc. | US-PGPUB; USPAT; USOCR | OR | OFF | 2020/09/17 22:02 |
| S407 | 1,141 | B62B1/14.cpc. | US-PGPUB; USPAT; USOCR | OR | OFF | 2020/09/17 22:03 |
| S408 | 717 | B65D21/0209,0228.cpc. | US-PGPUB; USPAT; USOCR | OR | OFF | 2020/09/17 22:03 |
| S409 | 468 | B25H3/023.cpc. | US-PGPUB; USPAT; USOCR | OR | OFF | 2020/09/17 22:03 |
| S410 | 940 | B62B5/067.cpc. | US-PGPUB; USPAT; USOCR | OR | OFF | 2020/09/17 22:03 |
| S411 | 38 | B65D2255/00.cpc. | US-PGPUB; USPAT; USOCR | OR | OFF | 2020/09/17 22:03 |
| S412 | 203 | B65H2701/533.cpc. | US-PGPUB; USPAT; USOCR | OR | OFF | 2020/09/17 22:03 |
| S413 | 2 | (("10583962") or ("10703534")).PN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2020/09/17 22:05 |
| S414 | 1 | "15826201" | US-PGPUB; USPAT; USOCR | OR | OFF | 2020/09/17 22:08 |

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|---|---|---|---|---|---|---|
| S415 | 5 | "15826232" | US-PGPUB; USPAT; USOCR | OR | OFF | 2020/09/17 22:08 |
| S416 | 3 | "16216724" | US-PGPUB; USPAT; USOCR | OR | OFF | 2020/09/17 22:09 |
| S417 | 1 | "10703534".pn. | US-PGPUB; USPAT; USOCR | OR | OFF | 2020/09/17 22:19 |
| S418 | 0 | "15826201".a[. | US-PGPUB; USPAT; USOCR | OR | OFF | 2020/09/17 22:20 |
| S419 | 0 | "15826201".ap. | US-PGPUB; USPAT; USOCR | OR | OFF | 2020/09/17 22:20 |
| S420 | 0 | "15826201".did. | US-PGPUB; USPAT; USOCR | OR | OFF | 2020/09/17 22:20 |
| S421 | 4 | ("2018/0161975").URPN. | USPAT | OR | OFF | 2020/09/17 22:21 |
| S422 | 188 | (US-0271616-$ \| US-0320243-$ \| US-10434638-$ \| US-1276744-$ \| US-1321247-$ \| US-14125488-$ \| US-1428764-$ \| US-1477050-$ \| US-1819487-$ \| US-19750543-$ \| US-2042387-$ \| US-2970358-$ \| US-20140000-$ \| US-20218996-$ \| US-2047181-$ \| US-2289671-$ \| US-2330521-$ \| US-2346741-$ \| US-2406331-$ \| US-2413265-$ \| US-2456341-$ \| US-2555660-$ \| US-2555661-$ \| US-2608238-$ \| US-2805799-$ \| US-29708343-$ \| US-3117692-$ \| US-3974898-$ \| US-3141354-$ \| US-3510307-$ \| US-4168076-$ \| US-4415638-$ \| US-5035445-$ \| US-5105947-$ \| US-5240264-$ \| US-5301829-$ \| US-5595228-$ \| US-5608603-$ \| US-5628443-$ \| US-5797617-$ \| US-5951037-$ \| US-5988473-$ \| US-6050660-$ \| US-6085925-$ \| US-6109627-$ \| US-6176559-$ \| US-6347847-$ \| US-6367631-$ \| US-6371320-$ \| US-6431580-$ \| US-6601930-$ \| US-6619772-$ \| US-6637707-$ \| US-6641013-$ \| US-6945546-$ \| US-6948691-$ \| US-6983946-$ \| US-7044484-$ \| US-7066475-$ \| US-7147243-$ \| US-7263742-$ \| US-7367571-$ \| US-7503569-$ \| US-7658887-$ \| US-7779764-$ \| US-7780026-$ \| US-8028845-$ \| US-8177463-$ \| US-8191910-$ \| US-8454033-$ \| US-8505729-$ \| US-8567796-$ \| US-8689396-$ \| US-8714355-$ \| US- | US-PGPUB; USPAT; USOCR | OR | OFF | 2020/09/17 22:31 |

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|---|---|---|---|---|---|---|
| | | 8979100-$ \| US-8985922-$ \| US-9511491-$ \| US-9566990-$ \| US-9616562-$ \| US-9643629-$ \| US-9313802-$ \| US-D395533-$ \| US-D437669-$ \| US-D456972-$ \| US-D525789-$ \| US-D630851-$ \| US-D653832-$ \| US-D661858-$ \| US-D663952-$ \| US-D664354-$ \| US-D674605-$ \| US-D701696-$ \| US-D738106-$ \| US-D753394-$ \| US-D753395-$ \| US-D765974-$ \| US-D770179-$ \| US-D790221-$ \| US-D814187-$ \| US-D816334-$ \| US-D826510-$ \| US-D828671-$ \| US-D833744-$ \| US-D837515-$ \| US-D871013-$ \| US-20020000440-$ \| US-20020171228-$ \| US-20030115715-$ \| US-20030146589-$ \| US-20030184034-$ \| US-20030205877-$ \| US-20040103494-$ \| US-20040195793-$ \| US-20040206656-$ \| US-20050062244-$ \| US-20050104308-$ \| US-20050139745-$ \| US-20060006770-$ \| US-20060027475-$ \| US-20060119060-$ \| US-20060186624-$ \| US-20060254946-$ \| US-20070068757-$ \| US-20070090616-$ \| US-20070145700-$ \| US-20070194543-$ \| US-20080115312-$ \| US-20080121547-$ \| US-20080169739-$ \| US-20080271280-$ \| US-20080277221-$ \| US-20090026901-$ \| US-20090071990-$ \| US-20090145790-$ \| US-20090145866-$ \| US-20090145913-$ \| US-20090178946-$ \| US-20100052276-$ \| US-20100139566-$ \| US-20100147642-$ \| US-20100219193-$ \| US-20110139665-$ \| US-20110155613-$ \| US-20110181008-$ \| US-20120160886-$ \| US-20120180250-$ \| US-20120207571-$ \| US-20130024468-$ \| US-20130031731-$ \| US-20130031732-$ \| US-20130121783-$ \| US-20130127129-$ \| US-20130154218-$ \| US-20130223971-$ \| US-20140076759-$ \| US-20150274362-$ \| US-20150376917-$ \| US-20160023349-$ \| US-20170138382-$ \| US-20170165828-$ \| US-20170174392-$ \| US-20170217464-$ \| US-20170257958-$ \| US-20170349013-$ \| US-20180044059-$ \| US-20180220758-$ \| US-20190031222-$ \| US-20190106244-$ \| US-20190225371-$ \| US-20200055534-$).DID. | | | | |
| S423 | 6 | ("2016/0144500").URPN. | USPAT | OR | OFF | 2020/09/18 00:00 |
| S424 | 13 | ("20030094392" \| "20070034539" \| "20120024739" \| "20120312812" \| "20160008972" \| "20160144500" \| "5325966" \| "6082539" \| "7523827").PN. OR ("9725209").URPN. | US-PGPUB; USPAT; USOCR | OR | OFF | 2020/09/18 00:01 |

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| Substitute for form 1449/PTO | | | | ***Complete if Known*** | |
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| **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** | | | | **Application Number** | 16/752,441 |
| Date Submitted: May 7, 2020 | | | | **Filing Date** | January 24, 2020 |
| | | | | **First Named Inventor** | Yaron Brunner |
| *(use as many sheets as necessary)* | | | | Art Unit | 3736 |
| | | | | Examiner Name | PICKETT, JOHN G |
| Sheet | 1 | of | 1 | Attorney Docket Number | 066749-2584 |

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| Examiner Initials* | Cite No.[1] | Document Number<br>Number-Kind Code[2] (*if known*) | Publication Date MM-DD-YYYY | Name of Patentee or Applicant of Cited Document | Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear |
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| Examiner Initials* | Cite No.[1] | 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, page(s), volume-issue number(s), publisher, city and/or country where published. | T[6] |
|---|---|---|---|
| | | | |

| Examiner Signature | /GIDEON R WEINERTH/ | Date Considered | 09/17/2020 |
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| **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** | | | | **Application Number** | 16/752,441 |
| Date Submitted: September 16, 2020 | | | | **Filing Date** | January 24, 2020 |
| | | | | **First Named Inventor** | Yaron Brunner |
| *(use as many sheets as necessary)* | | | | Art Unit | 3736 |
| | | | | Examiner Name | WEINERTH, GIDEON R |
| Sheet | 1 | of | 2 | Attorney Docket Number | 066749-2584 |

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| | | | | **First Named Inventor** | Yaron Brunner |
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| | | | | Examiner Name | WEINERTH, GIDEON R |
| Sheet | 2 | of | 2 | Attorney Docket Number | 066749-2584 |

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| Examiner Signature | /GIDEON R WEINERTH/ | Date Considered | 09/17/2020 |
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| | | | | **Filing Date** | January 24, 2020 |
| Date Submitted: January 24, 2020 | | | | **First Named Inventor** | Yaron Brunner |
| | | | | Art Unit | To be determined |
| *(use as many sheets as necessary)* | | | | Examiner Name | To be determined |
| Sheet | 1 | of | 10 | Attorney Docket Number | 066749-2584 |

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| Examiner Signature | /GIDEON R WEINERTH/ | Date Considered | 09/17/2020 |
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| **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** | | | | **Application Number** | To be determined |
| | | | | **Filing Date** | January 24, 2020 |
| Date Submitted: January 24, 2020 | | | | **First Named Inventor** | Yaron Brunner |
| | | | | Art Unit | To be determined |
| *(use as many sheets as necessary)* | | | | Examiner Name | To be determined |
| Sheet | 9 | of | 10 | Attorney Docket Number | 066749-2584 |

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| Examiner Initials* | Cite No.[1] | Foreign Patent Document Country Code[3]-Number[4]-Kind Code[5] (*if known*) | Publication Date MM-DD-YYYY | Name of Patentee or Applicant of Cited Documents | Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear | T[6] |
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| | | | | Art Unit | To be determined |
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| **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** | | | | **Application Number** | 16/752,441 |
| Date Submitted: March 31, 2020 | | | | **Filing Date** | January 24, 2020 |
| | | | | **First Named Inventor** | Yaron Brunner |
| *(use as many sheets as necessary)* | | | | Art Unit | 3633 |
| | | | | Examiner Name | To be determined |
| Sheet | 1 | of | 2 | Attorney Docket Number | 066749-2584 |

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| Examiner Initials* | Cite No.[1] | Document Number<br>Number-Kind Code[2] (*if known*) | Publication Date MM-DD-YYYY | Name of Patentee or Applicant of Cited Document | Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear |
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| Examiner Signature | /GIDEON R WEINERTH/ | Date Considered | 09/17/2020 |
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## Bibliographic Data

Application No: 16/752,441

Foreign Priority claimed: ○ Yes ◉ No

35 USC 119 (a-d) conditions met: ☐ Yes ☐ No ☐ Met After Allowance

Verified and Acknowledged: /GIDEON R WEINERTH/ (Examiner's Signature) | (Initials)

Title: Utility Assembly and Coupling Mechanism

| FILING or 371(c) DATE | CLASS | GROUP ART UNIT | ATTORNEY DOCKET NO. |
|---|---|---|---|
| 01/24/2020 | 220 | 3736 | 066749-2584 |
| RULE | | | |

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Steven W. Hyma, Milwaukee, WI, UNITED STATES

**CONTINUING DATA**

This application is a CON of 16216724 12/11/2018 PAT 10583962

16216724 is a CON of 15826232 11/29/2017 PAT 10703534

15826232 is a CON of PCT/IL2017/050481 04/30/2017

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**FOREIGN APPLICATIONS**

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Sheet 1 of 2

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| | | | | **First Named Inventor** | Yaron Brunner |
| *(use as many sheets as necessary)* | | | | Art Unit | 3736 |
| | | | | Examiner Name | WEINERTH, GIDEON R |
| Sheet | 2 | of | 2 | Attorney Docket Number | 066749-2584 |

**FOREIGN PATENT DOCUMENTS**

| Examiner Initials* | Cite No.[1] | Foreign Patent Document Country Code[3]-Number[4]-Kind Code[5] (*if known*) | Publication Date MM-DD-YYYY | Name of Patentee or Applicant of Cited Documents | Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear | T[6] |
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| | A25 | WO2011/009480 | 01-27-2011 | HENSEL MAIC; HESS STEFAN; KAERCHER GMBH & CO KG. | | |
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| | A27 | WO2014/125488 | 08-21-2014 | KETER PLASTIC LTD | | |
| | A28 | WO2017/212840 | 12-14-2017 | GENESIS CO., LTD. | | |

**NON PATENT LITERATURE DOCUMENTS**

| Examiner Initials* | Cite No.[1] | 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, page(s), volume-issue number(s), publisher, city and/or country where published. | T[6] |
|---|---|---|---|
| /G.R.W/ | A29 | International Search Report and Written Opinion for International Application No. PCT/IL2020/050433, dated June 21, 2020, 14 pages | |

| Examiner Signature | /GIDEON R WEINERTH/ | Date Considered | 09/17/2020 |
|---|---|---|---|

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant's unique citation designation number (optional). 2 See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. 3 Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). 4 For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. 5 Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. 6 Applicant is to place a check mark here if English language Translation is attached.

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ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /G.R.W/

PTO/SB/08 (09-06)

Approved for use through 03/31/2007. OMB 0651-0031

U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

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| Substitute for form 1449/PTO | | | | ***Complete if Known*** | |
|---|---|---|---|---|---|
| **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** | | | | **Application Number** | 16/752,441 |
| Date Submitted: May 28, 2020 | | | | **Filing Date** | January 24, 2020 |
| | | | | **First Named Inventor** | Yaron Brunner |
| *(use as many sheets as necessary)* | | | | Art Unit | 3736 |
| | | | | Examiner Name | John G. Pickett |
| Sheet | 1 | of | 1 | Attorney Docket Number | 066749-2584 |

**U.S. PATENT DOCUMENTS**

| Examiner Initials* | Cite No.[1] | Document Number<br>Number-Kind Code[2] *(if known)* | Publication Date MM-DD-YYYY | Name of Patentee or Applicant of Cited Document | Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear |
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| Examiner Initials* | Cite No.[1] | U.S. Patent Application Document<br>Serial Number-Kind Code[2] *(if known)* | Filing Date of Cited Document MM-DD-YYYY | Name of Patentee or Applicant of Cited Document | Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear |
|---|---|---|---|---|---|
| | | | | | |

**FOREIGN PATENT DOCUMENTS**

| Examiner Initials* | Cite No.[1] | Foreign Patent Document<br>Country Code[3]-Number[4]-Kind Code[5] *(if known)* | Publication Date MM-DD-YYYY | Name of Patentee or Applicant of Cited Documents | Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear | T[6] |
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| | A10 | TW D192092 | 08-11-2018 | Name not in English | | |

**NON PATENT LITERATURE DOCUMENTS**

| Examiner Initials* | Cite No.[1] | 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, page(s), volume-issue number(s), publisher, city and/or country where published. | T[6] |
|---|---|---|---|
| | | | |

| Examiner Signature | /GIDEON R WEINERTH/ | Date Considered | 09/17/2020 |
|---|---|---|---|

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Substitute for form 1449/PTO

**INFORMATION DISCLOSURE STATEMENT BY APPLICANT**

Date Submitted: September 16, 2020

*(use as many sheets as necessary)*

Sheet 1 of 2

| *Complete if Known* | |
|---|---|
| **Application Number** | 16/752,441 |
| **Filing Date** | January 24, 2020 |
| **First Named Inventor** | Yaron Brunner |
| Art Unit | 3736 |
| Examiner Name | WEINERTH, GIDEON R |
| Attorney Docket Number | 066749-2584 |

**U.S. PATENT DOCUMENTS**

| Examiner Initials* | Cite No.[1] | Document Number: Number-Kind Code[2] (*if known*) | Publication Date MM-DD-YYYY | Name of Patentee or Applicant of Cited Document | Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear |
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**UNPUBLISHED U.S. PATENT APPLICATION DOCUMENTS**

| Examiner Initials* | Cite No.[1] | U.S. Patent Application Document: Serial Number-Kind Code[2] (*if known*) | Filing Date of Cited Document MM-DD-YYYY | Name of Patentee or Applicant of Cited Document | Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear |
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| | | | | | |

| Examiner Signature | | Date Considered | |
|---|---|---|---|

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| *(use as many sheets as necessary)* | | | | Art Unit | 3736 |
| | | | | Examiner Name | WEINERTH, GIDEON R |
| Sheet | 2 | of | 2 | Attorney Docket Number | 066749-2584 |

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| | A19 | GB2110076 | 06-15-1983 | Ostling Bernt et al. | | |
| | A20 | GB2449934 | 12-10-2008 | Protrend Co Ltd. | | |
| | A21 | JP2013022972 | 02-04-2013 | IZUMI DOI, HIDEKI NOMA, MASAYUKI NAKANISHI | | |
| | A22 | JP2013022976 | 02-04-2013 | DAIFUKU KK | | |
| | A23 | WO2007/121746 | 11-01-2007 | J.O. MADSEN APS; MADSEN JENS OLE | | |
| | A24 | WO2009/140965 | 11-26-2009 | J.O. MADSEN APS; MADSEN JENS OLE | | |
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| | A27 | WO2014/125488 | 08-21-2014 | KETER PLASTIC LTD | | |
| | A28 | WO2017/212840 | 12-14-2017 | GENESIS CO., LTD. | | |

| **NON PATENT LITERATURE DOCUMENTS** | | | |
|---|---|---|---|
| Examiner Initials* | Cite No.[1] | 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, page(s), volume-issue number(s), publisher, city and/or country where published. | T[6] |
| | A29 | International Search Report and Written Opinion for International Application No. PCT/IL2020/050433, dated June 21, 2020, 14 pages | |

| Examiner Signature | | Date Considered | |
|---|---|---|---|

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Deutsches Patent- und Markenamt

# Information relating to design 402018201520-0001

Status on Sep 14, 2020

Please note: this English version is a non-binding translation of the German register excerpt. Only the German version of the register excerpt is legally binding.

The following registrations exist:

## Master data

**[19]** **Data file:** DE
**[-----]** **Data pool:** Active
**[-----]** **Design number:** 402018201520-0001
**[21]** **File number:** 402018201520.6
**[11]** **Register number:** 402018201520
**[-----]** **Design status:** Design registered
**[-----]** **Deferment status:** No deferment
**[22]** **Application date:** Apr 29, 2018
**[15]** **Date of registration:** Nov 5, 2018
**[-----]** **Publication date:** Nov 30, 2018
**[-----]** **Product(s):** Transportsicherungen, Transportgestelle, Transportpaletten
**[51]** **Class(es) of goods:** 08-08; 09-03; 09-08
**[-----]** **Version of class of goods:** 11
**[-----]** **Number of reproductions:** 3
**[73]** **Owner:** Dirk Schlenzka, 24329 Grebin, DE
**[-----]** **Address for service:** Herrn, Dirk Schlenzka, Saseler Redder 7, 24329 Grebin
**[-----]** **Term of protection obtained:** 5 years
**[-----]** **Payment due on:** Apr 30, 2023
**[-----]** **Payment deadline:** Oct 31, 2023
**[-----]** **Date of capture in the IT system:** Nov 30, 2018
**[-----]** **Date of the first transfer into DPMAregister:** Nov 6, 2018
**[-----]** **Date of the (most recent) update in DPMAregister:** Nov 6, 2018; Nov 30, 2018



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Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products
IPR2024-01401

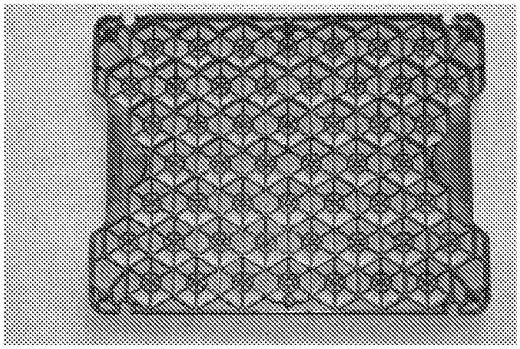
## Procedural data

Registration

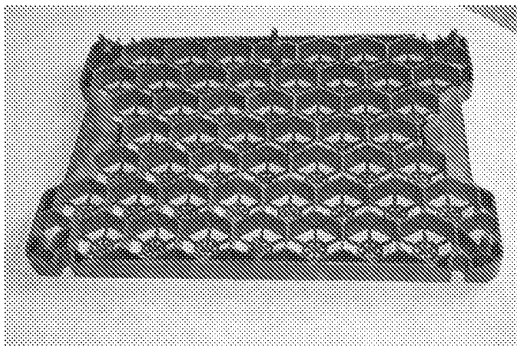
**[-----]** **Kind of procedure:** Registration
**[-----]** **Legal status:** The design has been registered
**[-----]** **Date of capture in the IT system:** Nov 5, 2018
**[-----]** **Issue:** 48
**[-----]** **Part of Gazette:** part 1a
**[-----]** **Publication year:** 2018
**[45]** **Publication date:** Nov 30, 2018

## Design reproduction

**402018201520-0001.1**



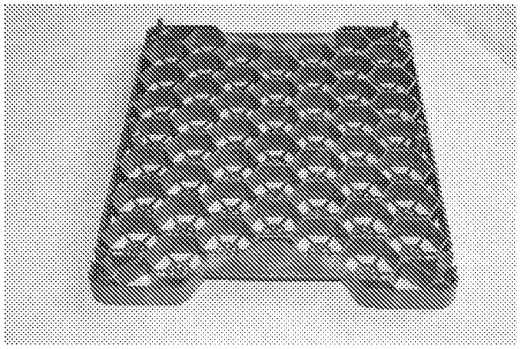
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**402018201520-0001.3**



Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2003 - Page 525
Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products
IPR2024-01401



Deutsches Patent- und Markenamt

# Information relating to design 402018201520-0002

Status on Sep 14, 2020

Please note: this English version is a non-binding translation of the German register excerpt. Only the German version of the register excerpt is legally binding.

The following registrations exist:

## Master data

**[19]** **Data file:** DE
**[-----]** **Data pool:** Active
**[-----]** **Design number:** 402018201520-0002
**[21]** **File number:** 402018201520.6
**[11]** **Register number:** 402018201520
**[-----]** **Design status:** Design registered
**[-----]** **Deferment status:** No deferment
**[22]** **Application date:** Apr 29, 2018
**[15]** **Date of registration:** Nov 5, 2018
**[-----]** **Publication date:** Nov 30, 2018
**[-----]** **Product(s):** Transportsicherungen, Transportgestelle, Transportpaletten
**[51]** **Class(es) of goods:** 08-08; 09-03; 09-08
**[-----]** **Version of class of goods:** 11
**[-----]** **Number of reproductions:** 1
**[73]** **Owner:** Dirk Schlenzka, 24329 Grebin, DE
**[-----]** **Address for service:** Herrn, Dirk Schlenzka, Saseler Redder 7, 24329 Grebin
**[-----]** **Term of protection obtained:** 5 years
**[-----]** **Payment due on:** Apr 30, 2023
**[-----]** **Payment deadline:** Oct 31, 2023
**[-----]** **Date of capture in the IT system:** Nov 30, 2018
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**[-----]** **Date of the (most recent) update in DPMAregister:** Nov 6, 2018; Nov 30, 2018



Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2003 - Page 527
Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products
IPR2024-01401

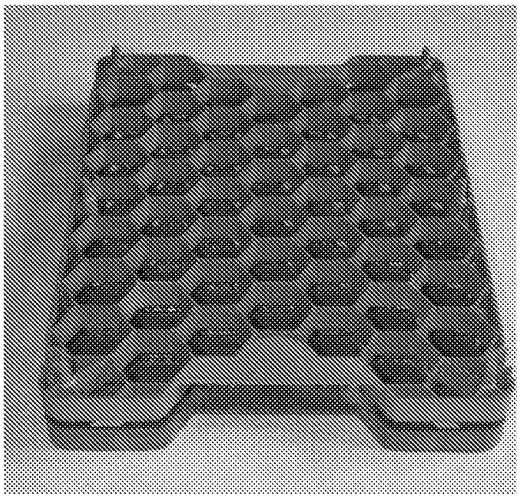
## Procedural data

Registration

**[-----]** **Kind of procedure:** Registration
**[-----]** **Legal status:** The design has been registered
**[-----]** **Date of capture in the IT system:** Nov 5, 2018
**[-----]** **Issue:** 48
**[-----]** **Part of Gazette:** part 1a
**[-----]** **Publication year:** 2018
**[45]** **Publication date:** Nov 30, 2018

## Design reproduction

**402018201520-0002.1**





**Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2003 - Page 528**
**Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products**
**IPR2024-01401**

(12) UK Patent Application (19) GB (11) 2 110 076 A

(21) Application No **8233451**
(22) Date of filing
**24 Nov 1982**
(30) Priority data
(31) **8107083**
(32) **27 Nov 1981**
(33) **Sweden (SE)**
(43) Application published
**15 Jun 1983**
(51) **INT CL³ A47B 57/42**
(52) Domestic classification
**A4B** 1C1 1C2 1D 1E 1G 2A 3B 5A1X 5A4X
(56) Documents cited
**GB A 2059252**
**GB 1020988**
**GB 0874137**
(58) Field of search
**A4B**
(71) Applicants
**Bernt Ostling**
**Adengatan 4**
**S–335 00**
**Gnosjo**
**Sweden**
**Per-Olof Johansson**
**Ekegatan 7**
**S–335 00**
**Gnosjo**
**Sweden**
(72) Inventor
**Bernt Ostling**
(74) Agent and/or Address for Service
**Wynne-Jones Laine and James**
**22 Rodney Road**
**Cheltenham**
**Gloucestershire**
**GL50 1JJ**

(54) **A mounting device**

(57) A toolholder for a numerically controlled machine is engaged by bars 7 in notches 9 and recess 10 of a bracket 5. The bracket bears a four-hooked mounting saddle and a pivotable abutment 16, and can be engaged with a slotted mounting plate 1 by:–

(a) first engaging the upper hooks, then swinging the bracket downwardly until the lower hooks engage, and the abutment contacts the plate at 15

(b) first folding the abutment upwardly, thereby allowing the lower hook to engage first, then swinging the bracket upwardly to engage the upper hooks, and finally swinging the abutment down to contact the plate at 15.

Method (a) is used when the vertical spacing of slots 2 is large, and method (b) is used when the slots are closely spaced. The inclination of the toolholder can be selected according to which notch 9 is used.

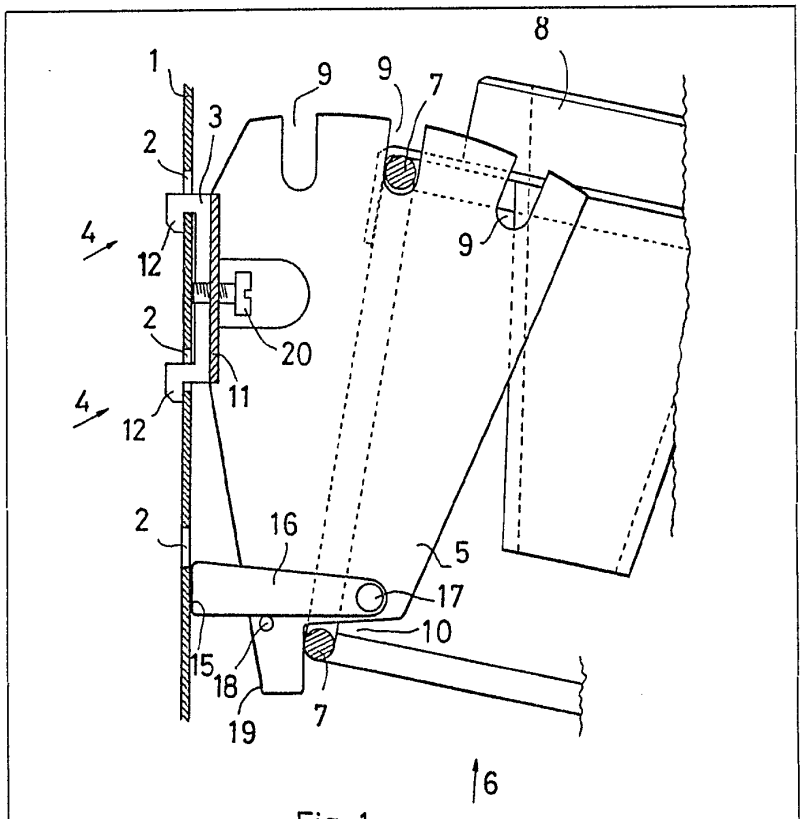



Fig 1

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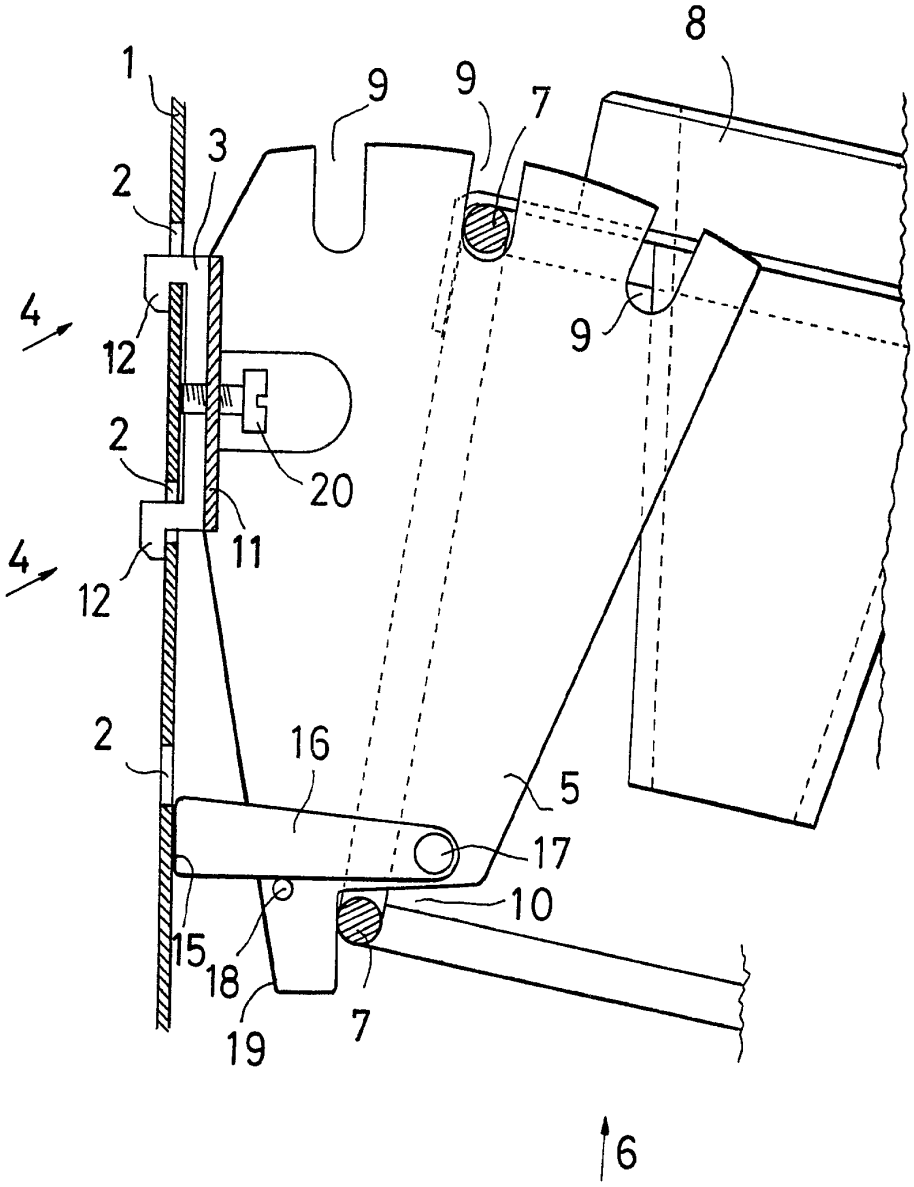



Fig 1

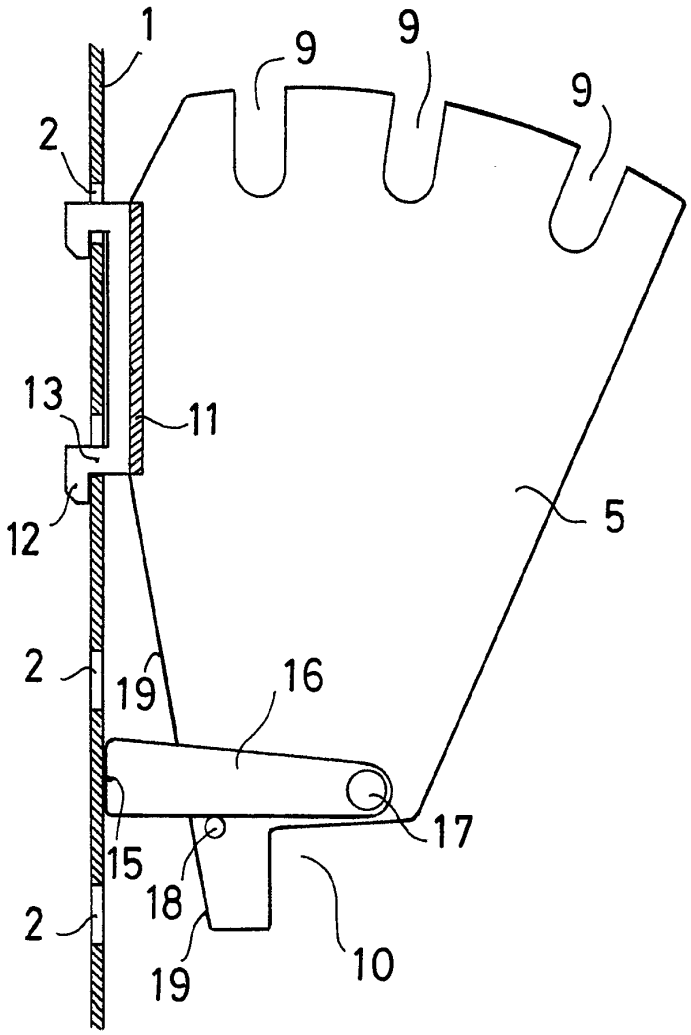



Fig 2

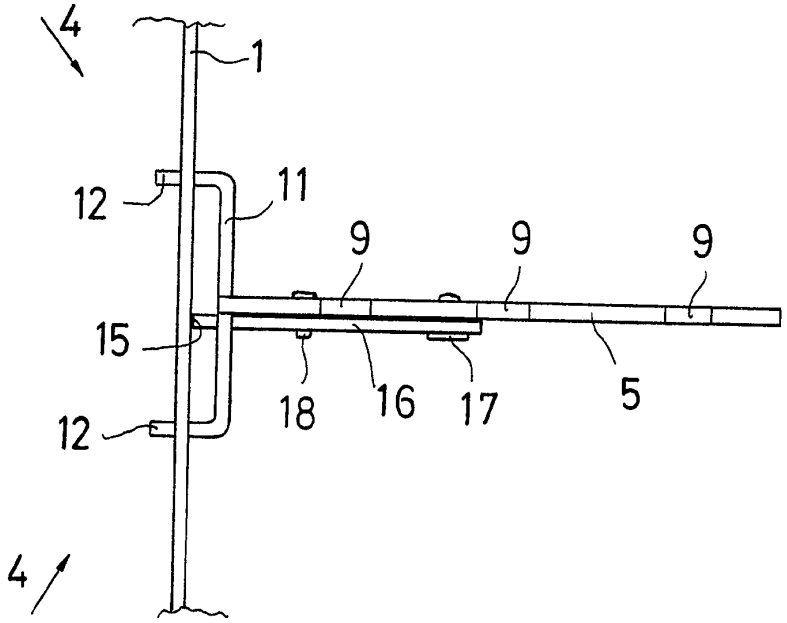



Fig 3

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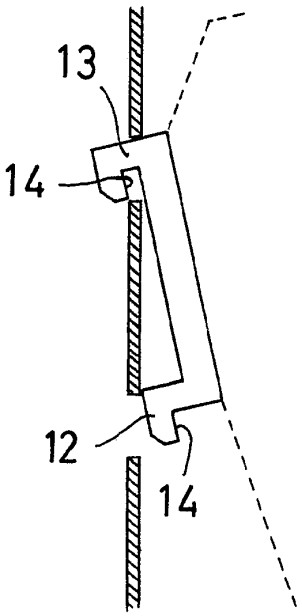



Fig 4

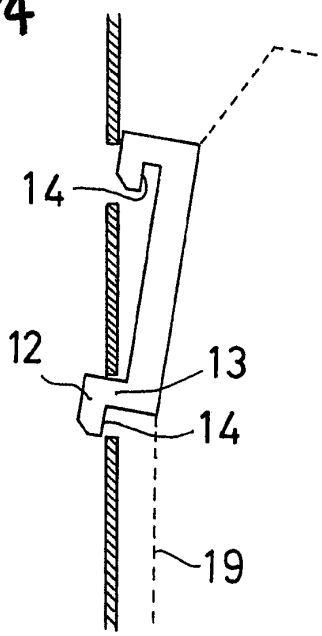



Fig 6

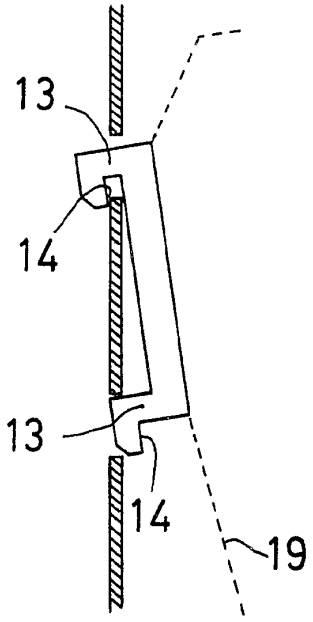



Fig 5

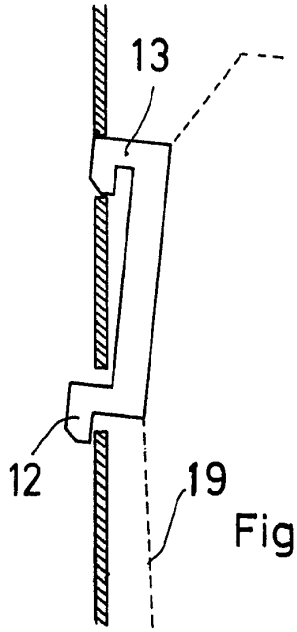



Fig 7

SPECIFICATION

**A mounting device**

The present invention relates to a device for mounting a tool rack which, for example, may be used for tools to an NC-controlled machine and which may releasably be suspended upon a carrier designed as a sheet metal plate perforated with square holes, the square holes being optionally one of two given, standardised spacings.

In the precision engineering industry, more and more use is being made of tool racks in which, for example, drills, milling heads or preset special tools for NC-controlled machines are stored during downtime and when the tools have been selected for use in the processing machine in question. The current types of tools are often heavy, this being particularly applicable to large milling heads and tools for NC-controlling machines, for which reason the tool rack may be of considerable weight. Furthermore, the tools may, on many occasions, be of such a bulky nature that they extend laterally outside the tool rack employed.

In the precision engineering industry, use is often made, for suspending different types of tools, machine parts, implements and the like, of sheet metal panels perforated with square holes. In these perforated sheet metal panels, the square holes have the same dimensions but there are two different spacings between the holes, both vertically and horizontally. For this reason, there are available on the market both special tool holders in a great number of variaties which are intended for either of the hole spacings, but certain types of universal tool holders have also been launched on the market which may be used for both hole spacings.

Despite the fact that the above-mentioned square hole-perforated panels have come into considerable use, it has not hitherto been possible to use them for mounting the tool racks mentioned by way of introduction. Instead, special panels, bracket rails and the like in highly specialised designs have been used, the tool racks being in many cases designed in such a way as to be suspendible directly in these bracket rails. The use of these tool racks entails, thus, a risk for two different, mutually incompatible systems for tool storage, a situation which is wholly unacceptable.

One conceivable reason that the above-mentioned square hole perforated sheet metal panels have not been used for tool racks of the type described by way of introduction is that the mounting means used in the sheet metal panels have displayed, because of the dimensions of the sheet metal panels, wholly unsatisfactory strength properties.

Thus, the object of the present invention is the like, the device being designed in such a manner as to be able to cooperate with the square hole-perforated sheet metal panels mentioned by way of introduction, irrespective of the spacing of the holes thereof. A further object of the present invention is to realise a mounting device which offers fully satisfactory stability and strength properties, despite the often considerable weight of the tool racks. Finally, a further object of the present invention is to realise a mounting device which permits mounting of a tool rack in such a manner that the tool rack inclines in relation to a vertical plane.

The objects of the present invention are attained by means of a device of the type disclosed by way of introduction which has catches disposed on an anchorage portion for engagement in the above-mentioned holes, the anchorage portion transmitting the load of the tool rack to a support member designed as a perforated sheet metal panel, and the invention being characterised in that the anchorage portion has a projecting retainer member on which the tool rack may be suspended, that the retainer member has a portion extending beneath the catches with a support surface in contact with the support member, and that the catches have mutually superposed abutment surfaces which, irrespective of the spacing of the holes, are in contact with that side of the support member turned to face away from the support surface.

In order to ensure simultaneous abutment between all of the abutment surfaces and the support member so as thereby to obtain a greater load-bearing capacity, the subject matter of the present invention is further suitably characterised in that the support surface and the abutment surfaces are in such mutual spaced apart relationship that a plane through the abutment surfaces at the support surface is at a distance therefrom which substantially coincides with the material thickness of the support member.

One advantageous method of designing the anchorage portion so that it may, irrespective of the hole spacing in the support member, cooperate therewith, will be realised if the vertical maximum dimensions for the heads of the catches are insignificantly less than the vertical extent of the holes, and if the catches are dispoed with a spacing which lies between the prevalent hole spacing. In this embodiment, only one catch determined by the hole spacing in question can simultaneously be inserted through the holes, whereby the anchorage portion must be inclined. According to the present invention, this embodiment is suitably characterized in that the portions of the retainer member located above and beneath the catches are disposed in spaced apart relationship from the support member in order to permit inclination of the anchorage

Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2003 - Page 534
Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products
IPR2024-01401

vided on a movably disposed portion, whereby the support surface is movable to a greater distance from a plane through the abutment surfaces.

In order readily to permit placing of the tool rack on the retainer member and also removal of the rack therefrom, the subject matter of the present invention is suitably characterised in that the retainer member has a lower recess closed towards the support member for cooperation with a part included in the tool rack, and at least one upwardly open recess for cooperation with a further part included in the tool rack.

An example of the invention will be described in greater detail below with reference to the accompanying drawings, in which:–

*Figure 1* shows a rack mounting device in vertical section with a tool rack mounted in cooperation with a perforated sheet metal panel with the larger of the two given hole spacings;

*Figure 2* is a view corresponding to Fig. 1, a locking screw having, however, been dispensed with and the subject matter of the present invention being mounted in a sheet metal panel of the lesser hole spacing;

*Figure 3* is a top plan view of the device according to Fig. 2;

*Figures 4 and 5* illustrate two mutually subsequent steps in the attachment of the anchorage portion to a sheet metal panel with the larger of the two hole spacings; and

*Figures 6 and 7* show corresponding steps in the attachment of the anchorage portion to a sheet metal panel with the lesser hole spacing.

Fig. 1 illustrates a sheet metal panel or support, designated 1, and perforated with square holes 2. The holes in this sheet metal panel are all of equal size and have, in those types most frequently offered on the market, a 9 mm hole side. The spacing, both horizontal and vertical, may vary between two dimensions namely 34 and 38 mm, respectively.

The sheet metal panel 1 may, in practice, be disposed with approximately vertical directioning, and, for example, be permanently fixed to a wall in a store premises on a specially provided frame, a trolley or the like. Sheet metal panels of this type are conventionally used for suspending all kinds of tools, equipment, machine parts and the like and may, in general terms, be considered as standard.

An anchorage device 3 is disposed in the square holes of the sheet metal panel and is provided with four catches 4 (see Fig. 3), the anchorage device 3 being further provided with a projecting retainer member 5 which serves to cooperate with the tool rack 6 proper.

The tool rack per se is of no vital importance to the present invention, but merely has which cooperate with the retainer member 5. Otherwise, it should be designed in such a manner as to possess the requisite stability and such that it may simply be lifted from the retainer member 5 and carried to a site of use. Furthermore, the tool rack 6 has, on its upper face, a number of brackets 8, preferably manufactured of plastics material, in which the cutting tools proper are placed.

Since the tools themselves may often be of relatively large diameter, it is necessary that the tool rack can be suspended in such a manner that it is not located immediately adjacent the sheet metal panel 1, since, in such an event, the tools would perhaps not have room. Furthermore, considerable space saving in the vertical direction may be achieved at the same time as the tools will be more easily accessible if the tool racks were to be suspended above one another and inclined outwardly from the sheet metal panel 1 to an angle of up to 30°. The above-described placement of the tool racks and tools therein entails that the centre of gravity would be located at a considerable horizontal distance out from the sheet metal panel 1.

In order to permit the above-described suspension of the tool rack in several differnt manners in the retainer member 5, the retainer member has, in its upper edge, a series of recesses 9 which are open upwardly. Furthermore, in its lower portion, the retainer member has a recess 10 which is closed in a direction in towads the sheet metal panel 1, but is open at least in the opposite direction. As a result, the tool rack may readily be removed from the retainer member 5 in that the lower horizontal rod 7 is pivoted outwardly from the sheet metal panel 1, whereafter the entire tool rack is lifted so that the upper horizontal rod 7 is freed from the recess 9.

In order that suspension of the tool rack be effected in a closed but nevertheless reliable manner, the upper recesses 9 are, according to the invention, placed approximately along the arc of a circle whose centre point is located in the lower recess 10.

As will be apparent from Fig. 3, the retainer member 5 according to the invention may suitably be of one-piece sheet metal construction of appropriate thickness.

As is aparent from Fig. 3, the anchorage portion 3 is of U-shape seen from above and has a rectangular plate 11 from whose corners four catches 4 extend. The catches have, in their outer ends, heads 12 whose vertical extent is slightly less than the vertical extent of the holes 2 in the sheet metal panel 1. Furthermore, the catches are provided with collar portions 13 inside the heads 12, the collar portions connecting the heads to the anchorage portion 3 proper.

Suitably, the spacing between the catches 4

Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2003 - Page 535
Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products
IPR2024-01401

of the two alternative hole spacings in the sheet metal panel 1. In a practical example, this would entail that the vertical spacing of the cataches 4 amounts to 36mm if both of the alternative hole spacings are 34 and 38mm, repsectively. Furthermore, the vertical extent of the collar portion 13 may suitably amount to approximately half of the vertical extent of the heads 12 of the catches.

As a result of the above-described relationship between the placing and dimensioning of the catches, and the holes and their mutual spacing in the sheet metal panel, it is possible to insert the anchorage portion 3 to those positions illustrated in Figs. 1 and 2 where, thus, the heads 12 of the catches are located on the rear face of the sheet metal panel 1. In the alternative with the larger hole spacing in the sheet metal panel 1, it is necessary first to insert the head of the upper catch completely through a hole, whereafter the entire catch is shifted vertically downwardly until the head of the lower catch may also be passed through a corresponding lower hole. This process is illustrated in Figs. 4 and 5, and it should be particularly emphasized that the entire anchorage portion 3 and, naturally, the retainer member 5, will, therefore, also be relatively greatly inclined during the mounting operation in relation to the sheet metal panel 1.

If the sheet metal panel 1 has the lesser of the two hole spacings, it is impossible to insert the anchorage portion 3 in the above-described manner. Instead, the head of the lower catch must first be fully inserted through a suitable hole in the sheet metal panel. Thereafter, the anchorage portion 3 must be shifted downwardly until the head 12 of the upper catch is located in register with a corresponding upper hole, whereafter the head may be inserted therethrough and the entire anchorage portion shifted into place. This operation is illustrated in Figs. 6 and 7. If is apparent from these Figs. that the entire anchorage portion 3 and, naturally, also the retainer member 5, will be greatly inclined during the initial phase of the mounting operation.

It will be apparent from Fig. 1 that in the alternative with the larger hole spacing in the sheet metal panel 1, the upper pair of catches 4 will support all of the vertical loading from the tool rack 6. On the other hand, all four catches in the anchorage portion 3 will contribute to load uptake in a direction which is at right angles out from the sheet metal panel 1.

It will be further apparent from Fig. 2 that the same loading conditions apply in the horizontal direction if the sheet metal panel 1 has the lesser hole spacing, whereas, on the other hand, the loading in the vertical direction will be taken up completely by the lower catch pair.

In order that the described loading in-abutment surfaces of the catches facing the sheet metal panel 1 participate in the load uptake, the retainer member 5 must abut with a support surface 15 against the sheet metal panel 1. However, this support surface 15 cannot be disposed directly on the retainer member 5, since, in such an event, the requisite inclination of the retainer member on mounting on the sheet metal panel 1 would be prevented (See Figs. 6 and 7). Consequently, the support surface 15 is disposed on a support arm 16 which, by means of a joint 17, is pivotally connected to the retainer member 5 so that, in the operative position, it abuts against a stop member 18, and extends with a portion beyond the edge 19 of the retainer member 5 facing the sheet metal panel. This projection portion of the support arm 16 mounts the support surface 15 in its extremity. In order thus to permit mounting of the retainer member and the anchorage portion, the support arm 16 is, as intimated in Figs. 6 and 7, quite simply swung away so that it is located inside the edge 19. When the retainer member is subsequently brought to the position shown in Figs. 1 and 2, the suppot arm 16 is pivoted back so that thereby the support surface 15 comes into abutment against the sheet metal panel.

A condition that co-operation between the four catches and the sheet metal panel 1 be effected in the contemplated manner is that a plane through all four abutment surfaces 14 be in spaced apart relationship to the support surface 15 in its operative position a distance which substantially coincides with the material thickness of the sheet metal panel 1. As one alternative, the support surface 15 can, naturally, also constitute a cam surface which may with a certain portion be moved closer to or further away from the above-mentioned plane simple by a more or less extensive pivoting of the support arm 16.

As is apparent from Fig. 1, the plate 11 is further provided, in the anchorage portion 3, with a locking screw 20 whose primary object is to prevent play and rattle between the catches and the sheet metal panel 1. However, the screw 20 may also be seen as a guarantee against unintentional release of the anchorage portion 3 at least in that case when the anchorage portion is placed in the sheet metal panel having the larger hole spacing.

As a result of the above-described design of the anchorage portion, its catches and the sheet metal panel, a particularly favourable load uptake will be realised. Thus, loadings will be taken up in a favourable shearing direction in a vertical direction towards the collar portions by two catches simultaneously. As far as loading at right angles to the sheet metal panel 1 is concerned, all four catches co-operate, this being advantageous because of the long lever for the loading exercised by

Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2003 - Page 536
Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products
IPR2024-01401

In order further to improve the load uptake direction in the horizontal line, it is possible according to the present invention to shift the anchorage portion 3 upwardly so that it is placed flush with the upper edge of the retainer member 5.

Furthermore, the support arm 16 need not be of the appearance shown on the drawings, only as long as the support surface 15 may be moved away from its position of engagement with the sheet metal panel 1. For example, the pivotal support arm 16 may be replaced by a screw which extends through a threaded lug up-standing from the retainer member 5 and being approximately parallel to the plate 11.

The invention may be modified further without departing from the scope of the appended claims.

CLAIMS

1. A device for mounting a tool rack (6) or the like on a carrier (1), the carrier being provided with a number of vertical hole rows whose holes (2) have one optionally of preferably two given spacings, and catches (4) on an anchorage portion (3) engaging in the holes of the carrier, the loading of the tool rack being transmitted to the carrier, characterised in that the anchorage portion (3) has a projecting retainer member (5) on which the tool rack (6) may be suspended, that the retainer member (5) has a support member (16) extending beneath the catches and having a support surface (15) in contact with the carrier (1), and that the catches have mutually superposed abutment surfaces (14) which, irrespective of the spacing of the holes (2), are in contact with the side of the carrier facing away from the support surface.

2. A device according to claim 1, characterised in that the support surfaces (15) and the abutment surfaces (14) are of such mutual placing that a plane through the abutment surfaces at the support surface is at a distance therefrom which substantially coincides with the material thickness of the carrier (1).

3. A device according to claim 1 or 2 and in which the vertical maximum dimension of the heads (12) of the catches (4) are insignificantly less than the vertical extent of the holes (2), and the catches are disposed at a spacing which lies between the given spacings for the holes, whereby, on mounting of the anchorage portion (3), but one catch determined by the current hole spacing can simultaneously be passed through the holes, characterised in that the portions of the retainer member (5) located above and below the catches (4) are disposed in spaced apart relationship to the carrier (1) in order to permit inclination of the anchorage portion (3), and that the support surface (15) is disposed on a movably disposed support member (16), whereby the tance from the plane through the abutment surfaces.

4. A device according to claim 1, 2 or 3, characterised in that the retainer member (5) has a lower recess (10) closed towards the carrier member for co-operation with a part (7) included in the tool rack (6), and at least one upwardly open recess (9) for co-operation with a further part included in the tool rack.

5. A device according to claim 3, charaterised in that the retainer member (5) has a plurality of upwardly open recesses (9) disposed at different distances from the carrier (1) and disposed approximately along the arc of a circle with the lower recess (10) as the centre point thereof.

6. A device according to any one of the preceding claims, characterised in that four catches (4) are disposed on each anchorage portion (3), the cataches being disposed pairwise on the same vertical level.

7. A device for mounting a tool rack substantially as hereinbefore described with reference to the accompanying drawings.

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Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2003 - Page 537
Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products
IPR2024-01401

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(51) INT CL:
***A47B 57/40*** (2006.01) ***A47B 96/06*** (2006.01)

(56) Documents Cited:
**GB 2370753 A** **GB 2144974 A**
**US 6024333 A** **US 5921412 A**
**US 5538213 A** **US 3701325 A**

(58) Field of Search:
UK CL (Edition X ) **A4B**
INT CL **A47B**
Other: **WPI, EPODOC**

(54) Abstract Title: **A wall mounted rack assembly**

(57) A multipurpose wall-mount rack 1 includes at least two vertical posts 10, each of which is provided on a front side with two longitudinal rows of spaced holes 11; and a plurality of supporting brackets 20 of the same configuration adapted to connect to the vertical posts by inserting respective rear end into the holes on the front side of the vertical posts. The supporting brackets have a plurality of retaining slots 23,24,25 on their upper edges and are configured to support any one of a metal-wire shelf 30, a board-type shelf (60, fig 10), a slide-out basket (67, fig 13) or a suit hanger bar (73, fig 16) thereon. The vertical posts are also provided at two lateral sides with a longitudinal row of spaced holes 12. A box-type container 50 maybe mounted to and between the two vertical posts via two hooking members (51, fig 5) which are hooked at outer hook portions to the lateral holes and engaged at upper slots with two pins (52, fig 5) projecting rearwardly from near two rear upper ends of the box-type container.

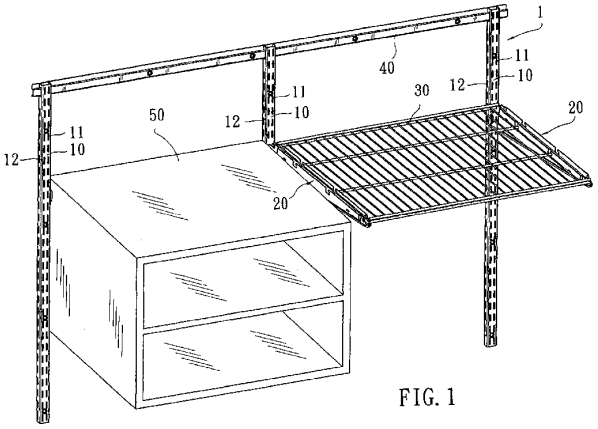



FIG. 1

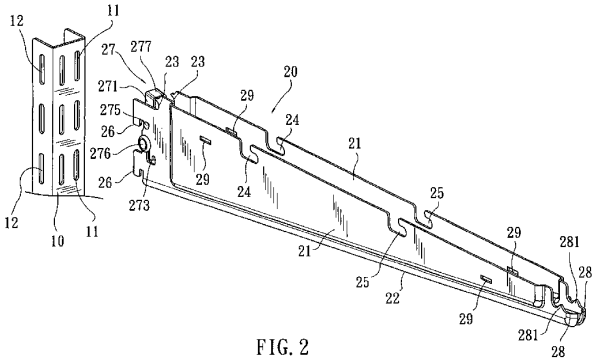



FIG. 2

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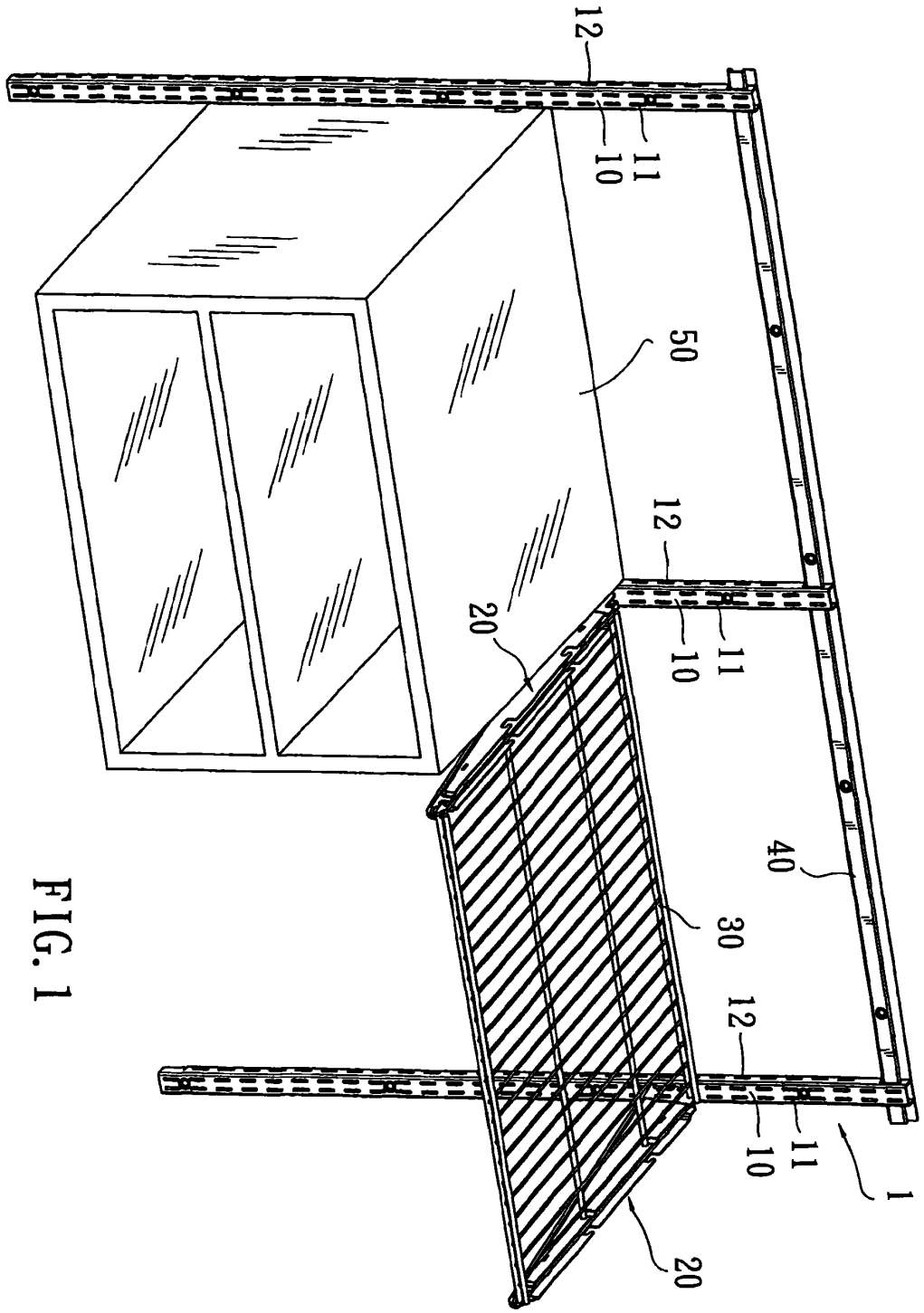



FIG. 1

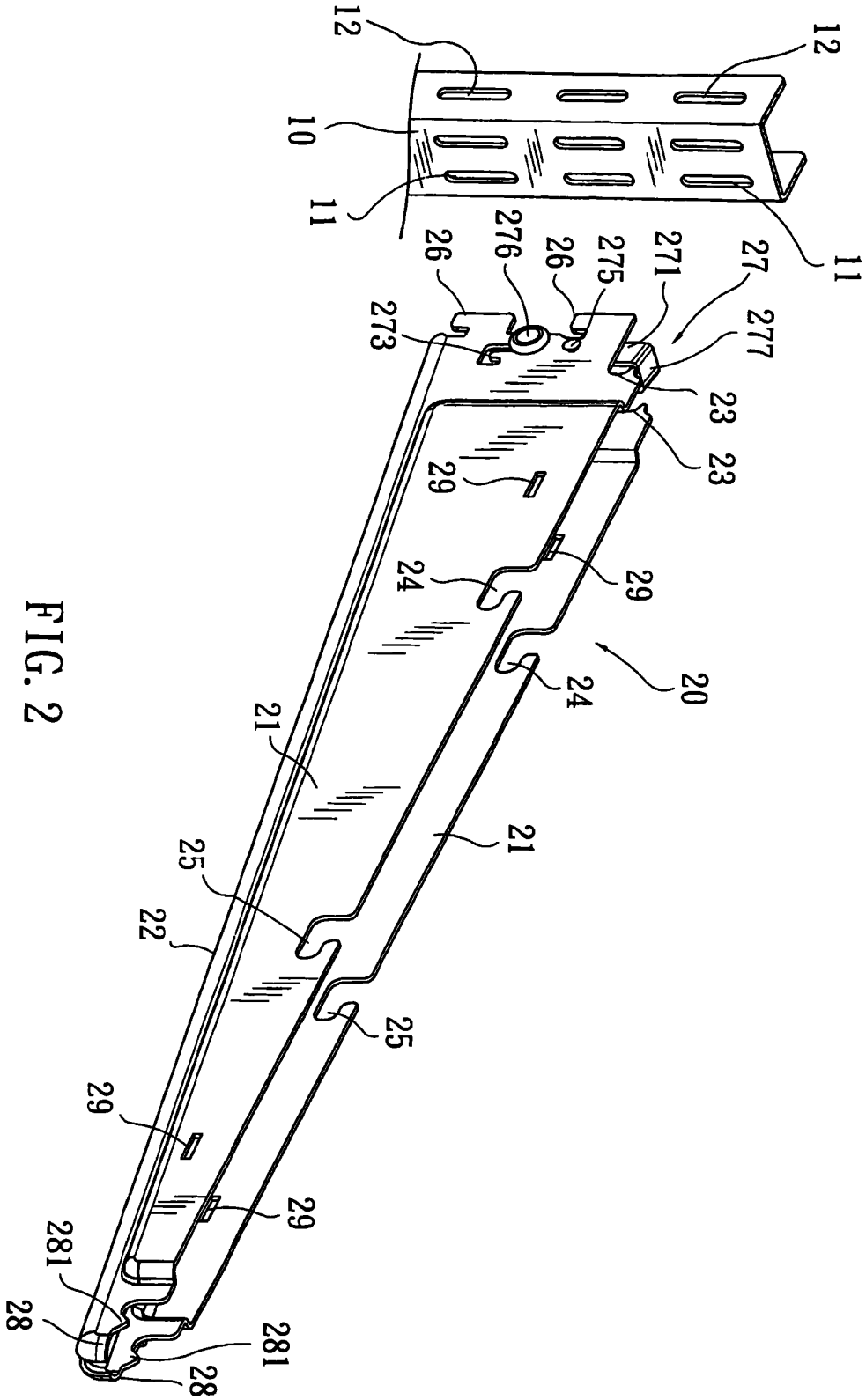

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FIG. 2

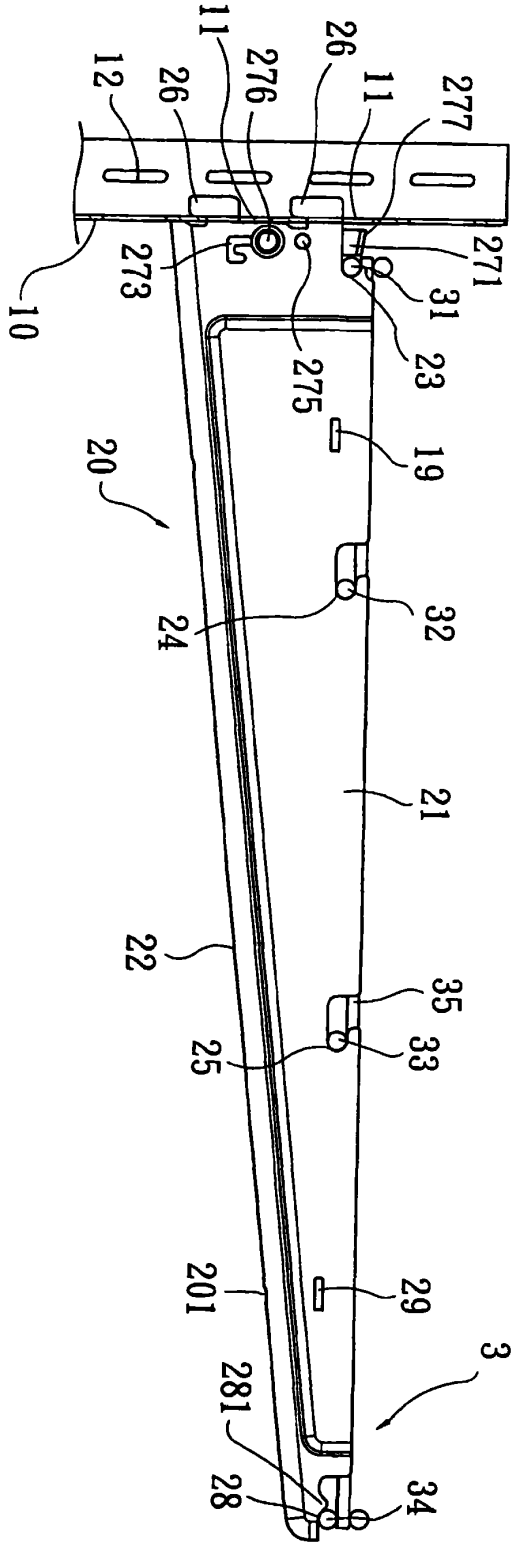

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FIG. 3

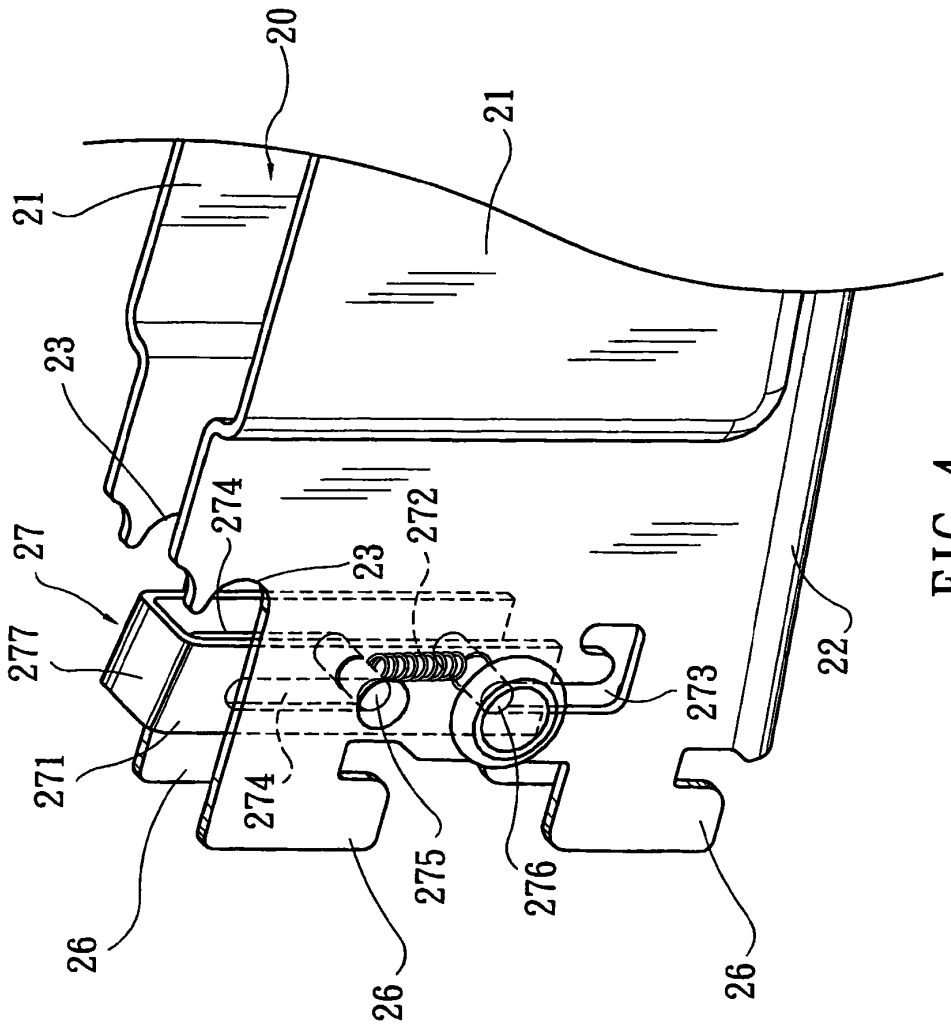



FIG. 4



Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2003 - Page 542
Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products
IPR2024-01401

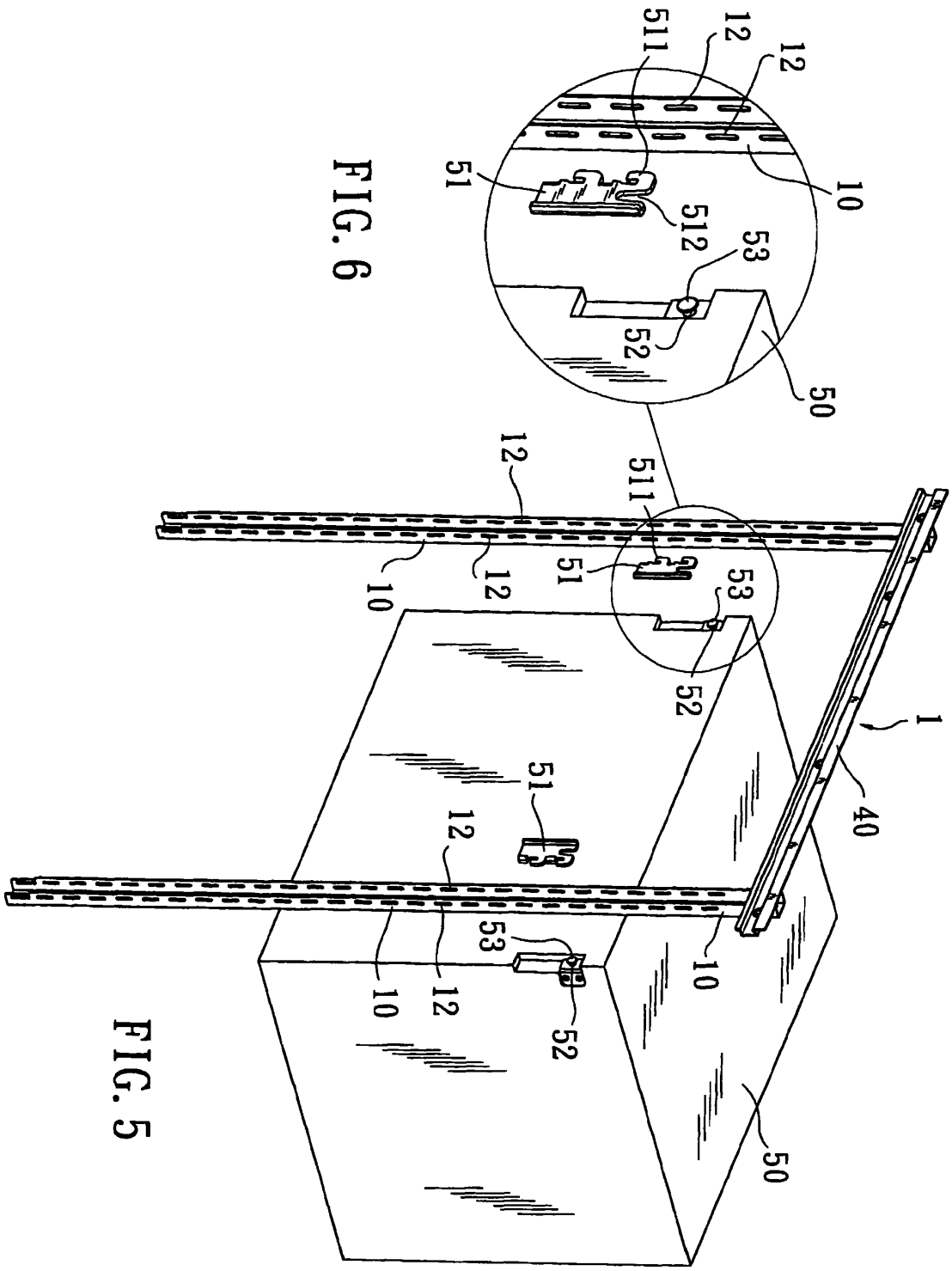
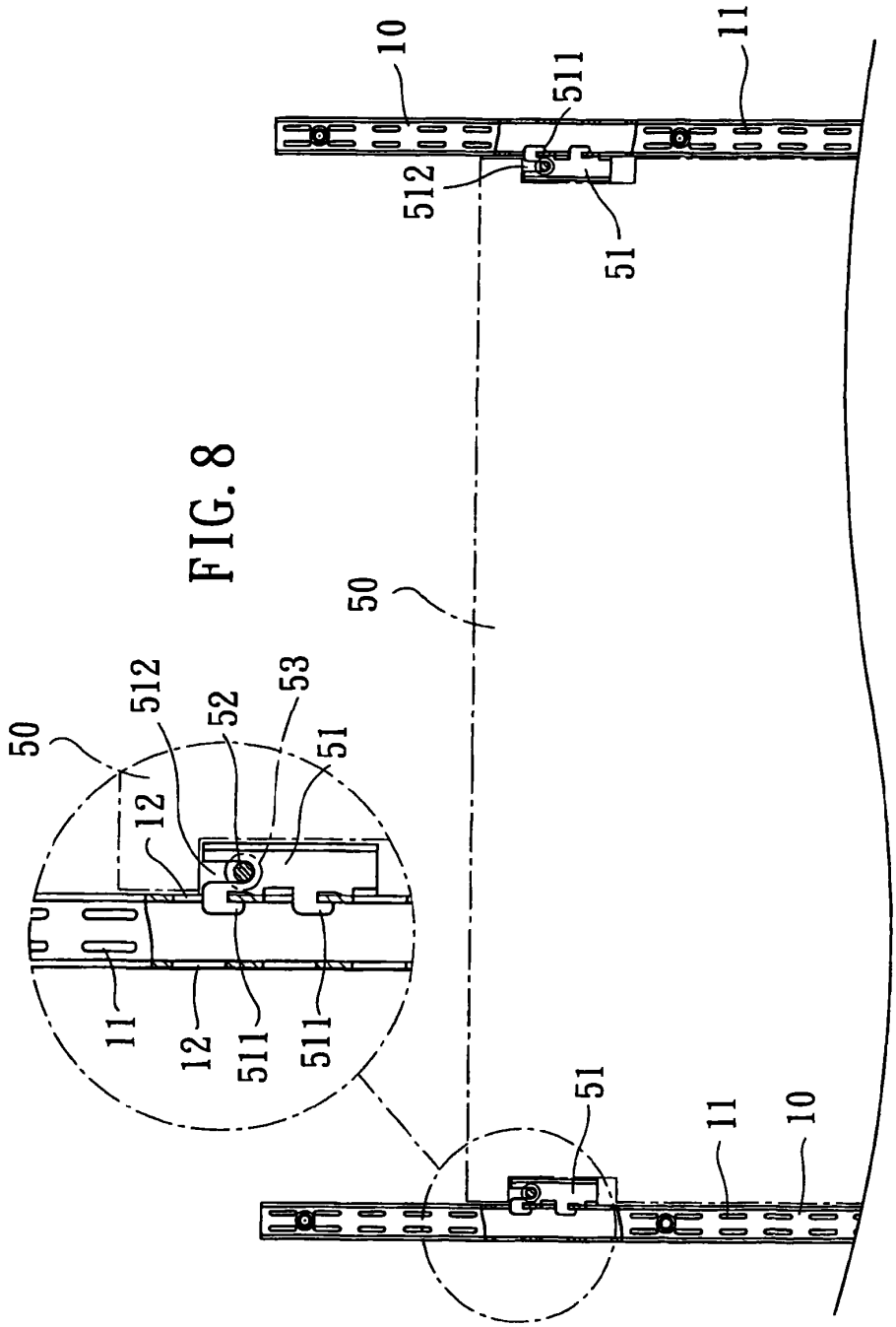

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FIG. 6

FIG. 5






Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2003 - Page 544
Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products
IPR2024-01401

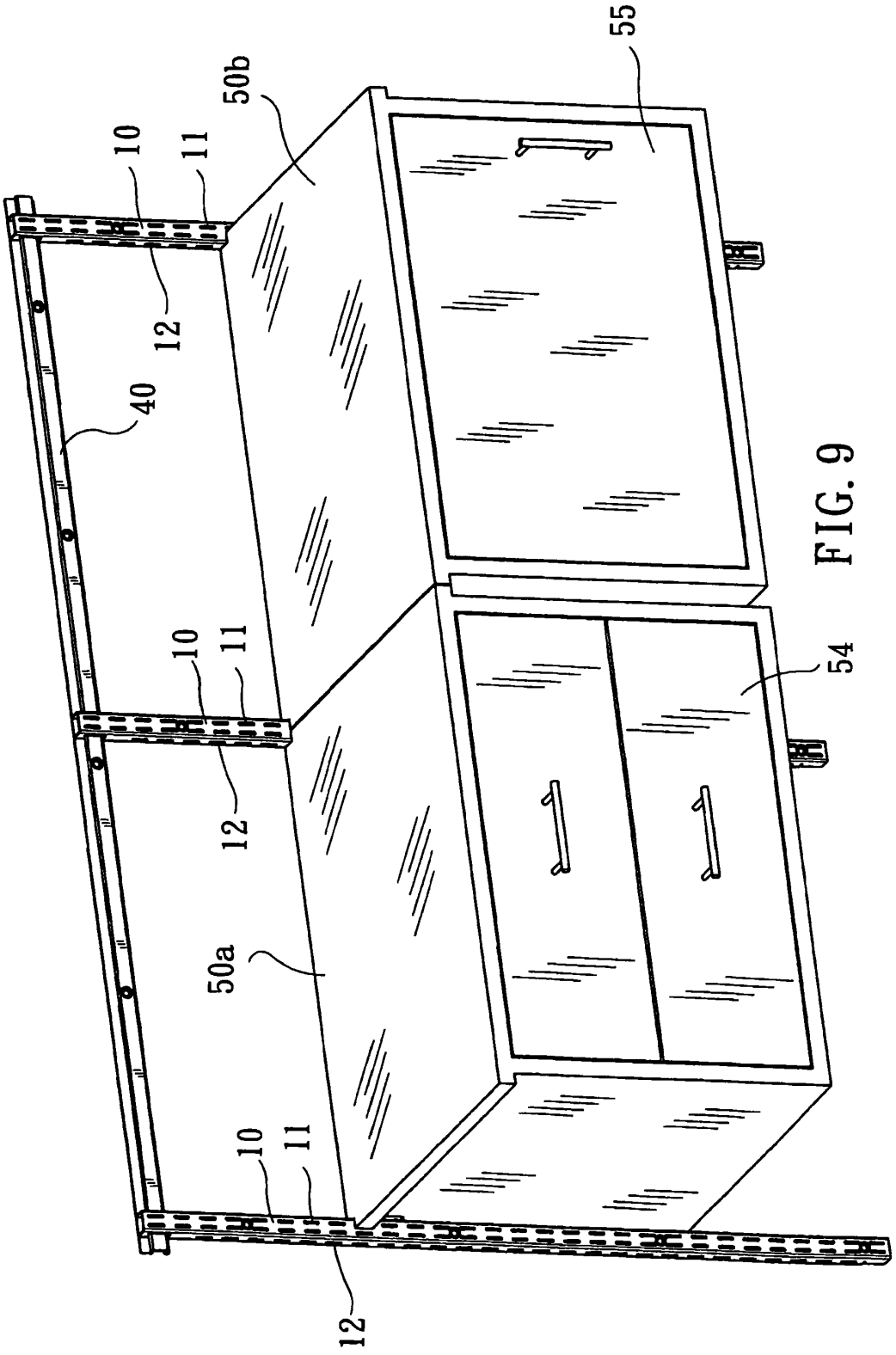



FIG. 9



Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2003 - Page 545
Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products
IPR2024-01401

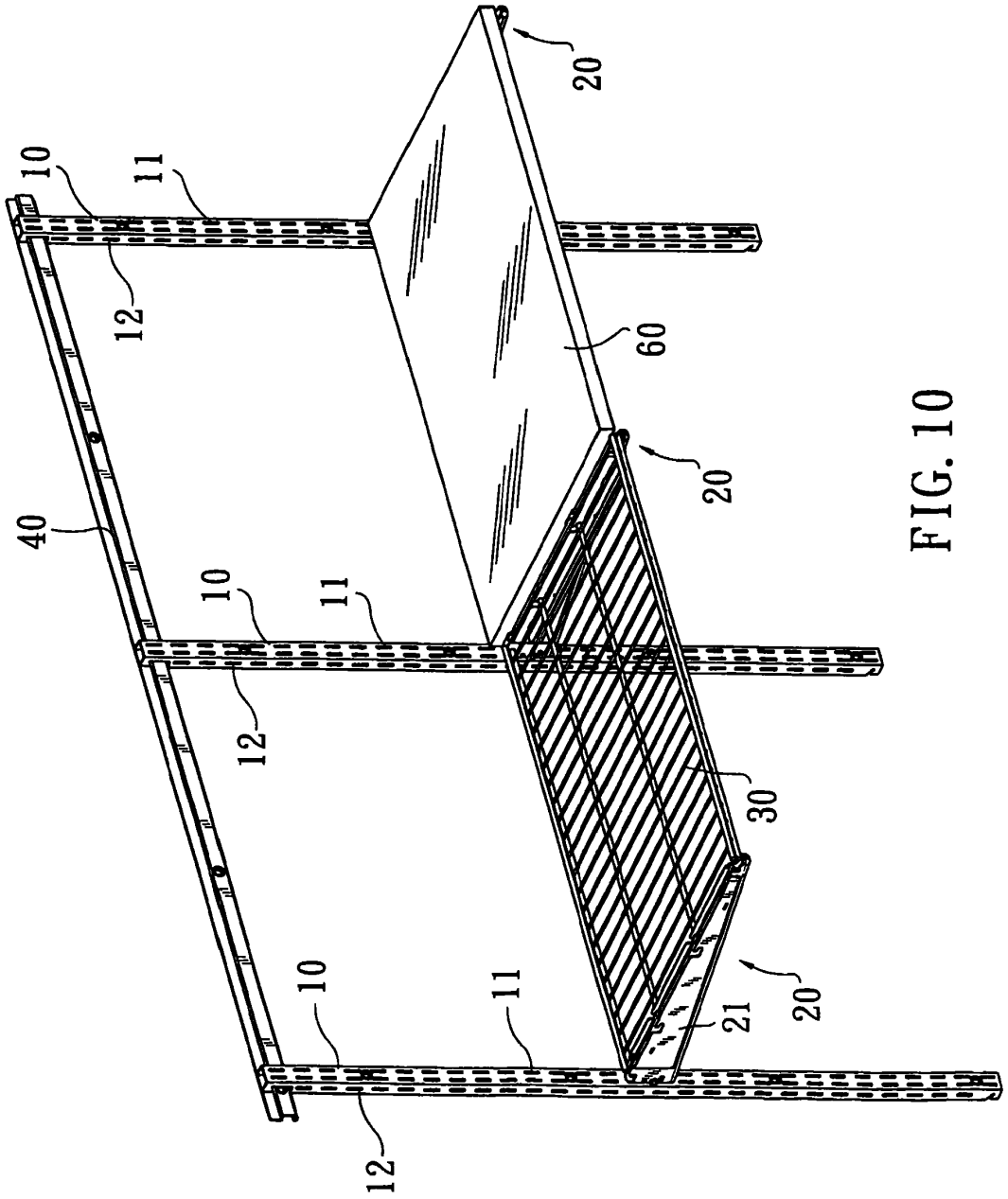



FIG. 10



Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2003 - Page 546
Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products
IPR2024-01401

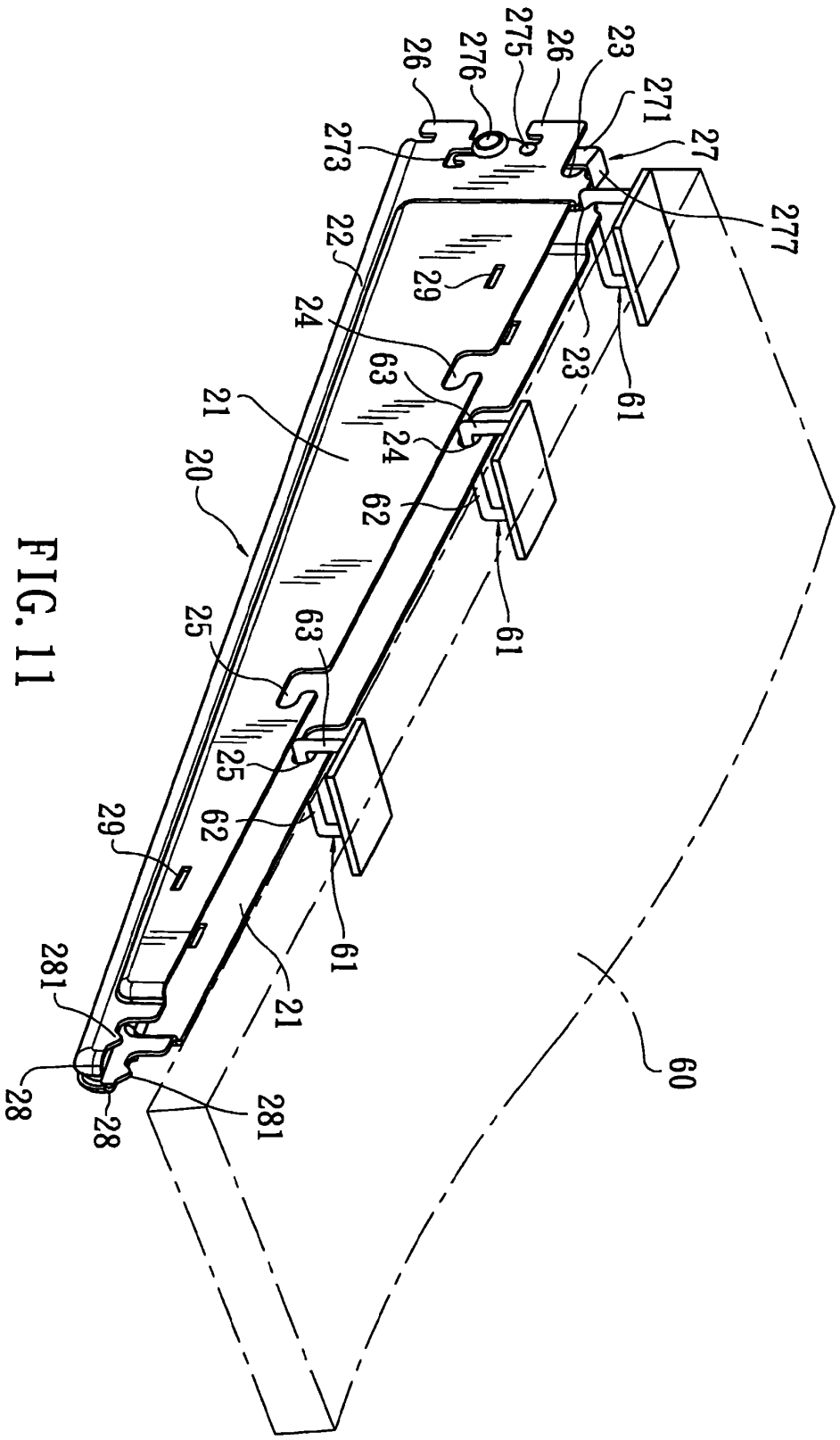

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FIG. 11

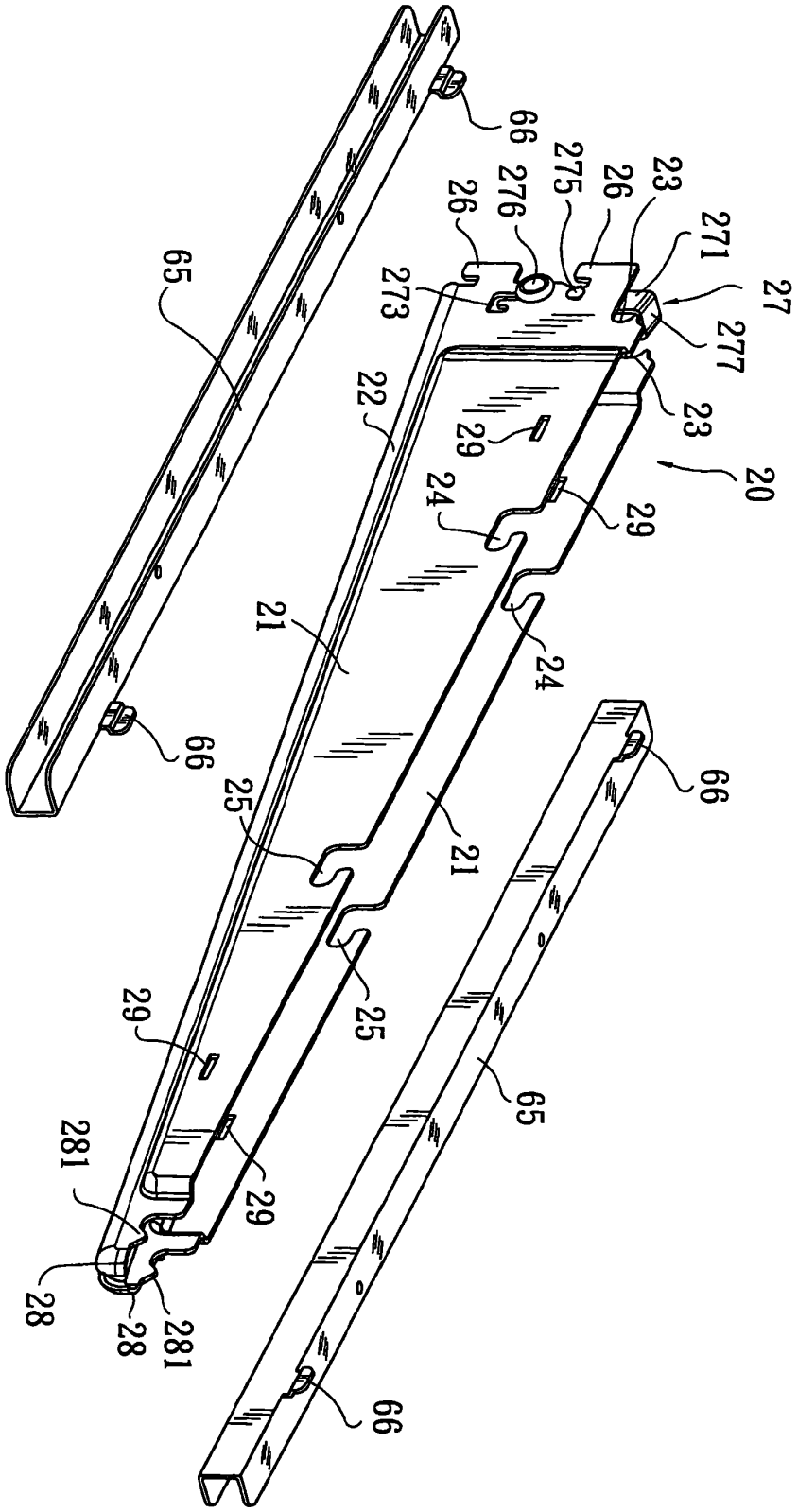



FIG. 12

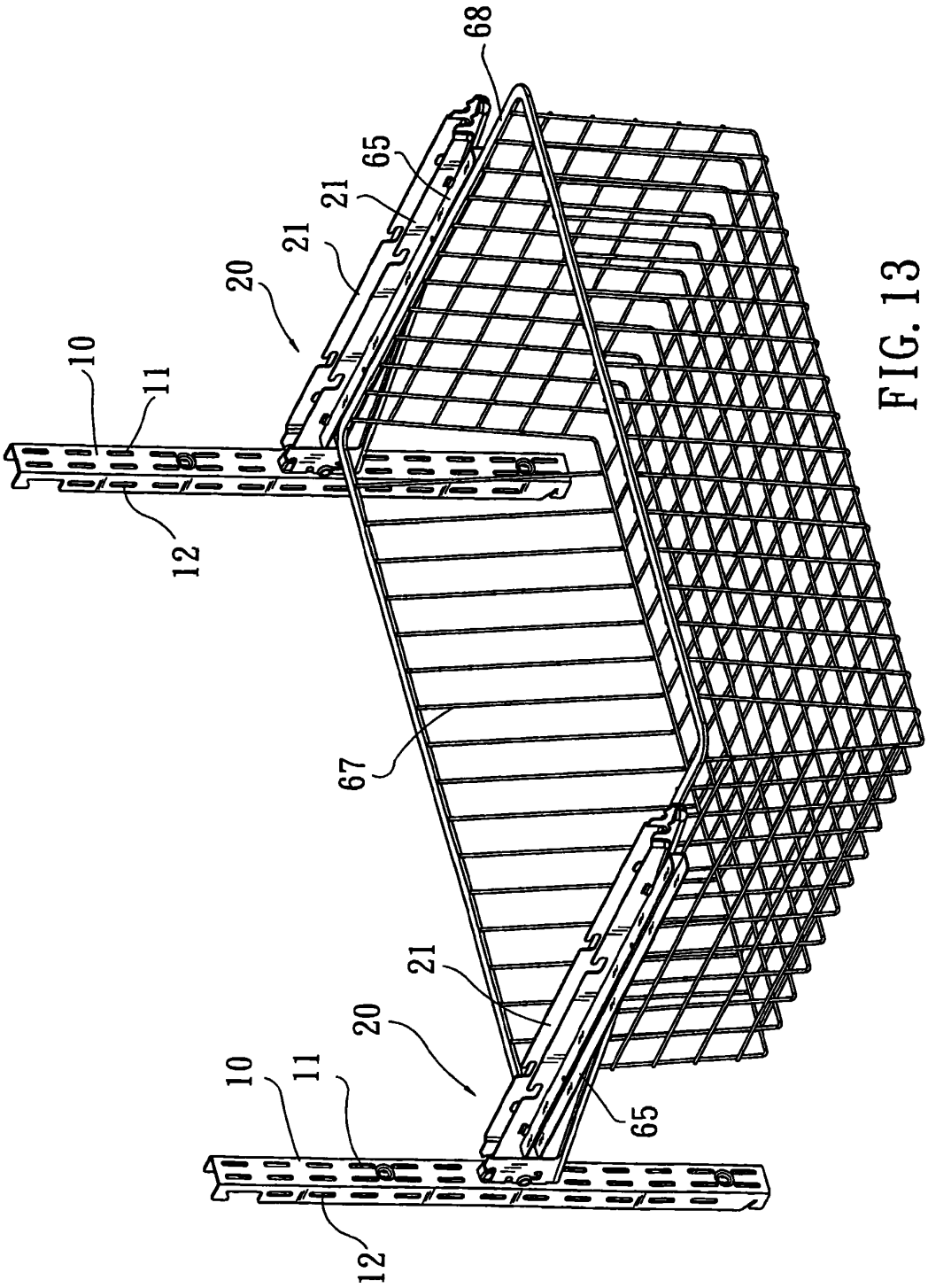



FIG. 13



Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2003 - Page 549
Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products
IPR2024-01401

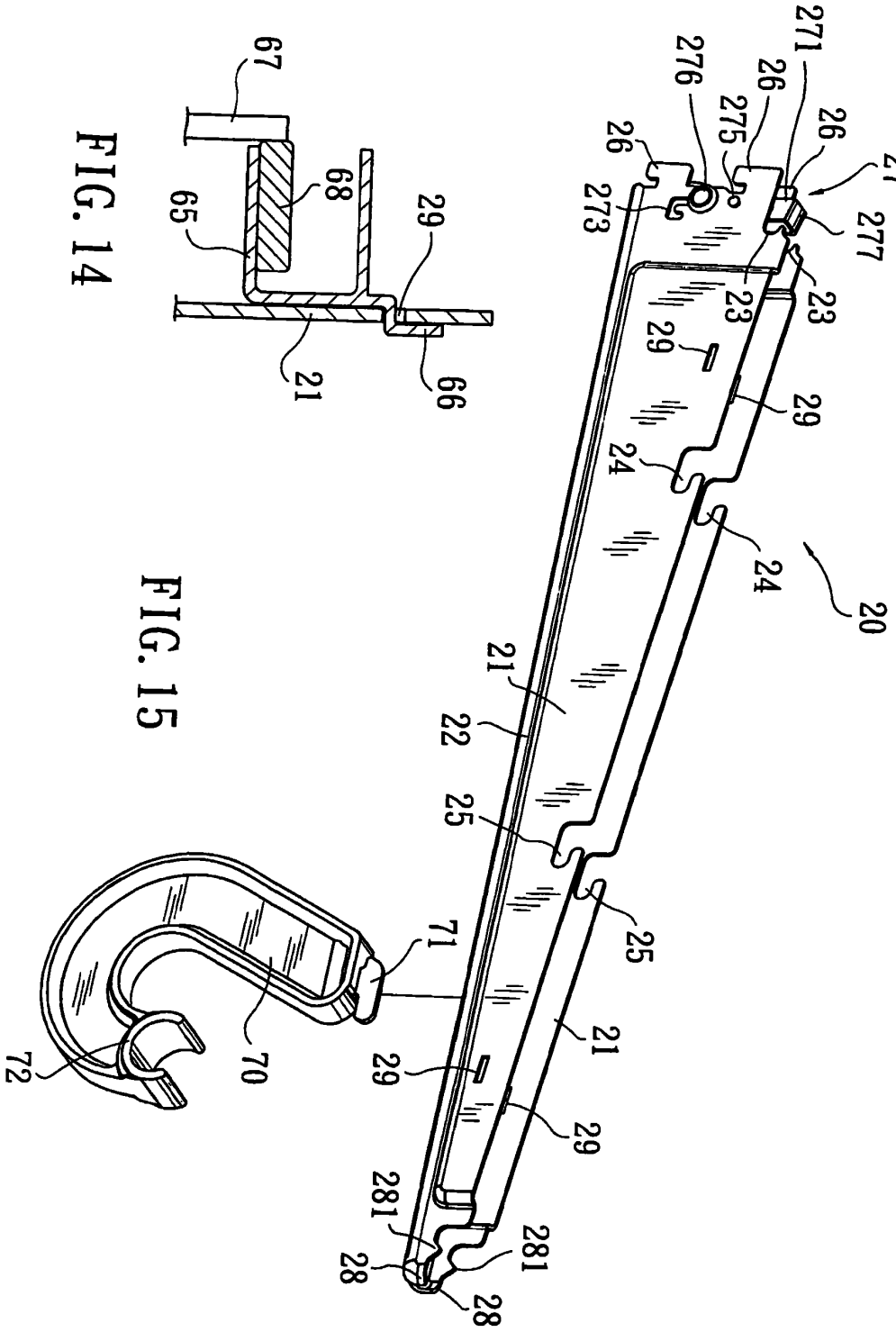

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FIG. 14

FIG. 15

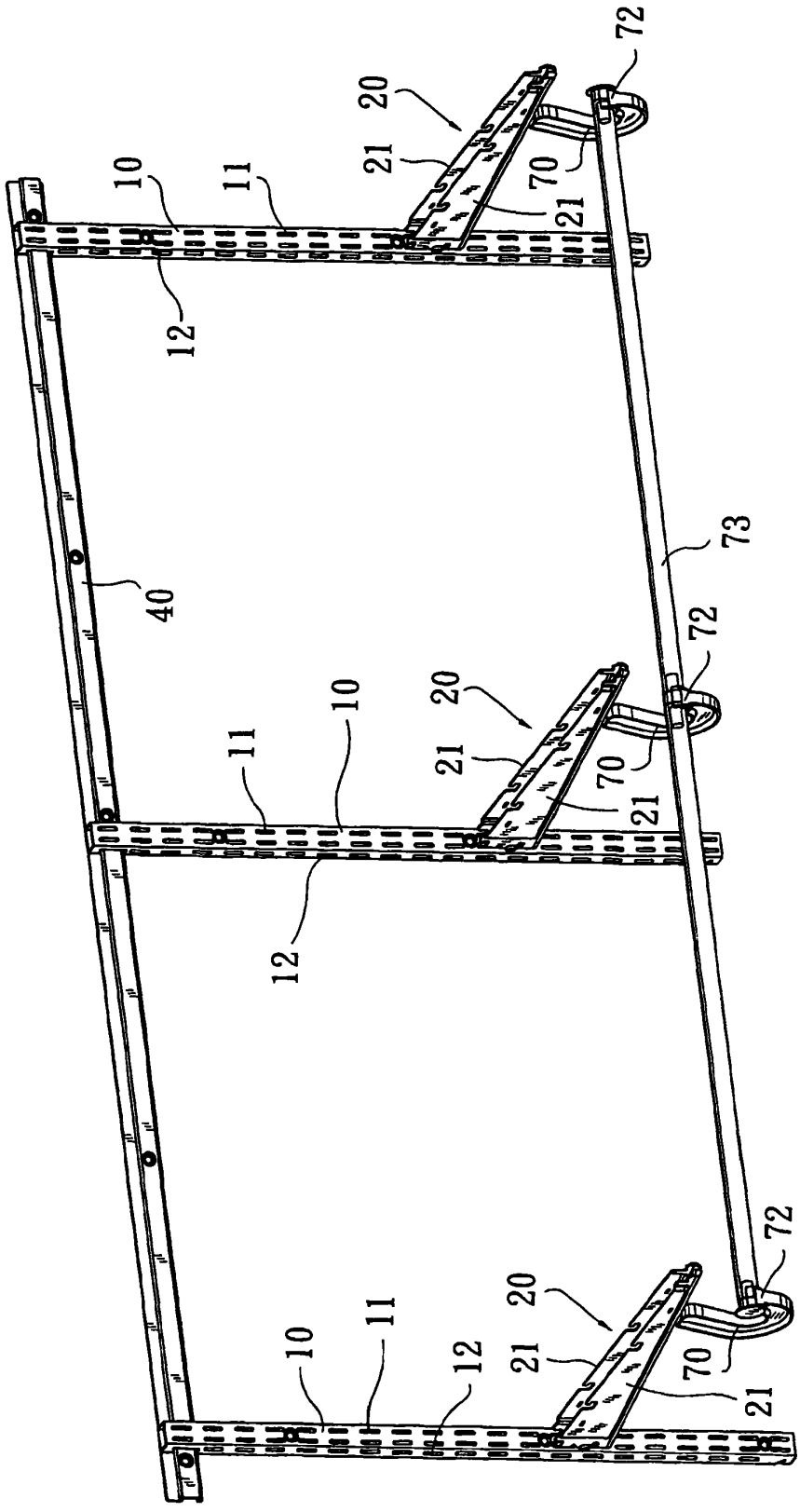



FIG. 16



Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2003 - Page 551
Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products
IPR2024-01401

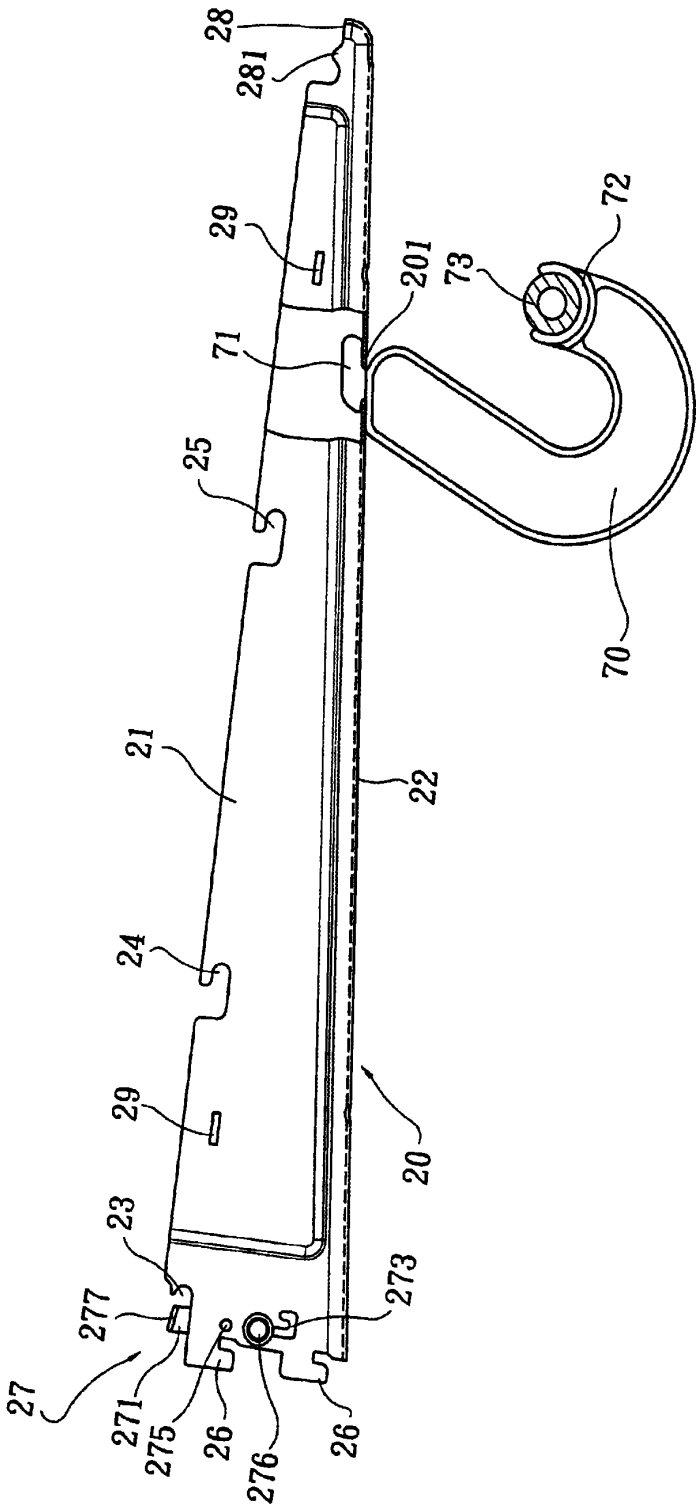

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276
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FIG. 17

Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2003 - Page 553
Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products
IPR2024-01401






FIG. 18




FIG. 19

# MULTIPURPOSE WALL-MOUNT RACK

## FIELD OF THE INVENTION

The present invention relates to a wall-mount rack, and more particularly to a multipurpose wall-mount rack that allows metal-wire shelves, board-type shelves, slide-out baskets, box-type containers, etc. to connect thereto to thereby provide complete functions for holding different things.

## BACKGROUND OF THE INVENTION

A general wall-mount rack includes a horizontal crossbar and a plurality of vertical posts. The horizontal crossbar is horizontally fixed to a wall surface high from the ground or floor, and the vertical posts are hung on the crossbar to parallelly space from one another and perpendicular to the ground or floor. The vertical post is provided on a front side with a row of holes, into which one or more supporting brackets may be inserted, so that a metal-wire shelf may be supported on two horizontally corresponding supporting brackets on the rack for holding things thereon. US patent Nos. D490697, 3701325, 5110080, etc. disclose

wall-mount racks having the above-described structure.

The conventional supporting brackets for wall-mount rack are designed to support only one type of member for holding things. For example, the brackets disclosed in US Patent Nos. 3,701,325 and 6,024,333 are designed to support metal-wire shelves only. When it is desired to mount a slide-out basket, for example, on the wall-mount rack, another type of bracket is required. Moreover, the brackets disclosed in US Patent Nos. 3,701,325 and 6,024,333 are designed to support only one metal-wire shelf each. When it is desired to mount two metal-wire shelves side by side at the same height on the wall-mount rack, two brackets are required to locate between the two metal-wire shelves to separately support one of them.

When it is desired to mount a box-type container on the vertical posts, the container would occupy the holes provided on the front sides of the vertical posts. Therefore, there are not holes available on the vertical posts at the same height as the box-type container for mounting brackets to support other shelves on another side of the vertical posts.

## SUMMARY OF THE INVENTION

A primary object of the present invention is to provide a multipurpose wall-mount rack, which includes a multipurpose supporting bracket adapted to support metal-wire shelves, board-type shelves, slide-out baskets, suit hanger bars, etc., so that parts for the wall-mount rack can be simplified.

Another object of the present invention is to provide a multipurpose wall-mount rack that allows a box-type container to be mounted between two adjacent vertical posts of the rack without hindering the mounting of other types of shelves or slide-out baskets to the vertical posts adjacent to the box-type container.

To achieve the above and other objects, the multipurpose wall-mount rack according to the present invention includes at least two vertical posts, at least two supporting brackets of the same configuration, and at least one shelf. Each of the vertical posts is provided on a front side with two longitudinal rows of spaced holes and on two lateral sides with one longitudinal row of spaced holes each. The two supporting brackets are separately hooked to two pairs of corresponding

holes at the same level on the front sides of the two vertical posts. The shelf is supported at two lateral sides on the two supporting brackets and thereby stably mounted on and between the two vertical posts.

The multipurpose wall-mount rack of the present invention may further include at least one box-type container and at least two hooking members. The hooking members may be hooked to two corresponding holes at the same level on two opposite inner lateral sides of the two vertical posts. The box-type container is symmetrically provided at two rear lateral ends near a top thereof with two rearward projected pins. The box-type container is hung on the two hooking members by engaging the two pins with the two hooking members and thereby stably mounted on and between the two vertical posts.

The supporting bracket included in the multipurpose wall-mount rack of the present invention may have at least one rail connected to one of two side walls thereof for supporting one lateral wall of a slide-out basket on the rail.

The supporting bracket included in the multipurpose

wall-mount rack of the present invention may have a supporting hook connected to a lower side thereof, so that a suit hanger bar may be transversely supported on two such supporting hooks hung from two adjacent supporting brackets for holding suit hangers thereon.

## BRIEF DESCRIPTION OF THE DRAWINGS

The structure and the technical means adopted by the present invention to achieve the above and other objects can be best understood by referring to the following detailed description of the preferred embodiments and the accompanying drawings, wherein

Fig. 1 is an assembled front perspective view of a multipurpose wall-mount rack according to a first embodiment of the present invention;

Fig. 2 is an exploded perspective view showing a vertical post and a supporting bracket adopted in the multipurpose wall-mount rack of the present invention;

Fig. 3 is a left side view of the supporting bracket shown in Fig. 2;

Fig. 4 is a fragmentary and enlarged perspective view of the supporting bracket;

Fig. 5 is an exploded rear perspective view showing the mounting of a box-type container to two vertical posts of the multipurpose wall-mount rack shown in Fig. 1;

Fig. 6 is an enlarged view of the circled area in Fig. 5;

Fig. 7 is a partially sectioned view showing the mounting of the box-type container to the vertical posts;

Fig. 8 is an enlarged view of the circled area in Fig. 7;

Fig. 9 is an assembled front perspective view showing differently configured box-type containers are mounted to vertical posts of the multipurpose wall-mount rack of the present invention;

Fig. 10 is an assembled front perspective view of a multipurpose wall-mount rack according to a second embodiment of the present invention;

Fig. 11 shows the connection of a board-type shelf to the supporting bracket in the second embodiment of the present invention shown in Fig. 10;

Fig. 12 is an exploded perspective view showing one supporting bracket and two rails for connecting to two lateral sides of the supporting bracket;

Fig. 13 is an assembled front perspective view showing the use of multiple supporting brackets and rails of Fig. 12 to support a slide-out basket on the multipurpose wall-mount rack of the present invention;

Fig. 14 is a sectional view showing the mounting of the slide-out basket on the rail;

Fig. 15 is an exploded perspective view showing the supporting bracket and a supporting hook for connecting to a lower side of the supporting bracket;

Fig. 16 is an assembled front perspective view showing the use of multiple supporting brackets and supporting hooks of Fig. 15 to support a suit hanger bar thereon;

Fig. 17 is a sectional view showing the manner in which a suit hanger bar is supported on the supporting bracket and the supporting hook of the multipurpose wall-mount rack of the present invention;

Fig. 18 is an exploded front perspective view showing the connection of two vertical posts for the multipurpose wall-mount rack of the present invention; and

Fig. 19 is an assembled sectioned side view of Fig. 18.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Please refer to Fig. 1. A multipurpose wall-mount rack 1 according to a first embodiment of the present invention includes a horizontal bar 40, at least two vertical posts 10, at least two supporting brackets 20, and at least one metal-wire shelf 30. The supporting brackets 20 are mounted on the vertical posts 10 to support the metal-wire shelf 30 thereon, so that a basic form of the multipurpose wall-mount rack 1 is provided.

Each of the vertical posts 10 is a U-sectioned post defining a front side, two lateral sides, and a rear open side. Two longitudinal rows of spaced holes 11 are formed on the front side and one longitudinal row of space holes 12 are correspondingly formed on each lateral side of the vertical post 10. The vertical posts 10 are fixed to a wall surface with the rear open side facing toward the wall surface. Moreover, the vertical posts 10 are mounted to the wall surface with a predetermined fixed distance left between them.

The two vertical posts 10 are connected at an upper end to the horizontal crossbar 40, so that the vertical posts 10 are parallel to each other and perpendicular to the ground or floor, and two holes 11 or 12 correspondingly formed on the two vertical posts 10 are at the same level. Since this is a known skill, it is not described in details herein.

Please refer to Figs. 2 and 3. Each of the supporting brackets 20 includes two side walls 21 and an elongate bottom wall 22 extended between and connected to lower edges of the two side walls 21. The two side walls 21 are parallel to each other and have a horizontal or near horizontal top edge each. The two side walls 21

are correspondingly provided on the top edges with a plurality of retaining slots 23, 24, 25. The metal-wire shelf 30 includes a plurality of transverse metal bars 31, 32, 33. The metal-wire shelf 30 is stably supported on and between two adjacent supporting brackets 20 by disposing two lateral ends of the transverse metal bars 31, 32, 33 in the retaining slots 23, 24, 25 on two inner side walls 21 of the two adjacent supporting brackets 20. Since each of the two side walls 21 of one supporting bracket 20 may hold one metal-wire shelf 30 thereto, two metal wire shelves 30 may be supported on one supporting bracket 20 at two opposite lateral sides thereof.

The two side walls 21 of the supporting bracket 20 are provided at respective rear end with two vertically spaced hooks 26. The hooks 26 at the rear ends of the two side walls 21 may be extended into and hooked to the holes 11 on the front side of the vertical post 10, so as to hold the supporting bracket 20 to the multipurpose wall-mount rack 1. When the supporting bracket 20 has been fully assembled to the vertical post 10 of the wall-mount rack 1, the top edges of the two side walls 21 are in or close to a horizontal position. The retaining slots 23, 24, 25 on each of the two side

walls 21 of the supporting bracket 20 are adapted to receive one lateral end of the transverse metal bars 31, 32, 33, respectively, of the metal-wire shelf 30, so that the metal wire shelf 30 can be supported on two supporting brackets 20, and each supporting bracket 20 is able to support two metal-wire shelves 30 at two opposite lateral sides thereof.

An elastic stopper 27 is disposed on the supporting bracket 20 behind the two rearmost retaining slots 23 on the side walls 21, so as to normally block two rearward openings of the two rearmost retaining slots 23 and prevent the transverse metal bars 31 of the metal-wire shelves 30 from moving out of the retaining slots 23.

The rearmost retaining slots 23 on the side walls 21 of the supporting bracket 20 have a rearward opening each. The elastic stopper 27 is disposed at a position adapted to block the rearward openings of the retaining slots 23, so as to stop the metal bars 31 of the metal-wire shelves 30 received in the retaining slots 23 from moving out of the retaining slots 23 via the rearward openings thereof.

The metal-wire shelf 30 is formed by welding intersected

metal wires together, and includes a plurality of transverse metal bars 31, 32, 33, 34, which are parallel to one another, and are connected at respective two lateral ends to two longitudinal metal bars 35. The transverse metal bars 31 and 34 respectively form a rear and a front edge of the metal-wire shelf 30, and the longitudinal metal bars 35 form two lateral edges of the metal-wire shelf 30. When one lateral end of the transverse metal bars 31, 32, 33 of the metal-wire shelf 30 are sequentially received in the retaining slots 23, 24, 25 on one side wall 21 of the supporting bracket 20, the longitudinal metal bar 35 corresponding to that end of the metal bars 31, 32, 33 is pressed against an inner surface of that side wall 21, preventing the metal wire shelf 30 from sidewardly separating from the supporting bracket 20.

Please refer to Fig. 4. The elastic stopper 27 includes a reversed U-shaped member 271, and an elastic element 272. The elastic element 272 normally pushes the reversed U-shaped member 271 upward to an elevated position just behind the retaining slots 23 to block the latter. A first rivet 275 immovably fixed on the supporting bracket 20 is extended into a long slot 274 vertically formed on the reversed U-shaped member 271.



Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2003 - Page 565
Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products
IPR2024-01401

A second rivet 276 immovably fixed to the reversed U-shaped member 271 is extended into an L-shaped guide slot 273 formed on the supporting bracket 20, so that the reversed U-shaped member 271 may be moved upward and downward in the L-shaped guide slot 273 via the second rivet 276. The elastic element 272 is connected at two ends to the first and the second rivet 275, 276, such that the reversed U-shaped member 271 may be automatically restored to the elevated position via the elastic element 272.

A top 277 of the reversed U-shaped member 271 is a slightly forward and downward inclined surface. When an end of the transverse metal bar 31 of the metal-wire shelf 30 is pressed against the top 277 of the reversed U-shaped member 271, the metal bar 31 is brought to move forward along the inclined top 277 while presses the whole reversed U-shaped member 17a downward due to the weight of the metal-wire shelf 30, and then automatically moves into the retaining slot 23. At this point, the reversed U-shaped member 271 is automatically elevated by the elastic element 272 to block the rearward opening of the retaining slot 23 again and locate behind the metal bar 31. Meanwhile, the ends of the transverse metal bars 32, 33 of the

metal-wire shelf 30 correspondingly sink into the retaining slots 24, 25 on the supporting bracket 20, making one lateral side of the metal-wire shelf 30 stably held to and supported on the supporting bracket 20. When the two lateral sides of one metal-wire shelf 30 are separately held to and supported on two adjacent supporting brackets 20, the metal-wire shelf 30 is assembled to the wall-mount rack 1 for use. When it is desired to dismount the metal-wire shelf 30 from the rack 1, simply move the reversed U-shaped member 271 downward with the second rivet 276 located in a lower end of the L-shaped guide slot 273. At this point, the reversed U-shaped member 271 is held to a lowered position, and the transverse metal bar 31 of the metal-wire shelf 30 can be removed from the retaining slot 23 to dismount the metal wire shelf 30 from the wall-mount rack 1.

The retaining slots 24, 25 on the side walls 21 of the supporting bracket 20 are L-shaped slots having an open-topped vertical section and a lower horizontal section. The transverse metal bars 32, 33 of the metal-wire shelf 30 enter the L-shaped retaining slots 24, 25 via the open-topped vertical section thereof. When the metal-wire shelf 30 is further pushed forward,

the metal bars 32, 33 are moved into the lower horizontal section of the retaining slots 24, 25 to restrict the metal-wire shelf 30 from moving upward.

A front end 28 of each of the side walls 21 of the supporting bracket 20 is adapted to support the front transverse metal bar 34 of the metal-wire shelf 30. A protrusion 281 is formed closely behind the front end 28 to stop the metal bar 34 from moving rearward, so that the metal-wire shelf 30 assembled to the wall-mount rack 1 is stably located in place.

Please refer to Figs. 5 and 6. The multipurpose wall-mount rack 1 of the present invention may further include at least one box-type container 50, and at least two hooking members 51. The hooking member 51 is a flat member and is formed at an outer side with at least one downward extended hook portion 511 and at a top with an open-topped slot 512. The two hooking members 51 are hung on the two vertical posts 10 by separately extending the hook portions 511 thereof into two sets of holes 12 at the same height on two opposite inner lateral sides of the two vertical posts 10, as shown in Figs. 7 and 8.

The box-type container 50 includes a square case defining an inner space for holding things therein. As can be seen from Fig. 5, the box-type container 50 is symmetrically provided at two rear lateral ends near a top thereof with two rearward projected pins 52. Each of the pins 52 has a free end formed into a diametrically expanded head 53, and the head 53 has an outer diameter larger than a width of the open-topped slot 512 on the hooking member 51. The box-type container 50 is mounted to the two vertical posts 10 by resting the two pins 52 in the slots 512 of the two hooking members 51 with the expanded heads 53 located behind the slots 512, as shown in Figs. 7 and 8.

The box-type container 50 has an overall width slightly smaller than and very close to the distance between the two vertical posts 10, so that the container 50 could be stably mounted on and between the two vertical posts 10 with the two opposite inner lateral sides of the two vertical posts 10 fitly bearing against two lateral sides of the box-type container 50.

In the first embodiment of the present invention as shown in Fig. 1, the inner space of the box-type container 50 is divided into two compartments. In a second

embodiment of the present invention as shown in Fig. 9, the multipurpose wall-mount rack 1 includes a box-type container 50a having a plurality of drawers 54, and another box-type container 50b provided with a front door 55. Since there is a wide choice of box-type containers 50, 50a, 50b providing different spatial designs, the wall-mount rack 1 of the present invention is more convenient and practical for use.

When the box-type container 50 is mounted on the rack 1, only the holes 12 at the inner lateral sides of the two vertical posts 10 are occupied. The holes 11 on the front sides of the vertical posts 10 at the same height of the container 50 are still available for the supporting brackets 20 to connect thereto for supporting other metal-wire shelves 30, as shown in Fig. 1.

Fig. 10 shows the use of the supporting brackets 20 of the present invention to support a board-type shelf 60 thereon. Please also refer to Fig. 11. The board-type shelf 60 is provided along each lateral side of a lower bottom surface with three U-shaped metal bars 61 corresponding to the retaining slots 23, 24, 25 on the side walls 21 of the supporting bracket 20.

The U-shaped metal bar 61 includes a horizontal bottom section 62 that is extended in a direction perpendicular to that of the retaining slots 23, 24, 25, and two vertical side sections 63. When the board-type shelf 60 has been mounted to the supporting bracket 20 with the U-shaped metal bars 61 received in the retaining slots 23, 24, 25, outer ones of the vertical side sections 63 of the U-shaped metal bars 61 are pressed against the inner surface of the side wall 21 to stably hold the board-type shelf 60 to the supporting bracket 20 for use.

Please refer to Figs. 12, 13, and 14. The supporting bracket 20 may have a rail 65 externally connected to either side wall 21 for supporting a slide-out basket 67 thereon. The two side walls 21 of the supporting bracket 20 are correspondingly provided with a rear and a front insertion hole 29 each. The rail 65 is provided at predetermined positions with two L-shaped hook tabs 66 corresponding to the rear and front insertion holes 29 on the side walls 21. The rail 65 may be connected to the supporting bracket 20 simply by inserting the two L-shaped tabs 66 into the two insertion holes 29. The slide-out basket 67 may be supported on and between two rails 65 connected to two

adjacent supporting brackets 20. The slide-out basket 67 is provided at the tops of two lateral side walls with two outward extended portions 68, which are slidably rested on the two rails 65 to thereby hold the slide-out basket 67 to the rails 65.

Please refer to Figs. 15, 16, and 17. The supporting bracket 20 may further have a supporting hook 70 connected to a lower side thereof. For this purpose, the elongated bottom wall 22 of the supporting bracket 20 is provided at a predetermined position with a longitudinally extended narrow slot 201. The supporting hook 70 is provided at a top with an upward projected tab 71, which is extended in the same direction as that of the elongated bottom wall 22, and is connected only at a near middle portion to the top of the supporting hook 70, so that a front and a rear portion of the tab 71 are longitudinally projected from the near middle portion; and at a lower free end formed with a supporting recess 72. The tab 71 has an overall length longer than that of the narrow slot 201. The supporting hook 70 is connected to the lower side of the supporting bracket 20 by extending the front or the rear portion of the tab 71 through the narrow slot 201 first, and then shifting the tab 71 to one end of the narrow slot 201

to allow extending of the other end portion of the tab 71 into the narrow slot 201, and then, the supporting hook 70 is moved for the two end portions of the tab 71 to rest on an inner side of the narrow slot 201. A suit hanger bar 73 may be horizontally rested on the supporting recesses 72 of at least two supporting hooks 70 for holding a plurality of suit hangers (not shown) thereon. Even with the supporting hook 70 provided on the supporting bracket 20, the supporting bracket 20 may still be used to support a metal-wire shelf 30 or a flat board-type shelf 60 thereon.

Please refer to Figs. 18 and 19. Each of the vertical posts 10 is provided at a lower end with two horizontal narrow slits 13 correspondingly formed on the two lateral sides of the vertical post 10, and a receded section 14 immediately below each of the horizontal slits 13. Two aligned vertical posts 10 could be connected end to end by engaging the horizontal slits 13 with a separate coupling bracket 80 to create an increased overall length for the vertical post of the wall-mount rack 1.

The coupling bracket 80 includes an upper and a lower horizontal end wall 81, 82, and is provided at two lateral

edges of a lower half with a forward extended side wall 83 each. All the end walls 81, 82 and the side walls 83 are extended forward. The receded sections 14 below the slits 13 of the vertical post 10 have a depth slightly larger than a material thickness of the coupling bracket 80. It is noted a lower one of the two aligned vertical posts 10 is in an inverted position, and the upper one of the two aligned vertical posts 10 is fixed to a wall surface prior to connecting with the lower vertical post 10. To connect the lower vertical post 10 to the upper one, which has already been fixed to the wall surface, first sidewardly slide the coupling bracket 80 into a gap between the wall surface and the receded sections 14 at the lower end of the upper vertical post 10, so that the horizontal upper end wall 81 of the coupling bracket 80 is located in the horizontal slits 13 of the upper vertical post 10. Then, align the horizontal slits 13 of the lower vertical post 10 with the horizontal lower end wall 82 of the coupling bracket 80, so that the lower vertical post 10 is correctly located below and aligned with the upper vertical post 10. Finally, fix the lower vertical post 10 to the wall surface. At this point, the two forward extended side walls 83 of the coupling bracket 80 are pressed against inner surfaces of the two lateral sides of the lower

vertical post 10. Since the vertical post 10 is fixed to the wall surface in a known manner, it is not described in details herein.

The multipurpose wall-mount rack according to the present invention needs only one type of supporting bracket that may be used to selectively support any one of a shelf, a slide-out basket, and a suit hanger bar. Therefore, the supporting brackets used with the multipurpose wall-mount rack of the present invention are simplified. Moreover, the provision of holes on two lateral sides of the vertical posts allows the mounting of a box-type container to and between two adjacent vertical posts, allowing the wall-mount rack to have more functions.

What is claimed is:

1. A multipurpose wall-mount rack, comprising at least two vertical posts, at least two supporting brackets, and at least one shelf;

each of the vertical posts being a U-sectioned post defining a front side, two lateral sides, and a rear open side; two longitudinal rows of spaced holes being formed on the front side and one longitudinal row of space holes being correspondingly formed on each lateral side of the vertical post; and the vertical posts being fixed to a wall surface with the rear open side facing toward the wall surface;

each of the supporting brackets being provided at a rear end with two pairs of vertically spaced hooks for extending into and hooking to the holes on the front side of the vertical post, such that the two supporting brackets may be mounted to the two vertical posts at the same height; the supporting bracket including two side walls and an elongate bottom wall extended between and connected to lower edges of the two side walls; the two side walls being correspondingly provided on respective top edge with

a plurality of retaining slots; and an elastic stopper being disposed at the rear end of the supporting bracket so as to block two rearmost ones of the retaining slots on the two side walls; and

the shelf including at least two transverse metal bars, which are located on the shelf corresponding to the retaining slots on the side walls of the supporting bracket; the shelf being fixedly supported on and between the two supporting brackets by correspondingly disposing two lateral ends of the transverse metal bars in the retaining slots on two inner ones of the side walls of the two supporting brackets; and the transverse metal bars disposed in the rearmost ones of the retaining slots on the two supporting brackets being stopped by the elastic stoppers from moving out of the rearmost retaining slots.

2. The multipurpose wall-mount rack as claimed in claim 1, further comprising at least one box-type container and at least two hooking members; the box-type container being a square case having an overall width slightly smaller and very close to a distance left between the two vertical posts, and

being symmetrically provided at two rear lateral ends near a top thereof with two rearward projected pins, each of which has a free end formed into a diametrically expanded head; and each of the hooking members being a flat member that is formed at an outer side with at least one downward extended hook portion and at a top with an open-topped slot; and

the two hooking members being hung on the two vertical posts by separately extending the hook portion thereof into two holes at the same height on two opposite inner lateral sides of the two vertical posts; and

the box-type container being mounted to the two vertical posts by resting the two pins in the slots of the two hooking members with the expanded heads located behind the slots.

3. The multipurpose wall-mount rack as claimed in claim 1, wherein the two rearmost retaining slots on the two side walls of the supporting bracket have a rearward opening each.

4. The multipurpose wall-mount rack as claimed in claim

1, wherein the elastic stopper includes a reversed U-shaped member and an elastic element, and is movable upward and downward along a guide slot; and the elastic element normally pushes the reversed U-shaped member to an elevated position to locate behind and close the rearmost retaining slots on the supporting bracket.

5. The multipurpose wall-mount rack as claimed in claim 4, wherein the reversed U-shaped member has a top defining a slightly forward and downward inclined surface.

6. The multipurpose wall-mount rack as claimed in claim 1, wherein the shelf is a metal-wire shelf including a plurality of parallelly arranged transverse metal bars and two longitudinal metal bars separately perpendicularly connected to two lateral ends of the transverse metal bars; and the two lateral ends of the transverse metal bars being located corresponding to and disposed in the retaining slots to be perpendicular to the supporting brackets.

7. The multipurpose wall-mount rack as claimed in claim 1, wherein the shelf is a board-type shelf being

provided along each lateral side of a lower bottom surface with a plurality of U-shaped metal bars corresponding to the retaining slots on the side walls of the supporting bracket; the U-shaped metal bar including a horizontal bottom section that is extended in a direction perpendicular to that of the retaining slots, and two vertical side sections; and outer ones of the vertical side sections of the U-shaped metal bars being pressed against the inner surface of the side wall when the board-type shelf has been mounted to the supporting bracket with the U-shaped metal bars received in the retaining slots.

8. The multipurpose wall-mount rack as claimed in claim 1, wherein at least one of the plurality of retaining slots on the supporting bracket is an L-shaped retaining slot.

9. The multipurpose wall-mount rack as claimed in claim 1, further comprising at least one slide-out basket and at least two rails; each of the two rails being provided at predetermined positions with two L-shaped hook tabs, and each of the two side walls of the supporting bracket being correspondingly provided with a rear and a front insertion hole for

the L-shaped hook tabs to insert thereinto, such that the rail is connected to the supporting bracket; and the slide-out basket being provided at tops of two lateral side walls thereof with two outward extended portions, which are slidably rested on the two rails connected to two inner ones of the side walls of two adjacent supporting brackets.

10. The multipurpose wall-mount rack as claimed in claim 1, further comprising at least one suit hanger bar and at least two supporting hooks; each of the supporting hooks being provided at a lower free end with a supporting recess, on which the suit hanger bar is supported, and at a top with an upward projected tab, which is extended in the same direction as that of the elongated bottom wall of the supporting bracket; and wherein the elongated bottom wall of the supporting bracket is provided at a predetermined position with a longitudinally extended narrow slot, into which the upward projected tab on the supporting hook is extended to thereby connect the supporting hook to a lower side of the supporting bracket.

11. The multipurpose wall-mount rack as claimed in claim

10, wherein the upward projected tab on the top of the supporting hook is connected only at a near middle portion to the top of the supporting hook, so that a front and a rear portion of the tab are longitudinally projected from the near middle portion; and the tab has an overall length longer than that of the narrow slot provided on the elongated bottom wall of the supporting bracket.

Intellectual property Office

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|---|---|---|---|
| **Application No:** | GB0711098.4 | **Examiner:** | Mr Hal Young |
| **Claims searched:** | 1-11 | **Date of search:** | 27 July 2007 |

## Patents Act 1977: Search Report under Section 17

**Documents considered to be relevant:**

| Category | Relevant to claims | Identity of document and passage or figure of particular relevance |
|---|---|---|
| A | | GB2144974 A (GUILLAUMOND) |
| A | | US5921412 A (MERL) |
| A | | US3701325 A (STREATER) |
| A | | US6024333 A (MIDWEST) |
| A | | GB2370753 A (ELFA) |
| A | | US5538213 A (BROWN) |

Categories:

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| X | Document indicating lack of novelty or inventive step | A | Document indicating technological background and/or state of the art |
| Y | Document indicating lack of inventive step if combined with one or more other documents of same category | P | Document published on or after the declared priority date but before the filing date of this invention |
| & | Member of the same patent family | E | Patent document published on or after, but with priority date earlier than, the filing date of this application |

**Field of Search:**

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC[X] :

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Worldwide search of patent documents classified in the following areas of the IPC

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The following online and other databases have been used in the preparation of this search report

WPI, EPODOC

**International Classification:**

| Subclass | Subgroup | Valid From |
|---|---|---|
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## ELECTRIC STEERING LOCK DEVICE

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## Abstract of JP2013022972 (A)

PROBLEM TO BE SOLVED: To provide an electric steering lock device in which heat damage due to overheating of an electric motor is prevented with a simple constraction without increasing cost.SOLUTION: The electric steering lock device performs unlock processing in a normal mode by controlling an electric motor based upon a preset electric power supply holding time in which electric power supply to the electric motor and an electric power supply stop time in which the electric power supply is stopped. If movement of a lock bolt to an unlock position is not detected although the unlock processing in the normal mode is performed on receiving an unlock command from an operator, the mode of unlock processing to be executed with a next unlock command from the operator is switched to a motor overheat protection mode in which an electric power supply holding time is set to be shorter than the electric power supply holding time in the normal mode, in order that a duty ratio calculated from the electric power supply holding time and electric power supply stop time is smaller than a duty ration in the normal mode.



Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2003 - Page 585
Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products
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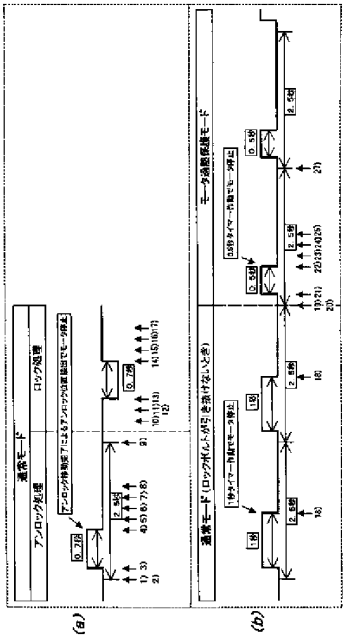
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(54)【発明の名称】電動ステアリングロック装置

(57)【要約】
【課題】コストアップを伴うことなく簡単な構成で電動モータの過熱による熱害の発生を防ぐことができる電動ステアリングロック装置を提供すること。
【解決手段】電動ステアリングロック装置において、予め設定された電動モータへの通電を維持する通電維持時間及び通電を休止する通電休止時間に基づいて電動モータを制御して通常モードのアンロック処理を行い、運転者からのアンロック指令を受信して通常モードのアンロック処理を行ったにも拘わらずロックボルトのアンロック位置への移動を検出できない場合には、運転者からの次回のアンロック指令によって実行されるアンロック処理のモードを、通電維持時間及び通電休止時間から計算されるデューティ比が通常モード時のデューティ比よりも小さくなるように、通電維持時間が通常モード時の通電維持時間よりも短く設定されたモータ過熱保護モードに切り替える。
【選択図】図４



【特許請求の範囲】
【請求項１】
車両のステアリングシャフトに係合するロック位置とその係合が解除されるアンロック位置との間を移動可能なロックボルトと、
該ロックボルトを移動させる電動モータと、
該電動モータへの通電を制御してロック／アンロック処理を行う制御手段と、
該制御手段に電気的に接続されて少なくとも前記ロックボルトがアンロック位置にあることを検出可能な位置検出手段と、
を備えた電動ステアリングロック装置において、
前記制御手段は、
予め設定された前記電動モータへの通電を維持する通電維持時間及び通電を休止する通電休止時間に基づいて前記電動モータを制御して通常モードのアンロック処理を行い、
運転者からのアンロック指令を受信して前記通常モードのアンロック処理を行ったにも拘わらず前記ロックボルトのアンロック位置への移動を検出できない場合には、運転者からの次回のアンロック指令によって実行されるアンロック処理のモードを、通電維持時間及び通電休止時間から計算されるデューティ比が前記通常モード時のデューティ比よりも小さくなるように、通電維持時間が前記通常モード時の通電維持時間よりも短く設定されたモータ過熱保護モードに切り替えることを特徴とする電動ステアリングロック装置。
【請求項２】
前記モータ過熱保護モード時の前記通電維持時間を、所定条件下における前記ロックボルトのロック位置からアンロック位置への移動を保障するアンロック保障通電時間よりも短く設定することを特徴とする請求項１記載の電動ステアリングロック装置。
【請求項３】
前記通電維持時間と前記通電休止時間から成るアンロック作動時間が前記通常モード時と前記モータ過熱保護モード時で同じになるよう前記モータ過熱保護モード時の通電休止時間を設定することを特徴とする請求項１又は２記載の電動ステアリングロック装置。
【請求項４】
前記制御手段は、運転者からのアンロック指令を受信する上位ＥＣＵと、該上位ＥＣＵからのロック／アンロック作動信号を受信すると前記電動モータへの通電を制御してロック／アンロック処理を実行するマイコンを備え、前記通電維持時間は前記マイコンによって制御されるとともに、前記通電休止時間は前記上位ＥＣＵによって制御され、
前記上位ＥＣＵは、アンロック処理を開始してから所定のアンロック作動時間内に前記アンロック指令を受信した場合には、前記アンロック作動時間が経過するまで待機し、前記アンロック作動時間経過後にアンロック処理を開始することによって前記通電休止時間を設定するよう構成したことを特徴とする請求項１～３の何れかに記載の電動ステアリングロック装置。

【発明の詳細な説明】
【技術分野】
【０００１】
本発明は、車両の駐車時にステアリングホイールの回転を電動でロックするための電動ステアリングロック装置に関するものである。
【背景技術】
【０００２】
近年、車両には盗難防止の目的で駐車時にステアリングホイールの回転を電動でロックするための電動ステアリングロック装置を備えたものがある。この電動ステアリングロック装置は、車両のステアリングシャフトに係合するロック位置とその係合が解除されるアンロック位置との間を移動可能なロックボルトと、該ロックボルトを移動させる電動モータと、該電動モータへの通電を制御してロック／アンロック処理を行う制御手段と、該制御手段に電気的に接続されて少なくとも前記ロックボルトがアンロック位置にあることを

Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2003 - Page 587
Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products
IPR2024-01401

検出可能な位置検出手段を備えている。

【０００３】

斯かる電動ステアリングロック装置は、エンジン作動状態で運転者がエンジンＯＮ／ＯＦＦスイッチをＯＦＦ操作すると、これを検知した車体側の上位ＥＣＵは、エンジンを停止させ、安全が確認されたことを条件に電動ステアリングロック装置に対してロック要求を行う。電動ステアリングロック装置は、このロック要求を受けると、マイコン（マイクロコンピュータ）等の制御手段によって電動モータを駆動制御し、該電動モータによってロックボルトを移動させてこれをステアリングシャフトに係合させることによってステアリングホイールの回転をロックする。

【０００４】

他方、エンジン停止状態で運転者がエンジンＯＮ／ＯＦＦスイッチをＯＮ操作すると、これを検知した上位ＥＣＵは、電動ステアリングロック装置に対してアンロック要求を行う。電動ステアリングロック装置は、このアンロック要求を受けると、制御手段によって電動モータを駆動制御し、該電動モータによってロックボルトを移動させて該ロックボルトのステアリングシャフトへの係合を解除し、ステアリングホイールをアンロックしてステアリング操作を可能とする。

【０００５】

ところで、斯かる電動ステアリングロック装置においてロックとアンロックを短時間のうちに頻繁に繰り返すと、電動モータの過熱によってコイルが断線する等の熱害が発生する可能性がある。

【０００６】

そこで、特許文献１には、電動モータの作動時間を要素とする関係式から算出された値が所定の休止閾値よりも大きいと判断した場合には、電動モータの作動を強制的に休止させるとともに、前記算出値が所定の無効閾値よりも大きい場合には、電動モータの作動要求があってもこれを無効化するようにした電動ステアリングロック装置が提案されている。

【先行技術文献】

【特許文献】

【０００７】

【特許文献１】特開２００４－２１７００２号公報

【発明の概要】

【発明が解決しようとする課題】

【０００８】

電動ステアリングロック装置において電動モータの過熱によって引き起こされる熱害には、特許文献１において提示されたもの（ロックとアンロックを短時間のうちに頻繁に繰り返すことによる電動モータの過熱に起因するもの）以外に、ロックボルトがステアリングシャフトに対して強く係合されている場合（所謂噛み込み時）が考えられる。このような場合には、電動モータの駆動力ではロックボルトをステアリングシャフトから引き抜くことができず、電動モータが過負荷状態となって該電動モータに過大な電流が流れるため、電動モータが発熱する。そして、ロックボルトがステアリングシャフトから抜けるまでアンロック操作が繰り返されると電動モータが高温となり、該電動モータのコイルが断線する等の熱害が発生する可能性がある。

【０００９】

上記問題を解決するためには、バイメタル等によって構成された過熱保護装置を内蔵した電動モータを使用することが考えられるが、斯かる電動モータは大型でコストが高いという問題がある。

【００１０】

本発明は上記問題に鑑みてなされたものであり、その目的とする処は、コストアップを伴うことなく簡単な構成で電動モータの過熱による熱害の発生を防ぐことができる電動ステアリングロック装置を提供することにある。

【課題を解決するための手段】
【００１１】
上記目的を達成するため、請求項１記載の発明は、
車両のステアリングシャフトに係合するロック位置とその係合が解除されるアンロック位置との間を移動可能なロックボルトと、
該ロックボルトを移動させる電動モータと、
該電動モータへの通電を制御してロック／アンロック処理を行う制御手段と、
該制御手段に電気的に接続されて少なくとも前記ロックボルトがアンロック位置にあることを検出可能な位置検出手段と、
を備えた電動ステアリングロック装置において、
前記制御手段は、
予め設定された前記電動モータへの通電を維持する通電維持時間及び通電を休止する通電休止時間に基づいて前記電動モータを制御して通常モードのアンロック処理を行い、
運転者からのアンロック指令を受信して前記通常モードのアンロック処理を行ったにも拘わらず前記ロックボルトのアンロック位置への移動を検出できない場合には、運転者からの次回のアンロック指令によって実行されるアンロック処理のモードを、通電維持時間及び通電休止時間から計算されるデューティ比が前記通常モード時のデューティ比よりも小さくなるように、通電維持時間が前記通常モード時の通電維持時間よりも短く設定されたモータ過熱保護モードに切り替えることを特徴とする。
【００１２】
請求項２記載の発明は、請求項１記載の発明において、前記モータ過熱保護モード時の前記通電維持時間を、所定条件下における前記ロックボルトのロック位置からアンロック位置への移動を保障するアンロック保障通電時間よりも短く設定することを特徴とする。
【００１３】
請求項３記載の発明は、請求項１又は２記載の発明において、前記通電維持時間と前記通電休止時間から成るアンロック作動時間が前記通常モード時と前記モータ過熱保護モード時で同じになるよう前記モータ過熱保護モード時の通電休止時間を設定することを特徴とする。
【００１４】
請求項４記載の発明は、請求項１～３の何れかに記載の発明において、前記制御手段は、運転者からのアンロック指令を受信する上位ＥＣＵと、該上位ＥＣＵからのロック／アンロック作動信号を受信すると前記電動モータへの通電を制御してロック／アンロック処理を実行するマイコンを備え、前記通電維持時間は前記マイコンによって制御されるとともに、前記通電休止時間は前記上位ＥＣＵによって制御され、
前記上位ＥＣＵは、アンロック処理を開始してから所定のアンロック作動時間内に前記アンロック指令を受信した場合には、前記アンロック作動時間が経過するまで待機し、前記アンロック作動時間経過後にアンロック処理を開始することによって前記通電休止時間を設定するよう構成したことを特徴とする。
【発明の効果】
【００１５】
請求項１記載の発明によれば、運転者からのアンロック指令を受信して通常モードのアンロック処理を行ったにも拘わらずロックボルトのアンロック位置への移動を検出できない場合、即ち、ロックボルトがステアリングシャフトに噛み込んでいると判断した場合には、次回のアンロック処理のモードを通常モードからモータ過熱保護モードに切り替え、電動モータのデューティ比が通常モード時のそれよりも小さくなるように電動モータへの通電時間を短くしたため、運転者によってアンロック処理が何度も繰り返し行われた場合であっても、電動モータの過熱を抑えてコイルの断線等の熱害の発生を防ぐことができる。そして、このような効果は、アンロック処理のモードを切り替えることによって得られるため、過熱保護装置を内蔵した電動モータ等の使用が不要となり、大型化やコストアップを避けることができる。

【００１６】
ところで、通常モードにおける電動モータの通電維持時間は、一度のアンロック処理でロックボルトが必ずロック位置からアンロック位置まで移動するのに十分で、且つ、高い応答性が確保できる条件を満足し得る最短時間に設定されている。この通電維持時間を維持したまま、電動モータのデューティ比（＝通電維持時間／アンロック作動時間）を下げるためには通電休止時間を延ばせば良いが、給電休止時間を延ばすとアンロック作動時間（＝通電維持時間＋通電休止時間）が長くなり、運転者への応答性が悪くなってしまう。
【００１７】
本発明では、モータ過熱保護モードにおける電動モータの通電維持時間を通常モードのそれよりも短くして電動モータのデューティ比を下げるようにしたため、全体のアンロック作動時間を短縮することができ、運転者への応答性を損なうことなく、電動モータの発熱を抑制することができる。
【００１８】
又、電動モータは一般的に温度上昇に伴ってトルクが下がるが、本発明では、モータ過熱保護モードにおいては通電維持時間を短くし、より温度が低くてトルクが高いときに電動モータを作動させ、この動作を複数回行うことによってロックボルトをロック位置からアンロック位置へと移動させるようにしたため、アンロック処理を効率良く行うことができる。
【００１９】
請求項２記載の発明によれば、モータ過熱保護モード時の通電維持時間をアンロック保障通電時間よりも短く設定したため、１回のアンロック処理ではロックボルトをアンロック位置まで移動させることができない場合があるが、アンロック作動時間を短くすることによって運転者に対する応答性（例えば、運転者がエンジンＯＮ／ＯＦＦスイッチを操作してからアンロック失敗等のワーニングが点灯するまでの時間）は損なわれず、運転者に違和感を与えることなく、運転者の複数回のアンロック操作によってロックボルトをアンロック位置まで確実に移動させることができる。
【００２０】
請求項３記載の発明によれば、モータ過熱保護モード時のアンロック作動時間を通常モード時のそれと同じにすることによって、運転者に対する応答時間を一定にすることができ、運転者に違和感を与えることがない。
【００２１】
請求項４記載の発明によれば、上位ＥＣＵは、アンロック処理を開始してから所定のアンロック作動時間内にアンロック指令を受信した場合には、アンロック作動時間が経過するまで待機し、アンロック作動時間経過後にアンロック処理を開始することによって通電休止時間を設定するよう構成したため、上位ＥＣＵによって通電休止時間及びアンロック作動時間を管理することができ、電動モータのデューティ比の制御を容易に行うことができる。
【図面の簡単な説明】
【００２２】
【図１】本発明に係る電動ステアリングロック装置のロック状態を示す縦断面図である。
【図２】本発明に係る電動ステアリングロック装置のアンロック状態を示す縦断面図である。
【図３】本発明に係る電動ステアリングロック装置の制御システム構成図である。
【図４】本発明に係る電動ステアリングロック装置の処理フローを示すタイミングチャートである。
【発明を実施するための形態】
【００２３】
以下に本発明の実施の形態を添付図面に基づいて説明する。
【００２４】
［電動ステアリングロック装置の構成］

図１は本発明に係る電動ステアリングロック装置のロック状態を示す縦断面図、図２は同電動ステアリングロック装置のアンロック状態を示す縦断面図であり、図示の電動ステアリングロック装置１は、電動によって不図示のステアリングシャフト（ステアリングホイール）の回転をロック／アンロックするものであって、そのハウジング２は、非磁性体の金属（例えば、マグネシウム合金）で構成されたケース３と該ケース３の下面開口部を覆う金属製のリッド４によって構成されている。

【００２５】

上記ケース３は矩形ボックス状に成形されており、その上部には円弧状の凹部３ａが形成され、この凹部３ａには不図示の円筒状のステアリングコラムが嵌め込まれ、ケース３は、これに結着される不図示の円弧状ブラケットによってステアリングコラムに固定されている。尚、図示しないが、ステアリングコラム内には前記ステアリングシャフトが挿通しており、該ステアリングシャフトの上端にはステアリングホイールが結着され、ステアリングシャフトの下端はステアリングギヤボックスに連結されている。そして、運転者がステアリングホイールを回転操作すれば、その回転はステアリングシャフトを経てステアリングギヤボックスに伝達され、操舵機構が駆動されて左右一対の前輪が転舵されて所要の操舵がなされる。

【００２６】

前記ハウジング２には、ロック部材収納部２Ａと基板収納部２Ｂが形成されており、これらのロック部材収納部２Ａと基板収納部２Ｂとは上下方向に延びる細長い連通部２Ｃによって互いに連通している。

【００２７】

上記ロック部材収納部２Ａにはロック部材５が収納されており、このロック部材５は、下端部外周に雄ネジ部６ａが刻設された略円筒状のドライバ６と、該ドライバ６内に上下動可能に収容されたプレート状のロックボルト７とで構成されている。ここで、ロックボルト７には上下方向に長い長孔７ａが形成されており、ロックボルト７は長孔７ａに横方向に挿通するピン８によってドライバ６に連結されている。

【００２８】

そして、ロックボルト７は、ケース３に形成された矩形のロックボルト挿通孔３ｂ内に上下動可能に嵌合しており、これとドライバ６の隔壁６ｂ間に縮装されたスプリング９によって常時上方に付勢され、通常はロックボルト７の長孔７ａの下部がピン８に係合することによって該ロックボルト７はドライバ６と共に上下動する。

【００２９】

又、ドライバ６の上部外周の相対向する箇所には水平に延びる係合部としてのアーム６Ａと上下方向に長い回り止め部６Ｂが一体に形成されており、アーム６Ａは、ハウジング２（ケース３）に形成された前記連通部２Ｃに上下動可能に収容され、回り止め部６Ｂは、ケース３に形成された係合溝３ｃに係合してドライバ６の回転を阻止する。そして、アーム６Ａの先端部には横断面矩形の磁石収納部６ｃが形成されており、この磁石収納部６ｃには四角柱状の磁石１０が圧入によって収納されている。

【００３０】

更に、ハウジング２内に形成された前記ロック部材収納部２Ａには円筒状のギヤ部材１１が回転可能に収容されており、該ギヤ部材１１の下部外周はリッド４の内面（上面）に立設された前記ギヤ保持筒部４ａによって回転可能に保持されている。そして、このギヤ部材１１の下部外周にはウォームギヤ１１ａが形成され、内周には雌ネジ部１１ｂが形成されている。

【００３１】

上記ギヤ部材１１の内部には前記ドライバ６の下部が挿入されており、このドライバ６の下部外周に形成された前記雄ネジ部６ａは、ギヤ部材１１の内周に形成された前記雌ネジ部１１ｂが噛合している。そして、リッド４のギヤ保持筒部４ａの中心部に形成された円柱状のスプリング受け４ｂとドライバ６の隔壁６ｂの間にはスプリング１２が縮装されており、ロック部材５（ドライバ６とロックボルト７）はスプリング１２によって常時上

方に付勢されている。

【００３２】

又、ハウジング２に形成された前記ロック部材収納部２Ａには電動モータ１３が横置き状態で収納されており、この電動モータ１３の出力軸１３ａには小径のウォーム１４が形成され、このウォーム１４はギヤ部材１１の外周に形成された前記ウォームギヤ１１ａに噛合している。ここで、ウォーム１４とウォームギヤ１１ａは、電動モータ１３の出力軸１３ａの回転力をロック部材５の進退力に変換する駆動機構を構成している。

【００３３】

一方、ハウジング２に形成された前記基板収納部２Ｂには、その内面がロック部材５の作動方向と平行となるように基板１５が収納されており、この基板１５の内面上下のロック位置とアンロック位置に対応する位置には磁気検出センサであるホール素子１６，１７がそれぞれ設けられており、これらのホール素子１６，１７と前記磁石１０によって位置検出手段が構成され、この位置検出手段によって後述のようにロック部材５（ロックボルト７）の位置（ロック／アンロック位置）が検出される。

【００３４】

次に、以上のように構成された電動ステアリングロック装置１の動作（ロック／アンロック動作）について説明する。

【００３５】

不図示のエンジンが停止している状態では、図１に示すように、ロック部材５のロックボルト７は上限のロック位置にあって、その上端部がケース３のロックボルト挿通孔３ｂから凹部３ａに突出して不図示のステアリングシャフトに係合している。この状態では、ステアリングシャフトの回動がロックしており、このロック状態においては不図示のステアリングホイールを回転操作することができず、これによって車両の盗難が防がれる。

【００３６】

上記状態から運転者が不図示のエンジンＯＮ／ＯＦＦスイッチをＯＮ操作すると、電動モータ１３が起動され、その出力軸１３ａの回転がウォーム１４とウォームギヤ１１ａによって減速されつつ方向が直角に変換されてギヤ部材１１に伝達され、該ギヤ部材１１が回転されるため、該ギヤ部材１１の内周に刻設された雌ネジ部１１ｂに螺合する雄ネジ部６ａが形成されたドライバ６がスプリング１２の付勢力に抗して下動する。このようにドライバ６が下動すると、該ドライバ６に一体に形成されたアーム６Ａとピン８によってドライバ６に連結されたロックボルト７が下動する。

【００３７】

上述のようにドライバ６のアーム６Ａが下動してロックボルト７が図２に示すように下限のアンロック位置に達すると、磁石１０の磁力がホール素子１７によって検出されて電動モータ１３の駆動が停止され、該ロックボルト７の上端部がケース３のロックボルト挿通孔３ｂの内部に退避するため、ロックボルト７のステアリングシャフトへの係合が解除される。この結果、ステアリングシャフトのロックが解除されてアンロック状態となり、運転者によるステアリングホイールの回動操作が可能となって車両の走行が可能となる。

【００３８】

そして、車両が停止し、運転者がエンジンＯＮ／ＯＦＦスイッチをＯＦＦ操作してエンジンを切ると、電動モータ１３が逆転起動されてその出力軸１３ａが逆転される。すると、電動モータ１３の回転はウォーム１４とウォームギヤ１１ａを経てギヤ部材１１に伝達され、該ギヤ部材１１が逆転されるためにドライバ６が上動し、該ドライバ６に一体に形成されたアーム６Ａとピン８によってドライバ６に連結されたロックボルト７が上動する。

【００３９】

而して、上述のようにドライバ６のアーム６Ａが上動して磁石１０の中心がロック位置近傍の検知範囲に達すると、磁石１０の磁力がホール素子１６によって検出されて電動モータ１３の駆動が停止され、図１に示すようにロックボルト７の上端部がケース３の凹部３ａから突出して不図示のステアリングシャフトに係合するため、ステアリングシャフト

の回転がロックされるロック状態となり、駐車時における車両の盗難が防がれる。尚、ロックボルト７のステアリングシャフトの係合溝への係合が良好に行われない場合には、該ロックボルト７に形成された長孔７ａ内をピン８が相対移動することができる範囲でロックボルト７がスプリング９の付勢力に抗して下動するため、ロックボルト７に過大な負荷が作用することがない。

【００４０】

［電動ステアリングロック装置のシステム構成］

次に、電動ステアリングロック装置１のシステム構成を図３に基づいて説明する。

【００４１】

図３は本発明に係る電動ステアリングロック装置１のシステム構成図であり、電動ステアリングロック装置１側には制御手段としてＥＣＵ１８が設けられ、車体側には同じく制御手段である上位ＥＣＵ１９が搭載されている。この上位ＥＣＵ１９には、運転者によって操作されるエンジンＯＮ／ＯＦＦスイッチ（図示せず）が電気的に接続されており、該上位ＥＣＵ１９は、不図示のタイマー手段及び記憶手段を備えている。

【００４２】

上記ＥＣＵ１８には、電源であるバッテリ（ＢＡＴＴ）２０から電動モータ１３に供給される駆動電流の極性を切り替え／遮断して前記ロック部材５の移動を制御するモータ駆動制御部２１と、該モータ駆動制御部２１を制御して前記電動モータ１３をロック／アンロック動作させるマイコン（マイクロコンピュータ）２２と、前記バッテリ２０から前記モータ駆動制御部２１及び前記マイコン２２への電源供給経路を遮断／導通する電源規制手段である第１スイッチ部２３と第２スイッチ部２４等が設けられている。尚、第１スイッチ部２３と第２スイッチ部２４は電源供給経路に直列的に設けられている。

【００４３】

ここで、上記モータ駆動制御部２１は、ロックリレー２５とアンロックリレー２６、マイコン２２からの指令によってロックリレー２５とアンロックリレー２６をそれぞれ駆動制御するロックリレー駆動回路２７とアンロックリレー駆動回路２８を備えている。又、マイコン２２には、前記ホール素子１６，１７（図１及び図２参照）によってロック部材５（ロックボルト７）のロック位置を検出する位置検出回路（ＬＯＣＫ）２９とアンロック位置を検出する位置検出回路（ＵＮＬＯＣＫ）３０が接続されるとともに、ＥＥＰＲＯＭ等の記憶手段３１が接続されている。尚、マイコン２２にはタイマー手段３２が内蔵されている。又、マイコン２２と前記上位ＥＣＵ１９との間では通信回路３３を介してロック／アンロック指令信号、故障状態等のＬＩＮ通信が行われる。

【００４４】

而して、マイコン２２、電動モータ１３、ロックリレー２５、アンロックリレー２６、位置検出回路（ＬＯＣＫ）２９、位置検出回路（ＵＮＬＯＣＫ）３０及び通信回路３３の電源は前記第１及び第２スイッチ部２３，２４の後から取られており、従って、第１及び第２スイッチ部２３，２４がＯＦＦされると、マイコン２２への通電が遮断されてマイコン２２は非作動状態となる。尚、第２スイッチ部２４からマイコン２２に至る電源供給経路の途中には定電圧出力回路３４とリセット回路３５が設けられている。

【００４５】

他方、車体側の上位ＥＣＵ１９と不図示のエンジンの点火装置（イグニッション）の電源は第１及び第２スイッチ部２３，２４の前から取られており、点火装置に電源を供給するＩＧ電源ラインの途中には、上位ＥＣＵ１９によって駆動制御されるＩＧリレー３６が設けられており、ＩＧ電源（イグニッション電源）は上位ＥＣＵ１９によって制御される。

【００４６】

ところで、本実施の形態では、前述のようにバッテリ２０からモータ駆動制御部２１及びマイコン２２への電源供給経路を遮断／導通する電源規制手段として第１及び第２スイッチ部２３，２４を設けたが、これらの第１及び第２スイッチ部２３，２４は上位ＥＣＵ１９によってＯＮ／ＯＦＦ制御されるため、マイコン２２の電源のＯＮ／ＯＦＦは上位Ｅ

ＣＵ１９によって制御される。

【００４７】

従って、上位ＥＣＵ１９が第１及び第２スイッチ部２３，２４の一方側をＯＮ制御、他方側をＯＦＦ制御している場合、これらの第１及び第２スイッチ部２３，２４が正常であればマイコン２２の電源が遮断されるが、このとき、マイコン２２の電源が遮断されなければ、ＯＦＦ制御されている他方側のスイッチ部２３又は２４が故障しているものと判断することができる。このため、専用の故障検出回路等を設けることなく、簡単な構成で第１及び第２スイッチ部２３，２４の故障を検出することができる。ここで、図３に示すように、前記ＩＧ電源ラインは第１スイッチ部２３に接続され、上位ＥＣＵ１９から出力される電源供給信号は第２スイッチ部２４に入力される。尚、第１スイッチ部２３に入力されるＩＧ電源は第１スイッチ部２３内で反転制御され、上位ＥＣＵ１９によってＩＧ電源がＯＮされた場合には第１スイッチ部２３がＯＦＦされ、ＩＧ電源がＯＦＦされた場合には第１スイッチ部２３がＯＮされる。これは、エンジンが始動不能であるＩＧ電源ＯＦＦの状態では、第１スイッチ部２３をＯＮとして電動ステアリングロック装置１を作動可能とし、エンジンが始動可能であるＩＧ電源ＯＮの状態では、第１スイッチ部２３をＯＦＦとして電動ステアリングロック装置１を作動不能とするためである。

【００４８】

而して、本発明に係る電動ステアリングロック装置１においては、ロックボルト７をロック位置からアンロック位置へと移動させるアンロック処理がなされるが、通常モードにおいては、予め設定された電動モータ１３への通電を維持する通電維持時間及び通電を休止する通電休止時間に基づいて電動モータ１３が制御される。

【００４９】

［アンロック処理（通常モード時）］

ここで、電動ステアリングロック装置１の通常モード（ロックボルト７が引き抜ける場合）におけるアンロック処理の流れを図４（ａ）に示すタイミングチャートに従って以下に説明する。尚、図４において付した番号１）～２７）は、下記の処理項目ごとに付した番号１）～２７）に対応している。

【００５０】

１）エンジン停止中に運転者がエンジンＯＮ／ＯＦＦスイッチをＯＮ操作すると、上位ＥＣＵ１９は、電源供給信号を出力して第２スイッチ部２４をＯＮし、電動ステアリングロック装置１に電源を供給する。ここで、エンジン停止中はＩＧ電源が遮断されているために第１スイッチ部２３はＯＮ状態にある。又、上位ＥＣＵ１９は、電動モータ１３のアンロック処理時間を設定するタイマー（２．５秒）を開始する。

【００５１】

２）上位ＥＣＵ１９は、マイコン２２と暗号コードのやり取りを行い、暗号化されたアンロック作動信号（通常モード）を送信する。

【００５２】

３）マイコン２２は、アンロック作動信号を受信すると、電動モータ１３の通電維持時間を設定するためのタイマー（１秒）を開始し、アンロックリレー駆動回路２８を介してアンロックリレー２６にＯＮ信号を送信して電動モータ１３をアンロック作動させる。

【００５３】

４）マイコン２２は、ロックボルト７がロック位置からアンロック位置まで移動すると、位置検出回路（ＵＮＬＯＣＫ）３０によってロックボルト７がアンロック位置まで移動したことを検出し、アンロックリレー２６へのＯＮ信号をＯＦＦとして電動モータ１３への通電を遮断する。この場合、電動モータ１３は、タイマー監視による通電維持時間（１秒）よりも短い時間（０．７秒）でＯＦＦされる。尚、このときの電動モータ１３の通電時間（０．７秒）は、バッテリ２０の電圧及び気温等によって後述するアンロック保障通電時間（１秒）を超えない範囲で変化する。

【００５４】

５）マイコン２２は、上位ＥＣＵ１９に対してアンロック確定信号（ロックボルト７が

Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2003 - Page 594
Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products
IPR2024-01401

アンロック位置まで移動したか否かの信号）を送信する。

【００５５】

６）上位ＥＣＵ１９は、アンロック処理が成功したか否かの結果を不図示のインジケータに表示する（例えば、成功は緑点灯、失敗は赤点滅等）。

【００５６】

７）上位ＥＣＵ１９は、電源供給信号をＯＦＦとし、第２スイッチ部２４をＯＦＦにして電動ステアリングロック装置１への電源の供給を遮断する。

【００５７】

８）上位ＥＣＵ１９は、「アンロック処理成功」の場合、ＩＧリレー３６をＯＮしてＩＧ電源をＯＮし、エンジン始動処理を行う。

【００５８】

９）上位ＥＣＵ１９は、「アンロック処理失敗」の場合。１）のタイマー開始から２．５秒の間に、運転者によるエンジンＯＮ／ＯＦＦスイッチの操作を検出した場合には、その２．５秒が経過するまで待機し、２．５秒経過後にマイコン２２に対して１）の処理を開始して次のロック処理を行う。

【００５９】

［ロック処理（通常モード時）］

次に、電動ステアリングロック装置１の通常モードでのロック処理の流れを図４（ａ）に基づいて以下に説明する。

【００６０】

１０）エンジン作動中に運転者がエンジンＯＮ／ＯＦＦスイッチをＯＦＦ操作すると、上位ＥＣＵ１９は、ＩＧリレー３６をＯＦＦし、ＩＧ電源を遮断してエンジンを停止させる。

【００６１】

１１）ＩＧ電源の遮断に連動して第１スイッチ部２３がＯＮ状態となる。上位ＥＣＵ１９は、電源供給信号を出力して第２スイッチ部２４をＯＮし、バッテリ２０から電動ステアリングロック装置１に電源を供給する。

【００６２】

１２）上位ＥＣＵ１９は、マイコン２２と暗号コードのやり取りを行い、暗号化されたロック作動信号をマイコン２２に送信する。

【００６３】

１３）マイコン２２は、上位ＥＣＵ１９からロック作動信号を受信すると、通電維持時間を設定するためのタイマー（１秒）を開始し、ロックリレー駆動回路２７を介してロックリレー２５にＯＮ信号を送信して電動モータ１３を作動させる。

【００６４】

１４）マイコン２２は、ロックボルト７がアンロック位置からロック位置まで移動すると、位置検出回路（ＬＯＣＫ）２９によってロックボルト７がロック位置まで移動してことを検出し、ロックリレー２５へのＯＮ信号をＯＦＦして電動モータ１３への通電を遮断する。

【００６５】

１５）マイコン２２は、ロック確定信号（ロックボルト７がロック位置まで移動したか否かの信号）を上位ＥＣＵ１９に対して送信する。

【００６６】

１６）上位ＥＣＵ１９は、ロック処理が成功したか否かの結果を電動ステアリングロック装置１に設けられた不図示のインジケータに表示する（例えば、成功は緑点灯、失敗は赤点滅等）。

【００６７】

１７）上位ＥＣＵ１９は、電源供給信号をＯＦＦとし、第２スイッチ部２４をＯＦＦとして電動ステアリングロック装置１への電源の供給を遮断する。

【００６８】

尚、このロック処理は、アンロック処理と比べて電動モータ１３への負荷は小さいため、アンロック処理のように電動モータ１３の作動時間（２．５秒等）の設定はなされない。

【００６９】

［アンロック処理（通常モード：ロックボルトが引き抜けない場合）］

次に、電動ステアリングロック装置１の通常モードにおいてロックボルト７が引き抜けない場合）のアンロック処理の流れを図４（ｂ）に基づいて以下に説明する。

【００７０】

このアンロック処理においては、ロックボルト７が引き抜ける場合の前記アンロック処理１）～９）のうち、４）の処理が下記の処理１８）のように変わり、他の１）～３）及び５）～９）の処理に変更はない。

【００７１】

１８）マイコン２２は、ロックボルト７がステアリングシャフトに噛み込んでアンロック位置まで移動しない場合には、位置検出回路（ＵＮＬＯＣＫ）３０によってロックボルト７がアンロック位置まで移動したことを検知することができないため、ロックボルト７の位置検出によっては電動モータ１３への通電が遮断されることはなく、通常維持時間タイマー（１秒）が経過すると、アンロックリレー２６へのＯＮ信号をＯＦＦとして電動モータ１３への通電を遮断する。

【００７２】

例えば、図４（ｂ）に示すように、通電維持時間（アンロック保障通電時間）を１秒、アンロック作動時間を２．５秒、通電休止時間を１．５秒に設定した場合の電動モータ１３のデューティ比（＝通電維持時間／アンロック作動時間）は１／２．５＝０．４となる。ここで、アンロック保障通電時間は、気温及びバッテリ２０の電圧がエンジンが掛からない程度まで低下したときに、仮に電動モータ１３を作動させた場合のアンロック完了までに通電される平均時間に対して余裕を持って多少大きめの値に設定される。

【００７３】

ところで、本発明に係る電動ステアリングロック装置１においては、上位ＥＣＵ１９が運転者からのアンロック指令を受信して通常モードのアンロック処理を行ったにも拘わらずロックボルト７のアンロック位置への移動を検出できない場合には、運転者からの次回のアンロック指令によって実行されるアンロック処理のモードを、通電維持時間及び通電休止時間から計算されるデューティ比が前記通常モード時のデューティ比よりも小さくなるように、通電維持時間が通常モード時の通電維持時間よりも短く設定されたモータ過熱保護モードに切り替えるようにしている。

【００７４】

ここで、モータ過熱保護モード時の通電維持時間は、所定条件下におけるロックボルト７のロック位置からアンロック位置への移動を保障するアンロック保障通電時間よりも短く設定されている。

【００７５】

又、本実施の形態では、通電維持時間と通電休止時間から成るアンロック作動時間が前記通常モード時と後述のモータ過熱保護モード時で同じになるようモータ過熱保護モード時の給電休止時間が設定される。

【００７６】

更に、本実施の形態では、通電維持時間はマイコン２２によって制御され、通電休止時間は上位ＥＣＵ１９によって制御されるが、上位ＥＣＵ１９は、アンロック処理を開始してから所定のアンロック作動時間内にアンロック指令を受信した場合には、アンロック作動時間が経過するまで待機し、アンロック作動時間経過後にアンロック処理を開始することによって通電休止時間を設定する。

【００７７】

［アンロック処理（モータ過熱保護モード）］

次に、電動ステアリングロック装置１のモータ過熱保護モード（ロックボルト７が引き

抜けない場合）でのアンロック処理の流れを図４（ｂ）に基づいて以下に説明する。

【００７８】

１９）エンジン停止中に運転者がエンジンＯＮ／ＯＦＦスイッチをＯＮ操作すると、上位ＥＣＵ１９は、電源供給信号を出力し、第２スイッチ部２４をＯＮにしてバッテリ２０から電動ステアリングロック装置１に電源を供給する。このとき、ＩＧ電源はＯＦＦのため、第１スイッチ部２３はＯＮ状態にある。又、上位ＥＣＵ１９は、電動モータ１３のアンロック処理時間を設定するタイマー（２．５秒）を開始する。

【００７９】

２０）上位ＥＣＵ１９は、直前のアンロック処理において「アンロック処理失敗」が２回連続して発生した場合には、マイコン２２と暗号コードのやり取りを行い、暗号化されたアンロック作動信号（モータ過熱保護モード）を送信する。

【００８０】

２１）マイコン２２は、上位ＥＣＵ１９からアンロック作動信号を受信すると、通電維持時間を設定するためのタイマー（０．５秒）を開始し、アンロックリレー駆動回路２８を介してアンロックリレー２６にＯＮ信号を送信して電動モータ１３をアンロック作動させる。

【００８１】

２２）マイコン２２は、位置検出回路（ＵＮＬＯＣＫ）３０によってロックボルト７がアンロック位置まで移動したことを検出することができない場合には、通電維持時間タイマー（０．５秒）が経過すると、アンロックリレー２６へのＯＮ信号をＯＦＦとして電動モータ１３への通電を遮断する。

【００８２】

２３）マイコン２２は、アンロック確定信号（ロックボルト７がアンロック位置まで移動したか否かの信号）を上位ＥＣＵ１９に対して送信する。

【００８３】

２４）上位ＥＣＵ１９は、アンロック処理が成功したか否かを不図示のインジケータに表示する（例えば、成功は緑点灯、失敗は赤点滅等）。

【００８４】

２５）上位ＥＣＵ１９は、電源供給信号をＯＦＦとし、第２スイッチ部２４をＯＦＦとして電動ステアリングロック装置１の電源を遮断する。

【００８５】

２６）上位ＥＣＵ１９は、「アンロック処理成功」の場合には、ＩＧリレー３６をＯＮとし、ＩＧ電源をＯＮしてエンジン始動処理を行う。

【００８６】

２７）上位ＥＣＵ１９は、「アンロック処理失敗」の場合、１９）のタイマー開始から２．５秒の間に、運転者によるエンジンＯＮ／ＯＦＦスイッチの操作を検出した場合には、その２．５秒が経過するまで待機し、２．５秒経過後にマイコン２２に対して１９）の処理を開始してアンロック処理を行う。

【００８７】

尚、このモータ過熱保護モードにおいては、通電維持時間を０．５秒、アンロック作動時間を２．５秒、通電休止時間を２．０秒に設定したため、電動モータ１３のデューティ比は０．５／２．５＝０．２となって、通常モード時のデューティ比０．４よりも小さく設定される。

【００８８】

以上のように、本実施の形態に係る電動ステアリングロック装置１においては、運転者からのアンロック指令を受信して通常モードのアンロック処理を行ったにも拘わらずロックボルト７のアンロック位置への移動を検出できない場合、即ち、ロックボルト７がステアリングシャフトに噛み込んでいると判断した場合には、次回のアンロック処理のモードを通常モードからモータ過熱保護モードに切り替え、電動モータ１３のデューティ比が通常モード時のそれよりも小さくなるように電動モータ１３への通電時間を短くしたため、

運転者によってアンロック処理が何度も繰り返し行われた場合であっても、電動モータ１３の過熱を抑えてコイルの断線等の熱害の発生を防ぐことができる。そして、このような効果は、アンロック処理のモードを切り替えることによって得られるため、過熱保護装置を内蔵した電動モータ等の使用が不要となり、大型化やコストアップを避けることができる。

【００８９】

又、本実施の形態では、モータ過熱保護モードにおける電動モータ１３の通電維持時間を通常モードのそれよりも短くして電動モータ１３のデューティ比を下げるようにしたため、全体のアンロック作動時間を短縮することができ、運転者への応答性を損なうことなく、電動モータ１３の発熱を抑制することができる。

【００９０】

ところで、電動モータ１３は一般的に温度上昇に伴ってトルクが下がるが、本実施の形態では、モータ過熱保護モードにおいては通電維持時間を短くし、より温度が低くてトルクが高いときに電動モータ１３を作動させ、この動作を複数回行うことによってロックボルト７をロック位置からアンロック位置へと移動させるようにしたため、アンロック処理を効率良く行うことができる。

【００９１】

又、本実施の形態に係る電動ステアリングロック装置１においては、モータ過熱保護モード時の通電維持時間をアンロック保障通電時間よりも短く設定したため、１回のアンロック処理ではロックボルト７をアンロック位置まで移動させることができない場合があるが、アンロック作動時間を短くすることによって運転者に対する応答性（例えば、運転者がエンジンＯＮ／ＯＦＦスイッチを操作してからアンロック失敗等のワーニングが点灯するまでに時間）は損なわれず、運転者に違和感を与えることなく、運転者の複数回のアンロック操作によってロックボルト７をアンロック位置まで確実に移動させることができる。

【００９２】

更に、本実施の形態では、モータ過熱保護モード時のアンロック作動時間を通常モード時のそれと同じにするようにしたため、運転者に対する応答時間を一定にすることができ、運転者に違和感を与えることがない。

【００９３】

尚、本実施の形態においては、通電維持時間（通常モード）を０．１秒、通電維持時間（モータ過熱保護モード）を０．５秒、アンロック作動時間を２．５秒、アンロック保証通電時間を１．０秒として設定しているが、これはあくまで一例を示したもので、この数値に限定されるものではなく、例えば、通電維持時間（モータ過熱保護モード）及びアンロック作動時間は、通電維持時間（モータ過熱保護モード）とアンロック作動時間とから計算される電動モータ１３のデューティ比が、アンロック処理を繰り返し行った場合でも、電動モータ１３の温度が所定の値を超えないように予め試験等で算出した上限のデューティ比を超えない範囲において任意に設定が可能である。

【００９４】

又，本実施の形態において、上位ＥＣＵ１９は、アンロック作動時間を設定するタイマーを、マイコン２２への電源供給と同時にカウントを開始するように構成しているが、これに限定されるものではなく、例えば、マイコン２２へのアンロック作動信号の送信を「アンロック処理の開始」として、マイコン２２へのアンロック作動信号の送信と同時にアンロック作動時間を設定するタイマーのカウントを開始するようにしても良い。この場合、上位ＥＣＵ１９は、タイマー開始からアンロック作動時間（２．５秒）の間に、運転者によるエンジンＯＮ／ＯＦＦスイッチの操作を検出した場合には、そのアンロック作動時間（２，５秒）が経過するまで待機し、アンロック作動時間（２．５秒）が経過した後にマイコン２２に対してアンロック作動信号を返信するように構成すれば良い。

【００９５】

更に、本実施の形態においては、直前のアンロック処理において「アンロック処理失敗

Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2003 - Page 598
Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products
IPR2024-01401

」が２回連続して発生した場合には、次回のアンロック処理をモータ過熱保護モードに移行するように構成しているが、これに限定されるものではなく、例えば、直前の１回の「アンロック処理失敗」によりモータ過熱保護モードに移行するように攻勢しても良く、或いは直前の連続する３回以上の「アンロック処理失敗」によりモータ過熱保護モードに移行するように構成しても良い。又、「アンロック処理失敗」が連続する場合に限らず、所定時間内に所定回数の「アンロック処理失敗」が発生した場合に、モータ過熱保護モードに移行するように構成しても良い。

【符号の説明】

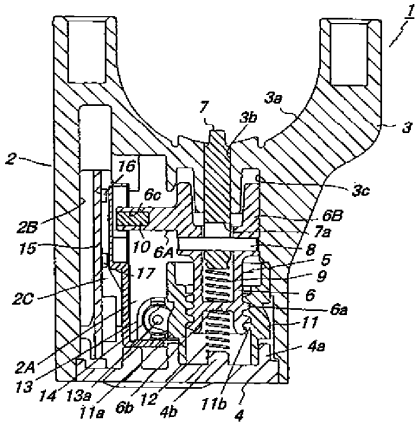
【００９６】

| | |
|---|---|
| １ | 電動ステアリングロック装置 |
| ２ | ハウジング |
| ２Ａ | ハウジングのロック部材収納部 |
| ２Ｂ | ハウジングの基板収納部 |
| ２Ｃ | ハウジングの連通部 |
| ３ | ケース |
| ３ａ | ケースの凹部 |
| ３ｂ | ケースのロックボルト挿通孔 |
| ３ｃ | ケースの係合溝 |
| ４ | リッド |
| ４ａ | リッドのギヤ保持筒部 |
| ４ｂ | リッドのスプリング受け |
| ５ | ロック部材 |
| ６ | ドライバ |
| ６Ａ | ドライバのアーム |
| ６Ｂ | ドライバの回り止め部 |
| ６ａ | ドライバの雄ネジ部 |
| ６ｂ | ドライバの隔壁 |
| ６ｃ | ドライバの磁石収納部 |
| ７ | ロックボルト |
| ７ａ | ロックボルトの長孔 |
| ８ | ピン |
| ９ | スプリング |
| １０ | 磁石 |
| １１ | ギヤ部材 |
| １１ａ | ギヤ部材のウォームギヤ |
| １１ｂ | ギヤ部材の雌ネジ部 |
| １２ | スプリング |
| １３ | 電動モータ |
| １３ａ | 電動モータの出力軸 |
| １４ | ウォーム |
| １５ | 基板 |
| １６，１７ | ホール素子 |
| １８ | ＥＣＵ |
| １９ | 上位ＥＣＵ |
| ２０ | バッテリ |
| ２１ | モータ駆動制御部 |
| ２２ | マイコン |
| ２３ | 第１スイッチ部 |
| ２４ | 第２スイッチ部 |
| ２５ | ロックリレー |

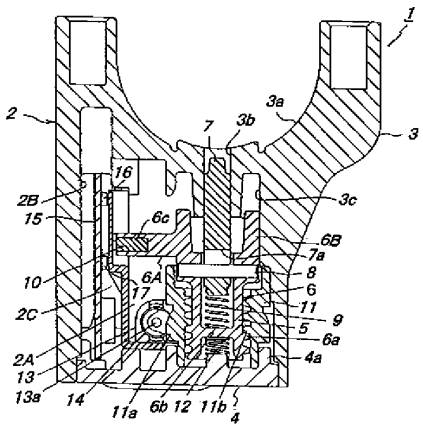
Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2003 - Page 599
Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products
IPR2024-01401

２６　アンロックリレー
２７　ロックリレー駆動回路
２８　アンロックリレー駆動回路
２９　位置検出回路（ＬＯＣＫ）
３０　位置検出回路（ＵＮＬＯＣＫ）
３１　記憶手段
３２　タイマー手段
３３　通信回路
３４　定電圧回路
３５　リセット回路
３６　ＩＧリレー

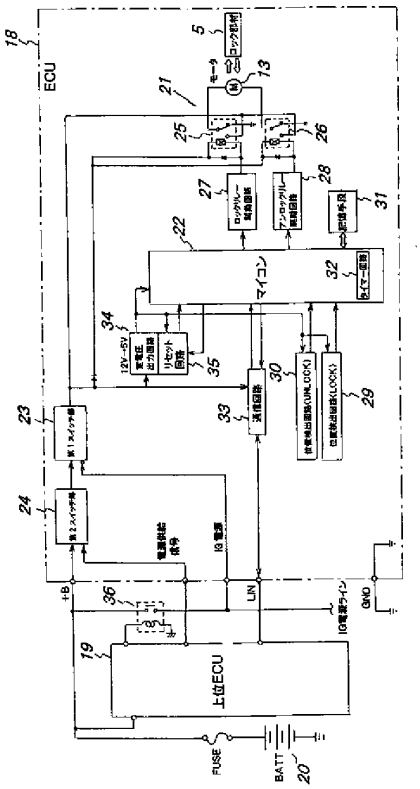
【図１】



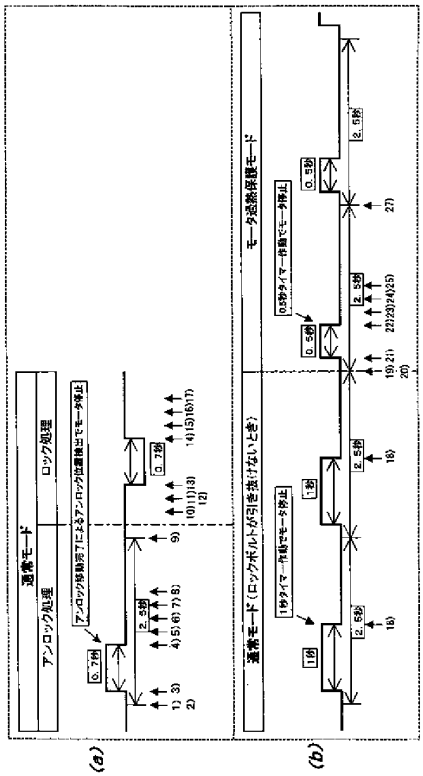

【図２】



【図３】


ECU
マイコン
上位ECU
FUSE
BATT
+B
LIN
GND

【図４】


通常モード
ロック処理
アンロック処理
モータ通電保護モード
(a)
(b)

Espacenet

# Bibliographic data: JP2013022976 (A) — 2013-02-04

## CAR WASHING MACHINE

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## Abstract of JP2013022976 (A)

PROBLEM TO BE SOLVED: To provide a car washing machine which washes a vehicle to be washed, without damaging it.SOLUTION: In the car washing machine WA, a top brush 4 for washing a top surface of the vehicle CA to be washed is arranged in an upper section of a car washing machine body 1 relatively moving in a longitudinal direction with respect to the vehicle CA to be washed, astride the vehicle CA to be washed. The car washing machine includes: two wires 63A and 63B which are connected to the top brush 4 and which suspend both ends in the axial direction 4A of the top brush 4; a winder 81 which winds the wires 63A and 63B; a lifting and lowering motor 65 which lifts and lowers the top brush by winding and unwinding the wires 63A and 63B via the winder 81; and a looseness detecter 75 which detects the looseness of the wires 63A and 63B.



Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2003 - Page 602
Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products
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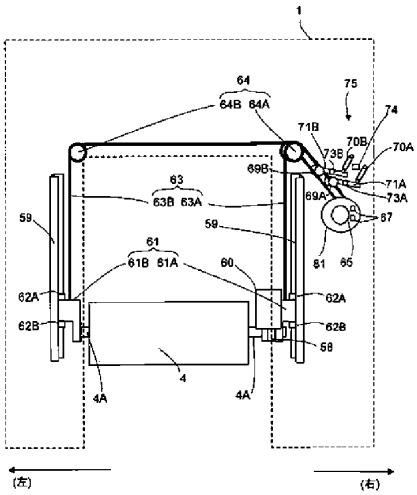
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最終頁に続く

(54)【発明の名称】洗車機

(57)【要約】
【課題】
本発明は、被洗浄車両を傷つけずに洗浄する洗車機を提供する。
【解決手段】
被洗浄車両ＣＡを跨いで前記被洗浄車両ＣＡに対して前後方向に相対移動する洗車機本体１の上部に前記被洗浄車両ＣＡの上面を洗浄するトップブラシ４を配した洗車機ＷＡにおいて、前記トップブラシ４に接続して前記トップブラシ４の軸方向４Ａの両端を吊り下げる２本のワイヤ６３Ａ、６３Ｂと、前記ワイヤ６３Ａ、６３Ｂを巻き取る巻取部８１と、前記巻取部８１を介して前記ワイヤ６３Ａ、６３Ｂの巻き取り及び繰り出しを行うことにより前記トップブラシを昇降させる昇降モータ６５と、前記ワイヤ６３Ａ、６３Ｂの緩みを検出する緩み検出部７５と、を備えたことを特徴とする。
【選択図】図３



【特許請求の範囲】
【請求項１】
被洗浄車両を跨いで前記被洗浄車両に対して前後方向に相対移動する洗車機本体の上部に前記被洗浄車両の上面を洗浄するトップブラシを配した洗車機において、
前記トップブラシに接続して前記トップブラシの軸方向の両端を吊り下げる２本のワイヤと、
前記ワイヤを巻き取る巻取部と、
前記巻取部を介して前記ワイヤの巻き取り及び繰り出しを行うことにより前記トップブラシを昇降させる昇降モータと、
前記ワイヤの緩みを検出する緩み検出部と、
を備えたことを特徴とする洗車機。
【請求項２】
前記緩み検出部は、
前記洗車機本体に回動自在に配されるレバーと、
前記レバーの一端に軸支されるローラーと、
前記ローラーを前記ワイヤに押し付ける方向に付勢する付勢部と、
前記レバーの変位を検出する検出センサと、
を備えたことを特徴とする請求項１に記載の洗車機。
【請求項３】
前記洗車機本体の上部に配した滑車を介して前記ワイヤが前記巻取部に巻回され、前記ローラーが前記滑車と前記巻取部との間の前記ワイヤに当接し、前記滑車の中心と前記巻取部の中心とを結ぶ線上に向かう方向に付勢されることを特徴とする請求項２に記載の洗車機。
【請求項４】
前記緩み検出部の検出によって前記ワイヤの緩みを検出した時に、前記トップブラシが前記ワイヤに正常な張力が復元する位置まで上昇することを特徴とする請求項１～３のいずれかに記載の洗車機。
【請求項５】
緩みを検知した時間が所定時間続くと、前記洗車機本体の洗浄動作を停止することを特徴とする請求項４に記載の洗車機。
【請求項６】
前記ワイヤの巻き取り量を検知する巻取センサを備え、前記巻取センサ及び前記昇降モータは前記トップブラシに対して一方の側方に配されることを特徴とする請求項１～５のいずれかに記載の洗車機。
【請求項７】
２本の前記ワイヤを１つの前記検出センサによって検出することを特徴とする請求項２～６のいずれかに記載の洗車機。
【発明の詳細な説明】
【技術分野】
【０００１】
本発明は、給油所等に設置して被洗浄車両の洗車を行う洗車機に関する。
【背景技術】
【０００２】
給油所等に設置される従来の洗車機は特許文献１に開示される。この洗車機は被洗浄車両の前後に開口部が形成された門型の洗車機本体を備えている。洗車機本体が被洗浄車両を跨いで被洗浄車両に対して前後に相対移動する。
【０００３】
洗車機本体には被洗浄車両の上面を洗浄するトップブラシと、トップブラシの重量に対応するつり合いおもりと、がワイヤに接続される。トップブラシの左右両端は長さの違うワイヤを介して吊り下げられ、それぞれのワイヤは右側部に設けられたつり合いおもりに

接続される。トップブラシは自重により相対移動する被洗浄車両に沿って被洗浄車両の上面と当接して洗浄する。

【先行技術文献】

【特許文献】

【０００４】

【特許文献１】特開昭５４－１１８６６３号公報

【発明の概要】

【発明が解決しようとする課題】

【０００５】

しかしながら、特許文献１に開示される洗車機はトップブラシに接続されるワイヤが緩むと、トップブラシの昇降動作が正常に動作せず被洗浄車両を破損する危険がある。

【０００６】

本発明は、被洗浄車両を傷つけずに洗浄する洗車機を提供することを目的とする。

【課題を解決するための手段】

【０００７】

上記目的を達成するために本発明は、被洗浄車両を跨いで前記被洗浄車両に対して前後方向に相対移動する洗車機本体の上部に前記被洗浄車両の上面を洗浄するトップブラシを配した洗車機において、前記トップブラシに接続して前記トップブラシの軸方向の両端を吊り下げる２本のワイヤと、前記ワイヤを巻き取る巻取部と、前記巻取部を介して前記ワイヤの巻き取り及び繰り出しを行うことにより前記トップブラシを昇降させる昇降モータと、前記ワイヤの緩みを検出する緩み検出部と、を備えたことを特徴とする。

【０００８】

この構成によると、被洗浄車両を跨ぐ洗車機本体に被洗浄車両の上面を洗浄するトップブラシが配される。洗車機本体が設定された洗車条件に基づいて、被洗浄車両に対して前後方向に相対移動しながらトップブラシを用いて洗浄を行う。トップブラシの両端はワイヤにより吊り下げられ、昇降モータにより巻取部を介してワイヤの巻き取り及び繰り出しを行って昇降される。洗車機本体にはワイヤの緩みを検出する緩み検出部が設けられ、ワイヤの緩みを検知するとトップブラシの昇降異常と判断して所定の動作が行われる。

【０００９】

また、本発明は上記構成の洗車機において、前記緩み検出部は、前記洗車機本体に回動自在に配されるレバーと、前記レバーの一端に軸支されるローラーと、前記ローラーを前記ワイヤに押し付ける方向に付勢する付勢部と、前記レバーの変位を検出する検出センサと、を備えたことを特徴とする。

【００１０】

また、本発明は上記構成の洗車機において、前記洗車機本体の上部に配した滑車を介して前記ワイヤが前記巻取部に巻回され、前記ローラーが前記滑車と前記巻取部との間の前記ワイヤに当接し、前記滑車の中心と前記巻取部の中心とを結ぶ線上に向かう方向に付勢されることを特徴とする。

【００１１】

また、本発明は上記構成の洗車機において、前記緩み検出部の検出によって前記ワイヤの緩みを検出した時に、前記トップブラシが前記ワイヤに正常な張力が復元する位置まで上昇することを特徴とする。

【００１２】

また、本発明は上記構成の洗車機において、緩みを検知した時間が所定時間続くと、前記洗車機本体の洗浄動作を停止することを特徴とする。

【００１３】

また、本発明は上記構成の洗車機において、前記ワイヤの巻き取り量を検知する巻取センサを備え、前記巻取センサ及び前記昇降モータは前記トップブラシに対して一方の側方に配されることを特徴とする。

【００１４】

また、本発明は上記構成の洗車機において、２本の前記ワイヤを１つの前記検出センサによって検出することを特徴とする。

【発明の効果】

【００１５】

本発明によると、被洗浄車両を傷つけずに洗浄する洗車機を提供することができる。

【図面の簡単な説明】

【００１６】

【図１】本発明の実施形態の洗車機の全体構成を示す側面図

【図２】本発明の実施形態の洗車機本体の構成を示す正面図

【図３】本発明の実施形態の洗車機本体の要部構成を示す正面図

【図４】本発明の実施形態の緩み検出部を示す正面図

【発明を実施するための形態】

【００１７】

本発明の第１実施形態を図面を参照して説明する。図１、図２は本実施形態の洗車機を示す側面図、正面図である。洗車機ＷＡは洗車機本体１を備え、洗車機本体１の進入経路上にはリモートパネル７Ａが配される。被洗浄車両ＣＡはリモートパネル７Ａの面前で停車し、リモートパネル７Ａの操作によって洗車の受け付け等を行う。

【００１８】

洗車機本体１は前後に開口し、被洗浄車両ＣＡを跨ぐ門型に形成される。洗車機本体１の底面には地面に設けられた左右一対のレール２上に配される車輪３が設けられる。これにより、洗車機本体１はレール２上を走行して被洗浄車両ＣＡに対して前後に相対移動する。

【００１９】

洗車機本体１には被洗浄車両ＣＡをブラッシングする複数の回転するブラシを設けている。ブラシはトップブラシ４、サイドブラシ５及びロッカーブラシ６から成っている。トップブラシ４は被洗浄車両ＣＡの上面を洗浄し、水平な回転軸（軸方向）４Ａ（図３参照）に布（織布、編布、不織布等）や樹脂繊維から成るブラシ毛を放射状に固着して形成される。

【００２０】

サイドブラシ５は左右一対設けられ、被洗浄車両ＣＡの両側面と前後面に摺動して被洗浄車両ＣＡを洗浄する。ロッカーブラシ６は左右一対設けられ、被洗浄車両ＣＡのタイヤを含む側面下部を洗浄する。サイドブラシ５及びロッカーブラシ６もトップブラシ４と同様の回転軸及びブラシ毛を有している。

【００２１】

洗車機本体１の一方の側方には洗剤やワックス等の各種液剤を貯液する複数の貯液タンク（不図示）を収納するタンク収納部５０が配される。タンク収納部５０の上方には市水及び各貯液タンクからの液剤を電磁弁等を介して分配する分配配管部５１が設けられる。分配配管部５１には第１、第２浄水ノズル１１、１３、第１、第２洗剤ノズル１２、１５、撥水コートノズル１４、ワックスノズル１６が導出される。

【００２２】

第１、第２浄水ノズル１１、１３は洗車機本体１の手前側及び奥側にそれぞれ配され、被洗浄車両ＣＡに対して市水を噴射する。第１、第２洗剤ノズル１２、１５は洗車機本体１の手前側及び奥側にそれぞれ配され、被洗浄車両ＣＡに対して洗剤を噴射する。撥水コートノズル１４は洗車機本体１の奥側に配され、被洗浄車両ＣＡに対して撥水コート剤を噴射する。ワックスノズル１６は洗車機本体１の奥側に配され、被洗浄車両ＣＡに対してワックスを噴射する。

【００２３】

また、洗車機本体１には被洗浄車両ＣＡを乾燥させるトップ送風ノズル２１とサイド送風ノズル２２とを設けている。洗車機本体１の中央上部にはトップ送風ノズル２１が設けられ、両側方にはサイド送風ノズル２２が設けられる。トップ送風ノズル２１及びサイド

送風ノズル２２はブロワ２０からの送風を被洗浄車両ＣＡに対して吹き付けて乾燥させる。

【００２４】

洗車機本体１の前面上部には車両センサ８が設けられている。車両センサ８は光電センサや超音波センサ等から成り、洗車機本体１に進入する被洗浄車両ＣＡの外面形状を検知する。

【００２５】

洗車機本体１の一方の側方の前面には操作パネル７が配される。操作パネル７はリモートパネル７Ａと同様の操作ボタンを備え、被洗浄車両ＣＡから降車したユーザ等の操作により洗車の受け付けや洗車条件の設定を行う。

【００２６】

洗車条件の設定としてはシャンプー、ワックス掛け、撥水コート等を水洗いに追加するボタンが操作パネル７及びリモートパネル７Ａに設けられる。また、高級なシャンプー、高級なワックス、高級な撥水コート、特殊なコート等を行うボタンも設けられている。さらに、フロントガード有り、フェンダーポール有り、ドアミラー有り、リヤワイパー有り、該当装備品無し等の装備品設定ボタンが設けられている。

【００２７】

図３は洗車機本体１のトップブラシ４の要部構成を示す正面図である。トップブラシ４の回転軸４Ａはトップブラシ４の中心から左右方向に伸び、左右に設けられたホルダ６１によって回転自在に支持される。トップブラシ４を回転させる回転モータ６０は右側方に配されて伝達機構５８を介してトップブラシ４の回転軸４Ａに連結される。これにより回転モータ６０はトップブラシ４を回転させる。

【００２８】

ホルダ６１はワイヤ６３Ａに接続される右側方のホルダ６１Ａとワイヤ６３Ｂに接続される左側方のホルダ６１Ｂとから構成される。ホルダ６１Ａ、Ｂにはそれぞれ上下に配される第１ガイドローラ６２Ａ及び第２ガイドローラ６２Ｂが軸支される。

【００２９】

洗車機本体１の両側部には上下方向に伸びる案内部５９が設けられる。案内部５９は水平断面図がコ字状に形成され、第１ガイドローラ６２Ａ及び第２ガイドローラ６２Ｂが当接して転動する。これによりホルダ６１Ａ、６１Ｂは案内部５９の案内によって上下に移動可能になっている。

【００３０】

右側方のホルダ６１Ａの上部はワイヤ６３Ａに接続され、上方に配される滑車６４Ａを介して巻取部８１へ接続される。ホルダ６１Ｂの上部はワイヤ６３Ｂに接続され、上方に配される滑車６４Ｂ及び滑車６４Ａを介して巻取部８１へ接続される。

【００３１】

巻取部８１は昇降モータ６５のモータ軸６５Ａと連結されており、昇降モータ６５の巻回によってホルダ６１Ａ及びホルダ６１Ｂは昇降する。これにより、トップブラシ４はワイヤ６３により吊り下げられて被洗浄車両ＣＡとの距離を一定に維持される。そして、昇降モータ６５の駆動によりワイヤ６３の巻き取り及び繰り出しを行うことにより昇降自在になっている。

【００３２】

洗車機本体１にはワイヤ６３の巻き取り量を検知する巻取センサ６７が設けられ、巻取センサ６７はトップブラシ４に対して昇降モータ６５と同じ右側方に配される。このためトップブラシ４の高さ位置を正確に把握するとともに、洗車機本体１を小型化して配線を簡素化することができる。

【００３３】

滑車６４Ａと巻取部８１との間にはワイヤ６３Ａ、６３Ｂの緩みを検出する緩み検出部７５が配される。緩み検出部７５はワイヤ６３Ａ、６３Ｂに対応して一対の引っ張りバネ７０Ａ、７０Ｂと、レバー７１Ａ、７１Ｂと、ローラー６９Ａ、６９Ｂと、を備える。ま

た、レバー７１Ａ、７１Ｂの変位を検出する検出センサ７４が１つ設けられる。なお、７３Ａ、７３Ｂはそれぞれレバー７１Ａ、７１Ｂの軸部を示している。

【００３４】

図４は緩み検出部７５の正面図を示している。図を簡略化するために一方のワイヤ６３Ａの緩みを検出する構成を記載しており、ワイヤ６３Ｂについても同様である。洗車機本体１にはレバー７１Ａが軸部７３Ａで回動自在に支持される。引っ張りバネ７０Ａは一端を洗車機本体１に接続され、他端をレバー７１Ａの下部に接続される。これにより、レバー７１Ａが図中、反時計回りに付勢される。

【００３５】

ローラー６９Ａはレバー７１Ａの上端に軸支され、滑車６４Ａと巻取部８１との間のワイヤ６３Ａに当接する。この時、ローラー６９Ａは引っ張りバネ７０Ａによって滑車６４Ａの中心６４Ｃと巻取部８１の中心８１Ａとを結ぶ線Ｔ上に向かう方向（Ｆ方向）に付勢される。これにより、滑車６４Ａ及び巻取部８１からワイヤ６３Ａの脱落を防止することができる。

【００３６】

上記構成により、洗車機本体１が設定された洗車条件に基づいて被洗浄車両ＣＡに対して前後方向に相対移動する。そして、被洗浄車両ＣＡには貯液タンク５０から液剤が供給され、洗車機本体１に設けた回転ブラシが被洗浄車両ＣＡに摺動して被洗浄車両ＣＡが洗車される。この時、車両センサ８の検知によってトップブラシ４は昇降モータ６５の駆動により被洗浄車両ＣＡの上面に沿って一定の距離を維持して昇降し、被洗浄車両ＣＡの上面を傷つけずに洗浄することができる。

【００３７】

例えば、トップブラシ４が下降して被洗浄車両ＣＡの上面を洗浄中に装備品のフェンダーミラー、ルーフキャリアなどにトップブラシ４が乗り上げるとワイヤ６３に緩みが発生する。この時、検出センサ７４の検知によってワイヤ６３の緩みを検出し、緩み検出部７５は異常動作であると判定する。そして、制御部（不図示）を介して操作パネル７による表示などによって報知してもよい。この時、巻取部８１を巻回することによりトップブラシ４はワイヤ６３に正常な張力が復元する高さ位置まで上昇される。これにより、被洗浄車両ＣＡの上面を傷つけることを抑えることができる。

【００３８】

さらに、緩み検出部７５が緩みを検知した時間が２～３秒続くと、前記洗車機本体の洗浄動作を全て停止する。これにより、確実に被洗浄車両ＣＡの破損を防止することができる。

【００３９】

本実施形態によると、洗車機本体１にはトップブラシ４を吊り下げるワイヤ６３と、ワイヤ６３を巻き取る巻取部８１と、ワイヤ６３の巻き取り及び繰り出しを行うことによりトップブラシ４を昇降させる昇降モータ６５と、ワイヤの緩みを検出する緩み検出部７５と、が設けられる。このため、トップブラシ４は被洗浄車両ＣＡの上面に沿って一定の距離を維持して昇降するため、被洗浄車両ＣＡの上面を傷つけずに洗浄することができる。また、ワイヤ６３の緩みを検出する緩み検出部７５を設けたので、ワイヤ６３の絡み付きなどによるトップブラシ４の昇降の異常を容易に判別することができる。従って、運転停止や報知等を行って被洗浄車両ＣＡの破損を防止することができる。

【００４０】

また、緩み検出部７５は、洗車機本体１に回動自在に配されるレバー７１Ａ、７１Ｂと、レバー７１Ａ、７１Ｂの一端に軸支されるローラー６９Ａ、６９Ｂと、ローラー６９Ａ、６９Ｂをワイヤ６３Ａ、６３Ｂに押し付ける方向に付勢する付勢部７０Ａ、７０Ｂと、レバー７１Ａ、７１Ｂの変位を検出する検出センサ７４と、を備える。このため、ワイヤ６３Ａ、６３Ｂの緩みの検出を容易に行うことができる。

【００４１】

また、ローラー６９Ａ、６９Ｂが滑車６４Ａと巻取部８１との間のワイヤ６３Ａ、６３

Ｂに当接し、滑車６４Ａの中心６４Ｃと前記巻取部８１の中心８１Ａとを結ぶ線Ｔ上に向かう方向Ｆに付勢される。このため、ワイヤ６３Ａ、６３Ｂに緩みが発生してもワイヤ６３Ａ、６３Ｂの滑車６４Ａの巻回位置は維持し易くなる。

【００４２】

また、緩み検出部７５の検出によってワイヤ６３Ａ、６３Ｂの緩みを検出した時に、トップブラシ４がワイヤ６３Ａ、６３Ｂに正常な張力が復元する位置まで上昇するため、このため、被洗浄車両の上面をより傷つけずに洗浄能力を維持できる。

【００４３】

また、緩みを検知した時間が所定時間続くと、洗車機本体１の洗浄動作を停止するため、被洗浄車両ＣＡをより確実に傷つけ難くする。

【００４４】

また、ワイヤ６３の巻き取り量を検知する巻取センサ６７を備え、巻取センサ６７及び昇降モータ６５はトップブラシ４に対して側方に配される。このため、洗車機本体１を小型化することができる。

【００４５】

また、２本のワイヤ６３Ａ、６３Ｂを１つの検出センサ７４によって検出することを特徴とする。このため、配線を簡素化するとともに、洗車機本体１の小型化することができる。

【００４６】

本実施形態において、巻取センサ６７及び昇降モータ６５はトップブラシ４に対して左側方に配されてもよい。

【産業上の利用可能性】

【００４７】

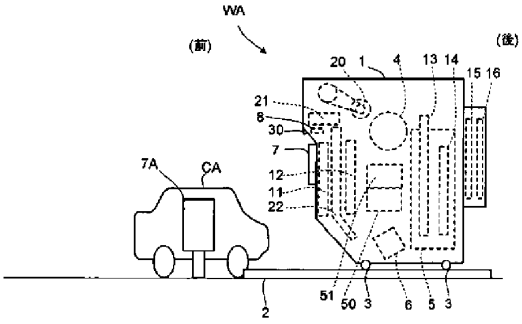
本発明によると、給油所等に設置して被洗浄車両の洗車を行う洗車機に利用することができる。

【符号の説明】

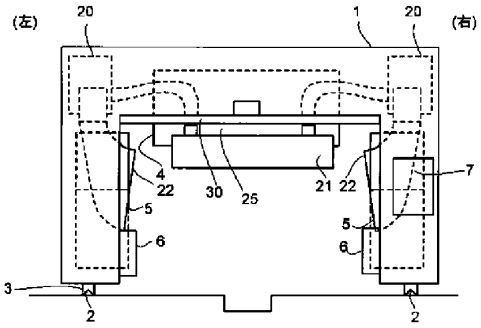
【００４８】

| | |
|---|---|
| １ | 洗車機本体 |
| ４ | トップブラシ |
| ４Ａ | 回転軸 |
| ５ | サイドブラシ |
| ６ | ロッカーブラシ |
| ７ | 操作パネル |
| ７Ａ | リモートパネル |
| ６０ | 回転モータ |
| ６３Ａ、６３Ｂ | ワイヤ |
| ６５ | 昇降モータ |
| ６７ | 巻取センサ |
| ６９Ａ、６９Ｂ | 滑車 |
| ７０Ａ、７０Ｂ | 引っ張りバネ |
| ７１Ａ、７１Ｂ | レバー |
| ７３Ａ、７３Ｂ | 軸部 |
| ７４ | 検出センサ |
| ７５ | 緩み検出部 |
| ８１ | 巻取部 |
| ＣＡ | 被洗浄車両 |
| ＷＡ | 洗車機 |

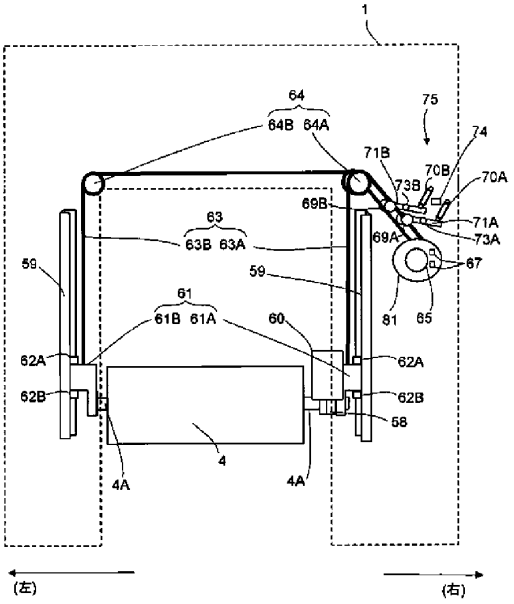
【図１】


WA
(前)
(後)
20 1 4 13 14 15 16
21
8
30
7
12
11
22
7A
CA
2
51 50 3 6 5 3

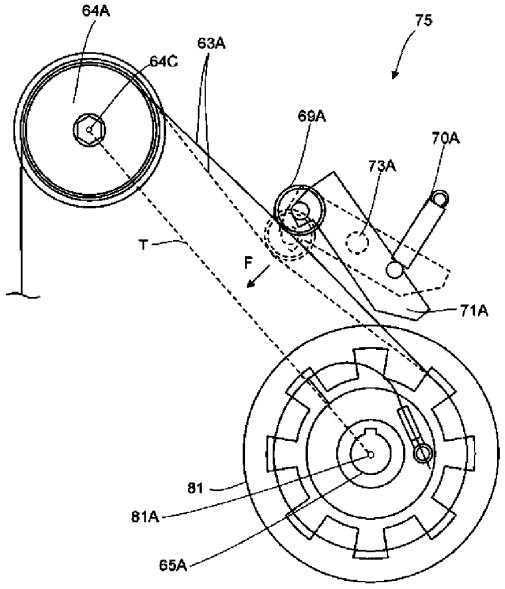
【図２】


(左)
20
1
20
(右)
4
22
30
25
21 22
7
5
6
5
6
3
2
2

【図３】


1
64
64B 64A
75
74
71B
70B
70A
73B
69B
71A
73A
63
63B 63A
69A
67
59
59
61
61B 61A
60
81
65
62A
62A
62B
62B
58
4
4A
4A
(左)
(右)

【図４】


64A
64C
63A
75
69A
70A
73A
T
F
71A
81
81A
65A

フロントページの続き

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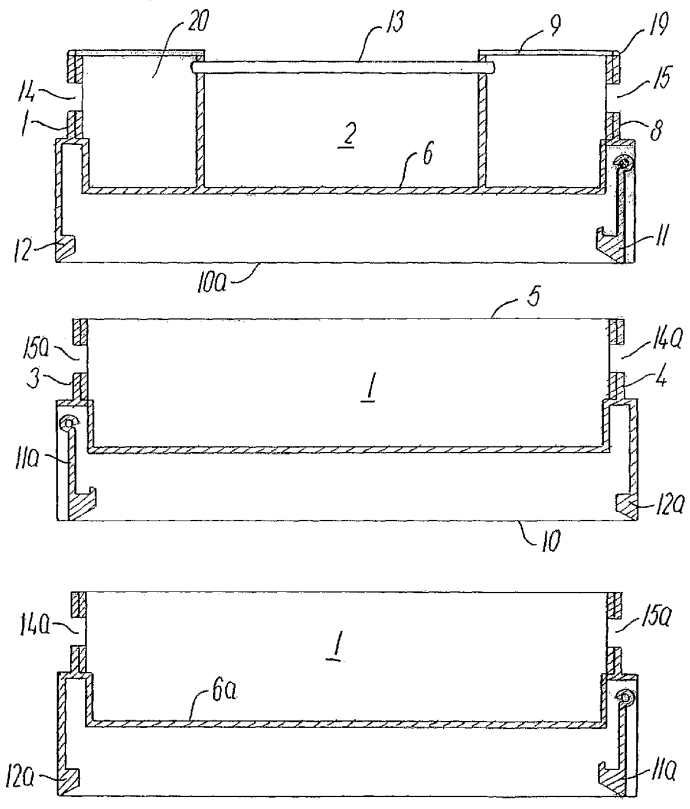
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*[Continued on next page]*

(54) Title: A STORAGE DEVICE COMPRISING TWO PARTS




(57) Abstract: A storage device for coupling at least one box (1) and at least one cover (2), having a carrier grip (13), together is formed by a lock or a snap lock (11, 11a), which is provided in the one gable (3, 8) or side wall of the cover or the box, while a locking pin (12, 12a) is provided in the opposite gable (4, 7) or side wall. The snap lock is adapted to engage a gripper flange (14, 14a), which is provided at the top of the gable (3, 8) or side wall of the box or the cover, while the locking pin (12, 12a) is adapted to engage a locking edge (15, 15a), which is provided in the opposite gable (4, 7) or side wall of the box or the cover. The invention provides a storage device, where a cover and a box may be coupled to and be disconnected from each other by a lateral movement of the cover or the box under the action of the carrier grip (13), so that the snap lock is not loaded by the weight of the cover in connection with the separation. In addition, assembly and separation of cover or box to/from the box or the cover may take place in a few seconds.

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A storage device comprising two parts

The invention relates to a storage device comprising two parts, such as two boxes or a box and a cover, which parts may be stacked and coupled together, wherein each part has two opposed gables and a coupling means at each gable for detachably coupling the two parts together in a stacked state, wherein the coupling means at the one gable of the one part is arranged to cooperate with the coupling means at the one gable of the other part, wherein the coupling means at the other gable of the one part is arranged to cooperate with the coupling means at the other gable of the other part, and wherein the coupling means of both parts at the one gable are formed by a first coupling means having a snap lock function.
The invention moreover relates to use of the storage device.

Boxes having covers which may be coupled together are provided in several embodiments and sizes and are used in a multitude of connections. In particular for use as tool boxes, there are many types which are configured with various gadgets.

Boxes having covers are known, wherein covers and boxes may be coupled together in a mutual order by means of snap locks provided in the covers, and may thus be adapted to various needs.
The box systems thus known are extremely flexible, but may be vitiated by the drawback that the release of boxes and covers from each other is performed in that a user grips the snap locks in the gables of the boxes and/or the covers by both hands, which means that the weight of the boxes and the covers being released is transferred to the snap locks. To prevent breaking of these, they must therefore be made very sturdy.

Accordingly, an object of the invention is to provide a storage device for boxes having covers, where the weight of the cover or covers and/or the

box or boxes is not transferred to the snap lock.

The object of the invention is achieved by a storage device of the type defined in the introductory portion of claim 1, which is characterized in that the coupling means of the two parts at the other gable are formed by a second coupling device, wherein both coupling means may be coupled together with and be detached from each other by lateral displacement of the two parts relative to each other.

Hereby, the cover and the box may be detached from each other by release of the snap lock, so that the entire weight is not transferred to the snap lock, since parts of the cover are supported by the box or the cover, while the snap lock is released.

It should also be noted that assembly and disassembly of the cover on/from the box takes place in a few seconds, and consequently is very time-saving and simple and convenient for a user to handle.

Expediently, as stated in claim 2, the two coupling means in said second coupling means are formed by a pin, which is provided in the lower portion of the other gable of the part disposed at the top of the stack, as well as an edge arranged to engage the pin, said edge being provided in the upper portion of the other gable of the part disposed at the bottom of the stack.

Hereby, a simple and effective attachment of the cover to the box is achieved when the snap lock is in engagement. The same will apply if it is desired to couple two boxes or two covers together.

To completely prevent transfer of any weight from the cover to the snap lock, it is advantageous if, as stated in claim 3, the cover is provided with a recessed carrier grip at its upper side, whereby the carrier grip absorbs the entire weight of the cover and the boxes and covers coupled together below the cover, which it might be desired to have removed from the underlying

boxes and/or covers.

As stated in claim 4, it is expedient that the snap lock function is configured as a snap lock, which is configured as a moulded part in the gable or side wall of the cover or the box, which may engage the edge which is provided in the gable or the side wall of the cover or the box.

If a more sturdy, but also more expensive snap lock is desired, it is advantageous if, as stated in claim 5, the snap lock is formed by a gripper part which is spring-biased.

If, as stated in claim 6, the cover is provided with an edge at the top of both gables or side walls, and the cover is provided with a snap lock at the bottom of its one gable or sidewall and is provided with a locking pin in its other gable or side wall, and, as stated in claim 7, the box is provided with an edge at the top of both gables or side walls and with a snap lock at the bottom of the one gable and with a locking part at the bottom of the opposite gable, an arbitrary number of boxes and covers may be coupled together in a simple manner in an arbitrary order.

As mentioned, the invention also relates to use.
This use is defined in claim 8.

The advantage of this use is that the costs of packaging, pallets, sheeting, shipment and storage space may be reduced considerably relative to the costs associated with tool boxes assembled at the factory, since a compact concept is involved here.
With this packaging system, combined with the extremely quick assembly concept, the costs may thus be reduced to 30 – 40% of the corresponding costs of tool boxes assembled at the factory.

The invention will now be explained more fully with reference to the drawing, in which

fig. 1 shows a storage device according to the invention on a box having a cover, where the cover is separated from the box,

fig. 2 shows the storage device of fig. 1 during the coupling-together of the cover and the box,

fig. 3 shows the storage device of fig. 1 and fig. 2, where the cover and the box are coupled together,

fig. 4 shows a second embodiment of the invention, where two boxes are seen in perspective before they are assembled,

fig. 5 shows a third embodiment seen from the side and how the storage device is configured with a cover and two boxes,

fig. 6 shows the storage device according to the invention used in another embodiment, while

fig. 7 shows how boxes and covers with the storage device of fig. 4 may be stacked.

Figs. 1 – 3 show a box having a cover, where there is only one set of locking means which cooperate on a box and a cover, while figures 4 and 5 show boxes and covers, where cooperating locking means are provided both at the top and at the bottom of the boxes and the covers.

The figures show a box 1 which has gables 3, 4, a bottom 6a.
In the gables of the box near the open upper part of the box, the gable 3 is

provided with a coupling means in the form of a locking edge 15a, while the opposite gable 4 is provided with a coupling means in the form of a gripper flange 14a.

At the bottom of the gables of the box (only figs. 4 and 5), a coupling means in the form of a snap lock 11a is provided near the open lower part 10 of the box, while a coupling means in the form of a locking edge 12a is provided in its opposite gable.

The numeral 2 designates a cover which has gables 7, 8, a lid 9 and an open lower part 10a as well as a carrier grip 13.

A coupling means in the form of a locking pin 12 and another coupling means in the form of a snap lock 11 are provided at the bottom of the one gable of the cover, said snap lock having spring properties so that a hook on the snap lock is affected by a force directed inwardly against the gable.
A locking means in the form of a gripper flange 14 is provided at the top (only figs. 4 and 5) of the one gable of the cover, while another locking means in the form of a locking edge 15 is provided in the opposite gable.
Further, the cover may be provided with a lid 9, below which an insert part intended to store small tools, screws, nails and the like may be placed.

The mode of operation of the locking system will now be explained more fully with reference to figures 1 – 3.
From the position shown in fig. 1 where a user (not shown) has gripped the carrier grip 13, the gable 7 is moved down, so that the locking pin 12 engages the locking edge 15a.
Then, the cover 2 is pressed down in the direction of the arrow 16, following which the snap lock 11 engages the locking edge 14a, so that the cover 2 is secured to the box 1 by the locking system, which is formed by the snap lock 11, the locking pin 12, the gripper flange 14a and the locking edge 15a.

When, subsequently, the cover 2 is to be detached from the box, a user grips the carrier grip 13 by the one hand and releases the snap lock 11 from the gripper flange 14a by the other hand, following which the cover is lifted and displaced to the right, whereby the cover may be detached from the box.

When the cover is coupled together with and separated from the box, the cover remains in almost the same horizontal plane, as lateral displacements take place during the operations.

In addition, the snap lock 11 will never have to absorb the weight of the cover, which may optionally contain tools and the like.

The storage device according to the invention may be used in connection with the coupling-together of several boxes and covers of the type which is described in the applicant's above-mentioned DK Patent Application No. PA 2004 01454, as will be explained now in connection with figures 6 and 7.

Fig. 6 shows a box system which consists of a box 1 with a mounted cover 2, and a tray 18 having a carrier grip 17 is arranged inside the box 1, where the tray may e.g. contain small tool parts, nails, screws and the like.

The box has obliquely inwardly extending walls, which means that they may be stacked as shown at the bottom of fig. 7.

Moreover, the tray 18 may be moved into the cover 2 and be stacked as shown in fig. 7.

Hereby, an extremely compact system is provided, which occupies minimum space during transport and during storage at wholesalers and at retailers.

Thus, just an assembled box with cover and tray, as shown in fig. 6, need be displayed in a sales room, and when a consumer wants to buy a box with cover, he just takes a box from a first stack and then a cover with tray from a second stack, which may subsequently be coupled together in a few seconds by the locking system according to the invention.

## PATENT CLAIMS

1. A storage device comprising two parts, such as two boxes or a box and a cover, which parts may be stacked and coupled together, wherein each part has two opposed gables and a coupling means at each gable for detachably coupling the two parts together in a stacked state, wherein the coupling means at the one gable of the one part is arranged to cooperate with the coupling means at the one gable of the other part, wherein the coupling means at the other gable of the one part is arranged to cooperate with the coupling means at the other gable of the other part, and wherein the coupling means of both parts at the one gable are formed by a first coupling means having a snap lock function, c h a r a c t e r i z e d in that the coupling means of the two parts at the other gable are formed by a second coupling device, wherein both coupling means may be coupled together with and be detached from each other by lateral displacement of the two parts relative to each other.

2. A storage device according to claim 1, c h a r a c t e r i z e d in that the two coupling means in said second coupling means are formed by a pin, which is provided in the lower portion of the second gable of the part disposed at the top of the stack, as well as an edge arranged to engage the pin, said edge being provided in the upper portion of the other gable of the part disposed at the bottom of the stack.

3. A storage device according to claim 1 or 2, c h a r a c t e r i z e d in that the cover is provided with a recessed carrier grip at its upper side.

4. A storage device according to claims 1 – 3, c h a r a c t e r i z e d in that the snap lock function is configured as a snap lock, which is configured as a moulded part in the gable or side wall of the cover or the box, which may engage the edge which is provided in the gable or side wall of the cover or

the box.

5. A storage device according to claims 1 – 3, c h a r a c t e r i z e d in that the snap lock is formed by a gripper part which is spring-biased.

6. A storage device according to claims 1 – 5, c h a r a c t e r i z e d in that the cover is provided with an edge at the top of both gables or side walls, and that the cover is provided with a snap lock at the bottom of its one gable or side wall and is provided with a pin at its other gable or side wall.

7. A storage device according to claims 1 – 6, c h a r a c t e r i z e d in that the box is provided with an edge at the top of both gables or side walls and is provided with a snap lock at the bottom of the one gable and is provided with a pin at the bottom of the opposite gable.

8. Use of a storage device according to claims 1 – 7 in connection with boxes and covers which are shaped conically.

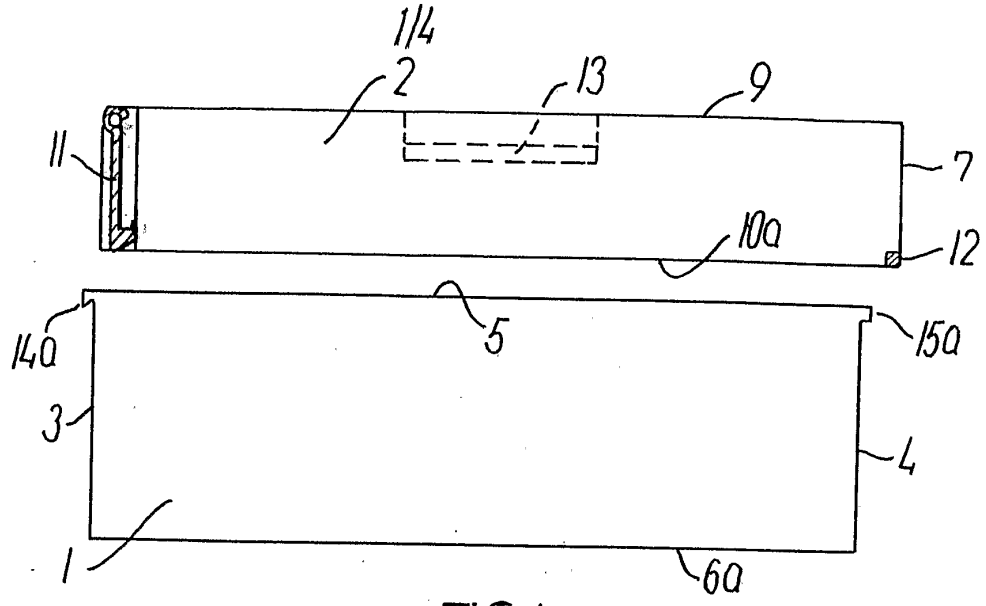



FIG.1

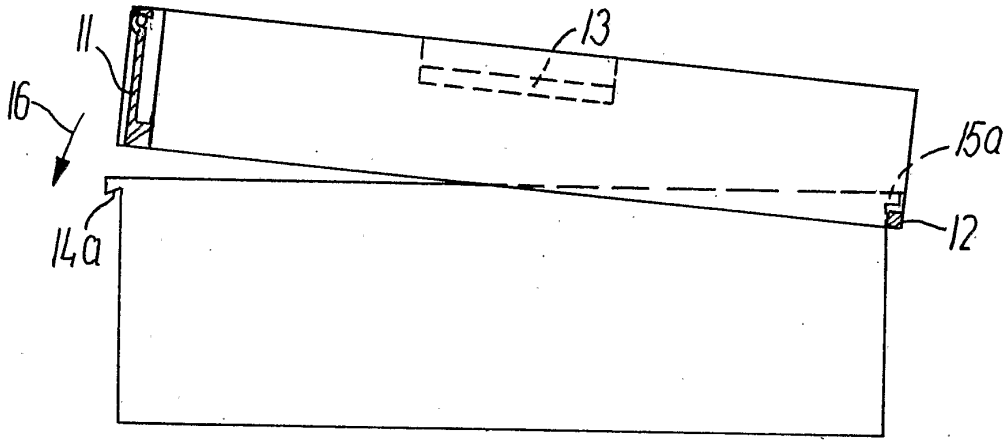



FIG.2

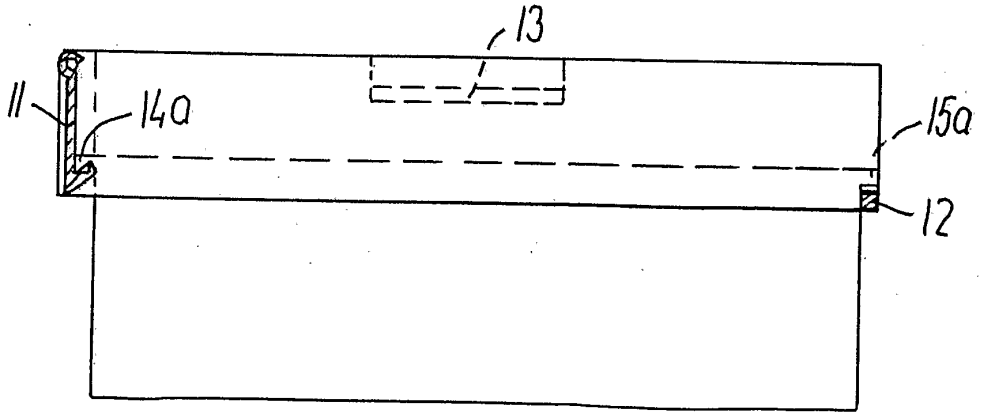



FIG.3

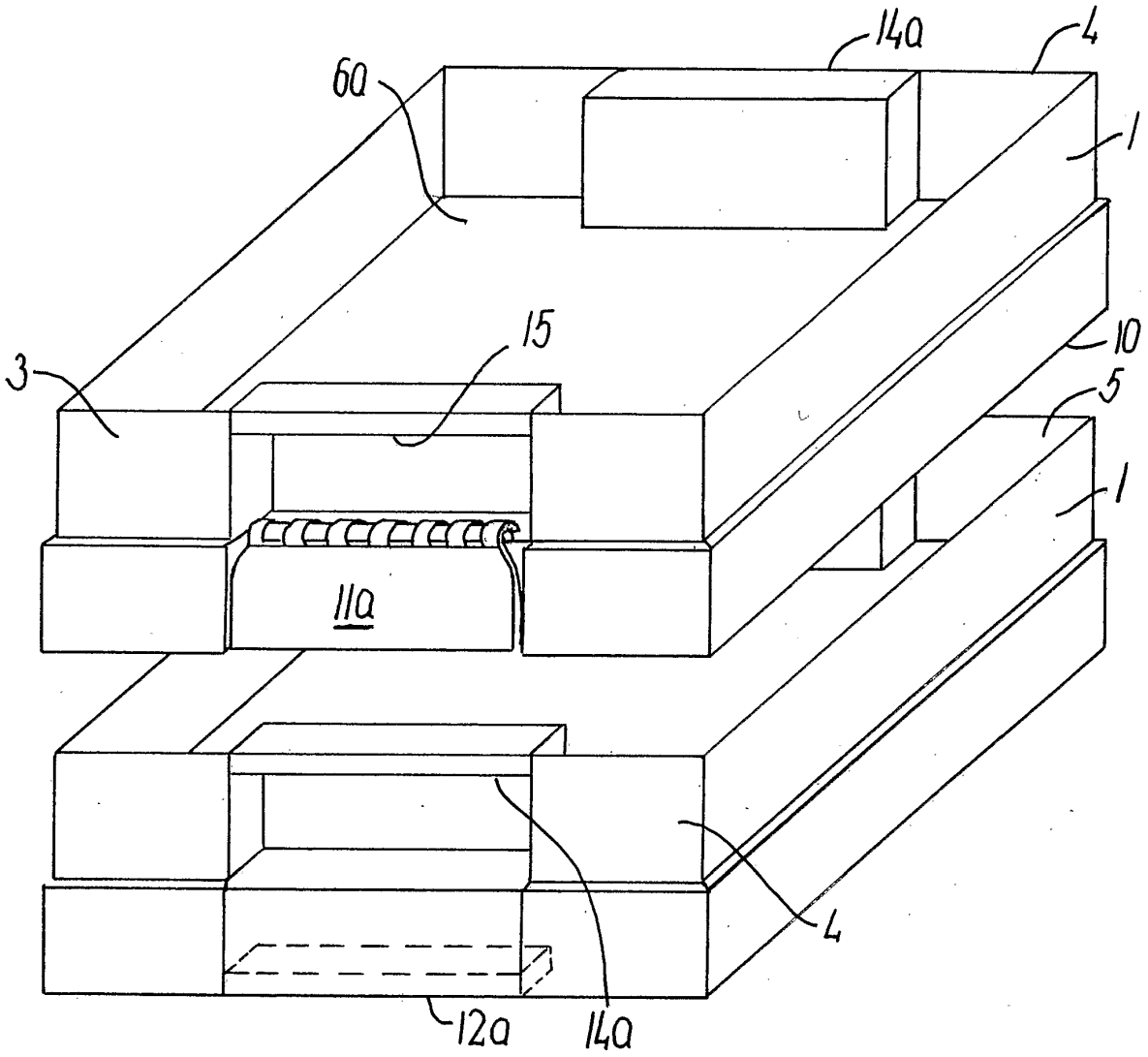



FIG. 4

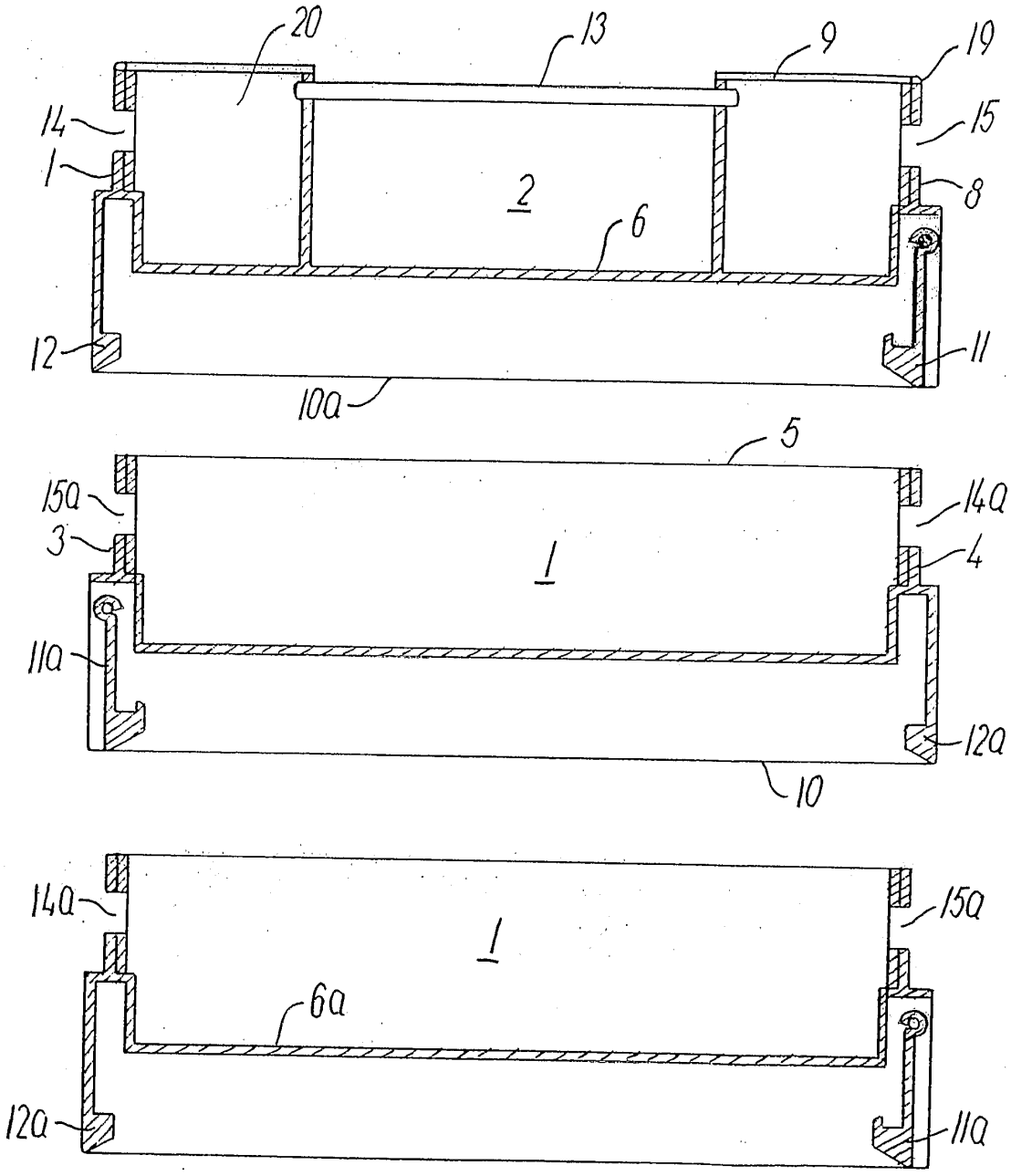

20
13
9
19
14
15
1
2
8
6
12
11
10a
5
15a
14a
3
1
4
11a
12a
10
14a
15a
1
6a
12a
11a

FIG.5

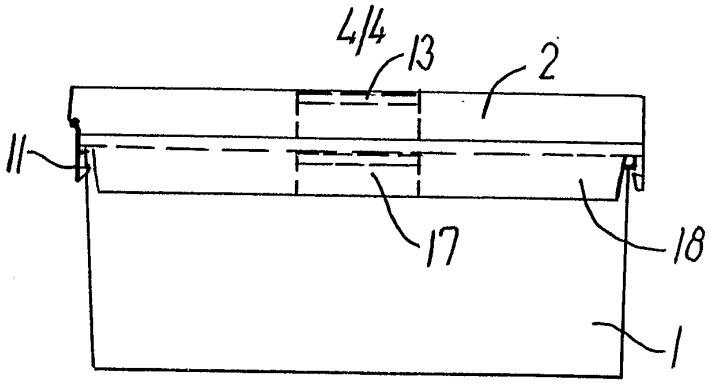



FIG. 6

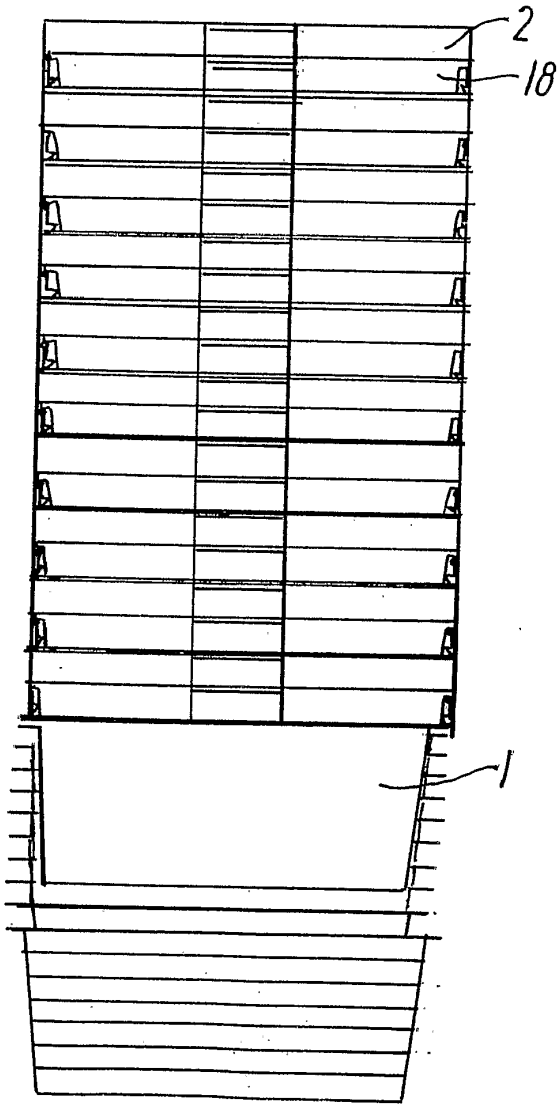



FIG. 7

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(54) **Title**: STORAGE ARRANGEMENT CONSISTING OF TWO PARTS SUCH AS TWO CASES OR ONE CASE AND ONE LID

Fig. 2

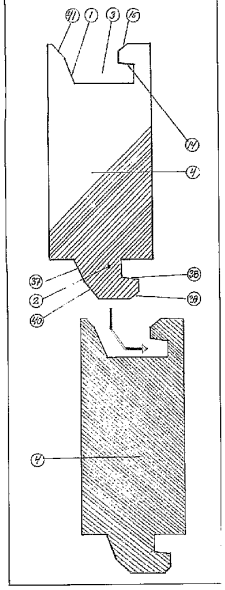
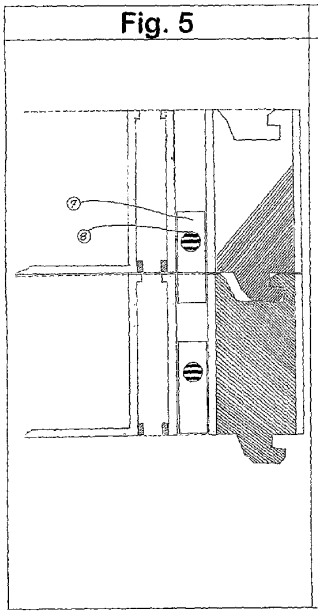


Fig. 5



(57) **Abstract**: u / The storage facility for coupling of at least one box and at least one lid is comprised of coupling units as shown in Fig. 2, bottom bridge 2 on the top box and top bridge 3 on the lower box. These must be tightly engaged via the conic flanges 14 + 38 and subsequently locked in the gear via transport lock 7. The primary objective of the invention is to provide a new and functional storage system for tools, equipment and minor parts, which makes it easy to locate what you are looking for and where the objects are easy and fast accessible. Furthermore, it is possible to produce the invention in an inexpensive way and still make it robust and easy to assemble as well as disassemble in only a few seconds.

WO 2009/140965 A1

Storage arrangement consisting of two parts such as two cases or one case and one lid.

The invention concerns a storage arrangement that includes two parts such as two cases or one case and one lid, which parts can be stacked and connected to each other and where each part has two opposite gables and by a coupling unit in each of the two gable corners for separable connection of the two parts in stacked condition, caused by the four coupling units having one in each corner, is arranged to cooperate with the coupling units of an underlying case or lid, which also are placed in the four corners.

The bottom part of each case is in each of the four corners provided with a bottom bridge and in the four corners of the top part with a top bridge. When the bottom bridges of the top case are placed above the opposite top bridges of the lower case they will easily get in gear and with a slight sidewards push be brought into a tight and compact condition. A transport lock placed in tight connection to one of the connecting bridges (bottom- and top bridges), can be activated outside the case with a little downwards push and provide a blocking for separation of the four sets of connecting bridges and as such also for separation of the two cases or case and lid.
As such cases can be connected unlimited. A craftsman f. inst. can have a set of cases (tower) existing of six – eight cases on top of each other. The value of tools and technical equipment in f. inst. six – eight cases can be extremely high and it can be desirable to lock the whole system (tower). A lock against theft can be integrated in the system with a blocking lock only operational inside the cases. A spring loaded security lock in full height of all cases can be activated with a downwards push and then be locked with a little twist. If f. inst. six cases are stacked on top of each other it will be possible with a push on the security lock on the top case to activate all the security locks of all underlying cases. On the top case a lid with a handgrip can be placed and on the lid can be placed a lock, f. inst. a digital code lock. During this, the whole case system (tower) is locked.

Cases with lids that can be connected are available in various designs and sizes and are being used in many connections. Many tool cases are available with various features.

Normally tool cases and stackable cases are designed with a hinged lid. There are stackable cases with hinged lid that in principle can be stacked and connected unlimited.

The coupling for these case systems normally takes place with snaplocks and/or locking clips. Snaplocks can be springloaded and provide automatic locking. Locking clips normally have to be operated by hand for both locking and unlocking. The disadvantages by these locking clips are that they by low temperature can be tight and difficult to operate (broken nails). They can also be worn, break into pieces and because it is a separate component it can fall off and disappear, where after the system does not work anymore. With a well known case system the coupling is made via four locking clips per case. By coupling of f. inst. six cases it means five cases with each four locking clips = in total twenty locking clips to be pressed in locking position. By separating the case system the process has to be repeated with twenty times finger releases. Furthermore it is a well known disadvantage by existing coupling systems that the coupling is not tight and compact and leaves a space in between the cases from 1,5 to 3,0 mm when lifting in the top case or top lid (accordion effect).

Coupling with snaplocks can be automatic in the locking process and as such very quick. Very often these snaplocks are separate components that can be worn, come to pieces or fall off. In addition these locks will not establish a tight and compact coupling and therefore not provide the desired breaking strength and wearing quality.

The purpose with the invention is to provide a connecting bridge for stackable cases and lids that can raise the desired and needed demand for strength and to avoid breakage in connection with daily use, wear and tear and in addition a simple and quick operational system. Other points and

functions are also a part of the invention and are described following.

The purpose with the invention is considered by a storage arrangement as described in the introduction to claim 1 that is characteristic by that in each of the four corners of the storage arrangement (case) a connecting bridge is moulded together from top to bottom of the case. The connecting bridge is constructed with a top bridge on top and in bottom a bottom bridge.

By coupling of two cases the bottom bridges of the top case will meet the top bridges of the lower case and they will easily fall in gear because of the conical catch flanges on both top- and bottom bridges. The final coupling is made by a slight sideward push on the top case. To secure this coupling, are by at least one of the four connecting bridges moulded together two vertical houses for locking (columns). In one of these is placed a vertical lock (transport lock) that can be operated from outside the case and with a slight downwards push bring the transport lock in a blocking position and secure that all four top bridges and bottom bridges are in gear.

The other vertical column for locking can be used as a security lock as described following.

Because of the special design of the conical top- and bottom bridges the coupling can happen very quick and a push on the locking knob placed outside the case will bring the transport lock in blocking position tight to the connecting bridge.

The four connecting bridges are placed in the outer corners of the cases and as such providing optimal strength and stability in the coupling. The connecting bridges including top- and bottom bridges are moulded together with the gable, sidewall and bottom of the cases and as such providing optimal strength and stability.

The connecting bridges are moulded together with the case and as such there are no loose components that can be worn, go apart, fall off and disappear.

Because of the construction where all the basic elements of the case are moulded together a very advantageous and inexpensive cost price can be obtained.

Alternatively to four connecting bridges per case it could be considered for lighter and private use only to use two connecting bridges, f. inst. one in each gable of the case. Because of the construction with the conical locking frames on top- and bottom bridges and combined with the accuracy available by plastic moulded subjects it will be possible to avoid accordion effect because the coupling will be tight and without wobble.

This also provides a robust impression in connection with the security lock and use of the system (tower) as a sack trolley.

The transport lock keeping the top- and bottom bridges in tight gear can be activated by a locking knob placed outside the cases. The process of locking and unlocking will only take one second.

The locking column for the security lock is moulded together with the case and the connecting bridge for optimal strength and stiffness. The security lock is in same height as the outer dimension of the case and is equipped with a push spring that at all time will try to position the security lock within the height of the case.

The security lock is being activated by a downward push from above and will after four to six mm's movement provide a total blocking and as such secure the coupling. The security lock has a locking arm that can be twisted, get in gear and fix the locking.

If f. inst. six cases are stacked on top of each other the six security locks will in principle be in contact with each other meaning that when the security lock of the top case is activated downwards the security locks of all underlying cases will be brought in blocking position and the final locking with the small locking arm is only needed inside the top case. The security lock can only be operated inside the cases. When the small locking arm in the vertical house for locking is turned back again the push spring will bring all six locks back to the starting point. Upon the top case will be placed a lid with an integrated lock f. inst. a digital padlock and the whole system is locked up.

As such the security lock is extremely quick to operate for unlocking the

system (tower) f. inst. consisting of six cases. Some users could choose to use the security lock as transport lock because only one action (one second) is needed for locking or unlocking the whole tower.
Both transport- and security locks are very robust and strong caused by the construction in which they are placed in the vertical houses moulded together with the gables, sidewalls and bottom of the cases.

The four bottom bridges can be provided with small rubber shoes and then be used as feet, which will protect against dust and scratches on the cases as well and on tables, shelves and floors on which the cases might be placed.

By a selection of extension walls (cases without bottom) existing height of the cases can be enlarged and the volume of the cases will also be enlarged. The extension walls also have a connecting bridge in each of the four corners and can as such be coupled and locked random with the other cases. If f. inst a case is 100 mm high and two extension frames of each 100 mm are placed on top the height of the case will be 300 mm.

With a case system, as here mentioned, with extreme tight and compact connection it is obvious to provide a rolling transport of the set (tower). A bottom box has two wheels that only will obtain contact to the foundation by a $15^{o}$ backwards inclination. Because the whole set (tower) is very compact and stiff it will in principle be possible to transport it as an ordinary sack trolley.

A transparent lid (possibly disposable) means that a supplier of machines, hand tools, accessories, screws, bolts, etc. can prepare and pack "a set", place the transparent lid on top of the case and seal it. With this the end user (final customer) is secured, that "the set" is complete in the buying situation and when sealing is broken.

A small opening locked with a transparent plate in the walls of the cases provides a visual view to the contents of the cases. The transparent plate is placed in an insert frame and can easily be replaced by a not transparent plate on which can be indicated contents etc. Without any indications this plate will simply just block for view into the case.

The invention also concerns the practical use.

With the previous mentioned basic ideas and features the modern craftsmen can look forward to a more organised and structured separation, handling and transport of tools, equipment, etc.

With the quick disassembly and assembly of the cases, combined with the visual overview of the contents the craftsmen can choose and couple together exact the cases needed for today's work. The transport of the set is wheeled (sack trolley concept).

Following the invention will be described with reference to the enclosed drawings and photos.

Fig. 1 showing two connecting bridges assembled and disassembled.

Fig. 2 showing two connecting bridges disassembled and with more details inclusive conical locks and catch flanges.

Fig. 3 showing two cases in which the connecting bridges in the corner unit are moulded together with the houses for transport- and security lock.

Fig. 4 showing the same as Fig. 3 but now with the transport lock in both cases.

Fig. 5 showing the same as Fig. 4 but with the transport lock of the top case in blocking position.

Fig. 6 showing the two cases with both transport- an security lock in neutral position.

Fig. 7 showing the same as Fig. 6 but with the security lock in blocking position on both top- and bottom case.

Fig. 8 showing transport- and security lock in the four possible positions in respectively 8A – 8B – 8C – 8D. The gable of the case is marked on 8A.

Fig. 9 showing a set of stacked cases (tower) where one of the two integrated transport wheels can be seen lowest at right.

Fig. 10 showing a set of cases (tower) with lid, code lock and carrying-grip.

Fig. 11 showing an extension frame without bottom but with the four connecting bridges.

Fig. 12 showing a 100 mm high standard case.

Fig. 13 showing a 100 mm high standard case with a 100 mm high extension frame placed and the transport lock is locked.

Fig. 14 showing a standard case with two extension frames on top.

Fig. 15 showing a case with a drill and a cable reel as a packed set. Closing of the case can be done with a transparent lid that can be sealed. It means that both the retailer and the end user can be sure that the set is complete.

Fig. 16 showing a case with an inside insert frame with a transparent window for view into the contents of the case.

Fig. 17 showing a case like in Fig. 16 on which the transparent window is replaced be a plate for indication of the contents.

Following the invention will be described with reference to the enclosed drawings/photos and the reference numbers used.

On Fig. 1 is shown the basic drawing of the connecting bridge (4) on which the bottom bridge (2) is framed like a downwards positive L-profile (male) which falls in gear with the top bridge (3) of the underlying case which is framed like a negative L-profile (female).

On Fig. 2 is shown the top bridge (3) with a direct frame (1) which will meet the catch flange (40) on the bottom bridge (2). To simplify and make an easy and safe placing of the top case on the lower case are both top bridge (3) and bottom bridge (2) provided with conical catch flanges (15 + 41) and (39 + 40). To secure a right and compact coupling both top bridge (3) and bottom bridge (2) are constructed with conical locking frames (14 + 38). When top case (10) is placed on top of the lower case (11) the direct frame (1) and the conical catch flange (40) will automatically bring the coupling parts in gear. A slight sideward push will bring the connecting bridges (4) in tight gear and as shown on Fig. 5 the transport lock (7) will block for disassembly and keep the connecting bridges in tight and compact coupling. The transport lock (7) can be activated outside the case by locking knob (8). As it appears on Fin. 5 the transport lock (7) is placed very close to the connecting bridges (4) and thus the coupling is free from wobbles and slack and at the same time robust and almost impossible to break open.

On Fig. 6 is shown the security lock (9) placed in mutual connection with connecting bridge (4) and transport lock (7). Security lock (9) is assembled with a push spring (18) and the set is placed in house for security lock (12) and fixed with a press bushing (17) which at the same time controls and supports the locking tap (19).

As it appears on Fig. 6 and Fig. 7 the two security locks (9) are in contact with each other. When the security lock (9) of the top case is pushed downwards it will automatically move the security lock (9) in the lower case downwards. At the same time the locking tap (19) of the top case is positioned in blocking position with the house for security lock (12) on the lower case.

It means that the security lock (9) of all upon each other placed cases can be activated by just activating the security lock (9) of the top case. Following the final locking can be made by a little twist with locking arm (13). A fine point could be to use the security lock as transport lock. All stacked cases locked via one activation of the security lock (9) of the top

case. Spend of time: 1 second.

All shown examples only show open cases stacked and with a lid on top. If one want a case cases with lids stacked, meaning a case + a lid + a case + a lid etc., it is possible because both the transport lock (7) and security lock (9) can be integrated in the separate lid which then can be stacked and locked with the same system as in the cases, although with a hole in the lid for activating the security lock (9).

On Fig. 9 and Fig. 10 is shown a stacked set (tower 36) with the special bottom case (24) in which the two transport wheels (20) are integrated. The tower (36) is finally on top closed with a lid (21) with carrying grip (23) and a code lock (22).

Fig. 11 shows an extension frame (27) without bottom. The corner unit (5) can also be seen here.

Fig. 12 shows a standard case (28) with bottom and connecting bridge (4) and top bridge (3).

Fig. 13 shows a standard case (28) and an extension frame (27) coupled together.

Fig. 14 shows the same example but with two extension walls (27). As it can be seen it gives a great flexibility to adjust cases in different heights.

Fig. 15 shows a standard case (28) in which a drill and a cable reel is placed. This kind of "combination-pack" is often used by manufacturers as promotional idea for machines, accessories, screws, bolts, nails, plugs etc. It is highly essential for as well manufacturer, retailer and the final end user to be sure that "the set" is complete.
The innovation is here that a transparent lid (29) is placed in a

countersinked frame (32). A sealing can be made by a warm-up/melting into the frame or alternatively via one or two hot melted straps. A carrying grip (30) as well as a hole (31) for the security lock (9) is a possibility, when the transparent lid is wanted for future and continuous use. The transport lock (7) can be operated from outside with the locking knob (8).

Fig. 16 shows the case with a transparent window (33) that inside the case is pushed down in an insert frame (34). The same insert frame (34) is used on Fig. 17 but with the transparent window replaced by a plate (35) for indication of contents.

Patent Claim

1. Storage facility comprising two or more boxes or a box and a lid, all parts that can be stacked and interconnected and where the boxes or lids have opposite facing gables and where the connecting bridge (4) is placed in the four corners or with one connecting bridge (4) on each of the opposite facing gables, whereby the bottom bridge (2) of the upper box or lid interconnects with the top bridge (3) of the below box or lid characterized by the bottom bridge (2) of the top box or lid being shaped as a downward pointing L profile (male part), which interconnects with the top bridge (3) of the below box, which is shaped as an L profile (female part).

2. Storage facility according to requirement 1 characterized by having the four connecting parts in the four outer corners of the boxes or lids.

3. Storage facility according to requirements 1-2 characterized by the connecting parts being cast together with the bottom and side walls of the boxes and the top and side walls of the lids.

4. Storage facility according to requirements 1-3 characterized by the connecting parts being cast together with boxes or lids and connecting via the four cast-in connecting parts.

5. Storage facility according to requirements 1-4 characterized by a construction that allows injection moulding of box and connecting parts or lid and connecting parts in one process.

6. Storage facility according to requirements 1-5 characterized by one or more of the connecting parts being cast together with a locking column.

7. Storage facility according to requirements 1-6 characterized by a construction that creates very close contact between connected boxes and lids.

8. Storage facility according to requirements 1-7 characterized by one or more of the connecting bridge being cast together with a cavity in which a security lock is placed.

9. Storage facility according to requirements 1-8 characterized by having a plexiglass in front of the catch on the locking device.

10. Storage facility according to requirements 1-9 characterized by the security locks' proximity to the connecting bridges and the fact that the security locks will interact with the below security locks, when the boxes or lids are placed on top of each other.

11. Storage facility according to requirements 1-10 characterized by having small soft rubber buttons underneath the four bottom bridges.

12. Storage facility according to requirements 1-11 characterized by wall systems, which are boxes without bottoms and with the same connecting system as boxes and lids.

13. Storage facility according to requirements 1-12 characterized by having transparent glass or plexiglass in the box gables or sides.

14. Storage facility according to requirements 1-13 characterized by having one bottom box with two transport wheels.

Fig. 1

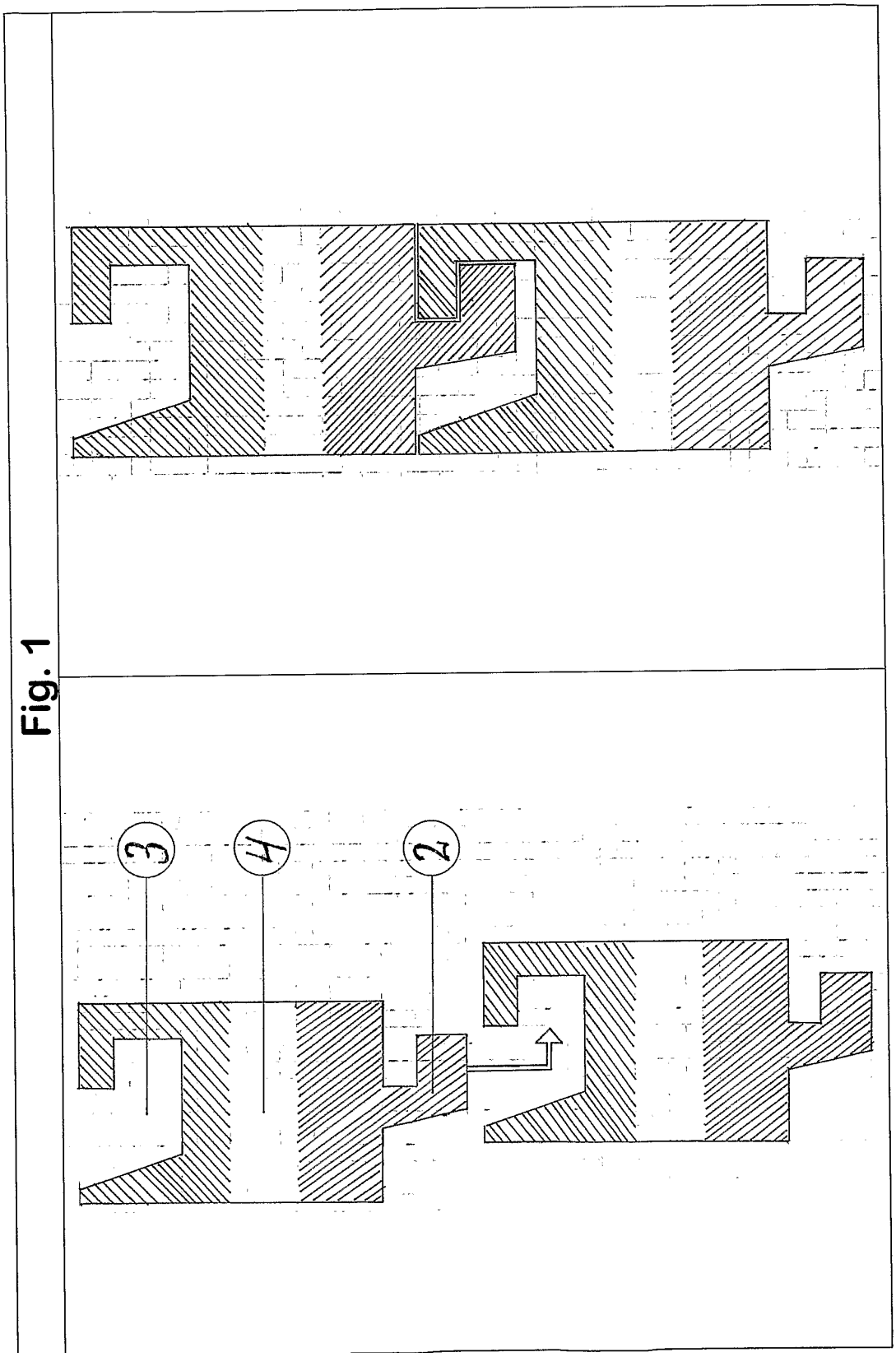


Fig. 4

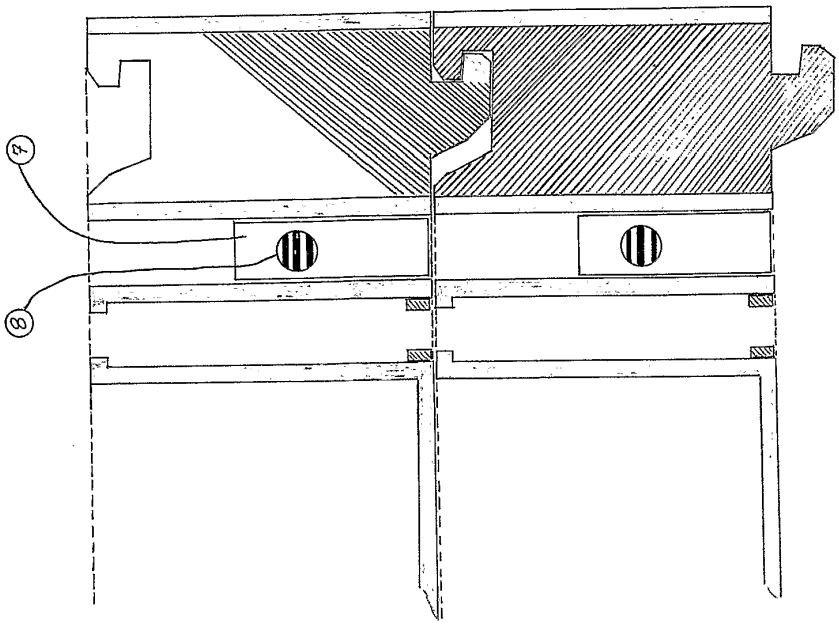



Fig. 3

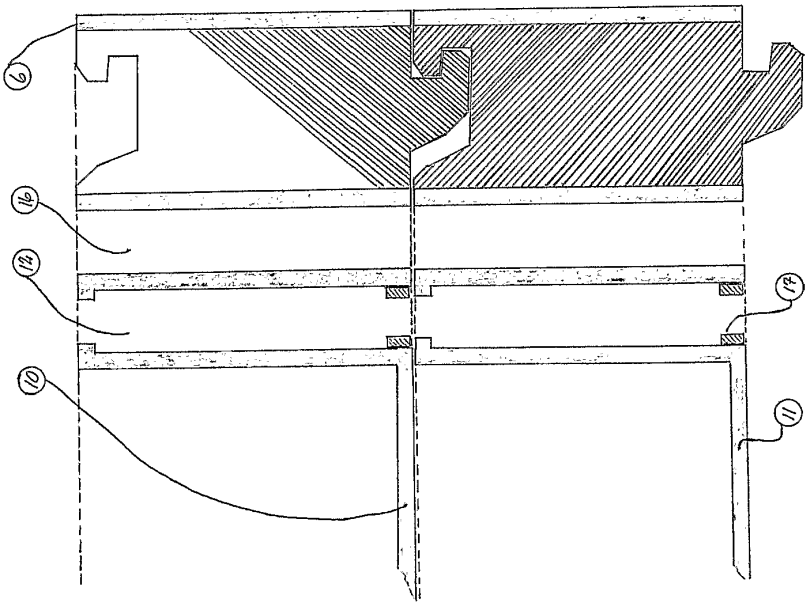



Fig. 2

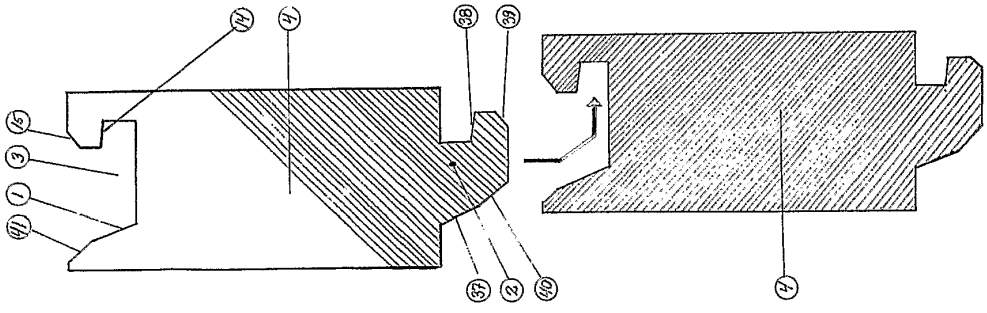


Fig. 7

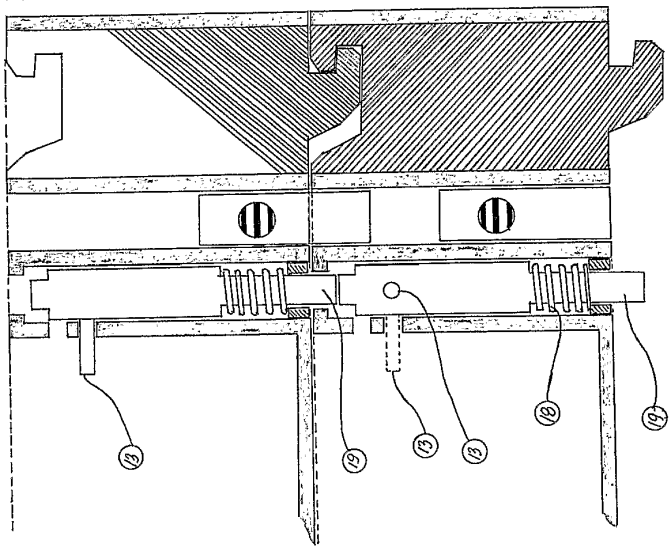



Fig. 6

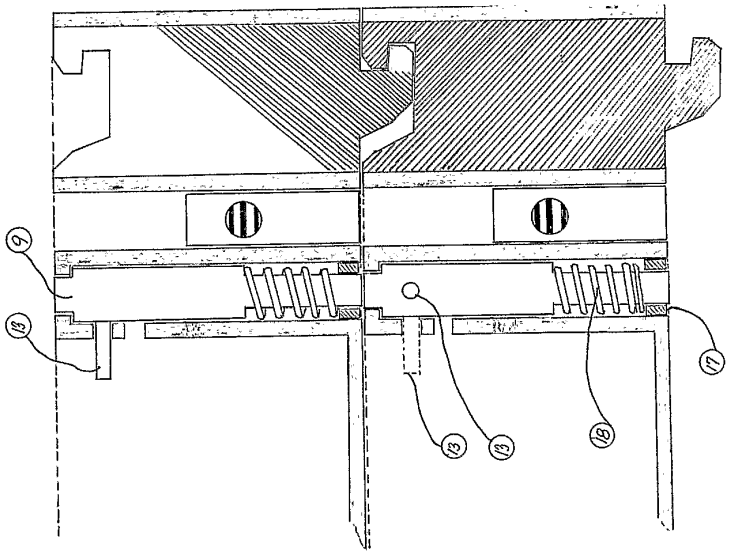
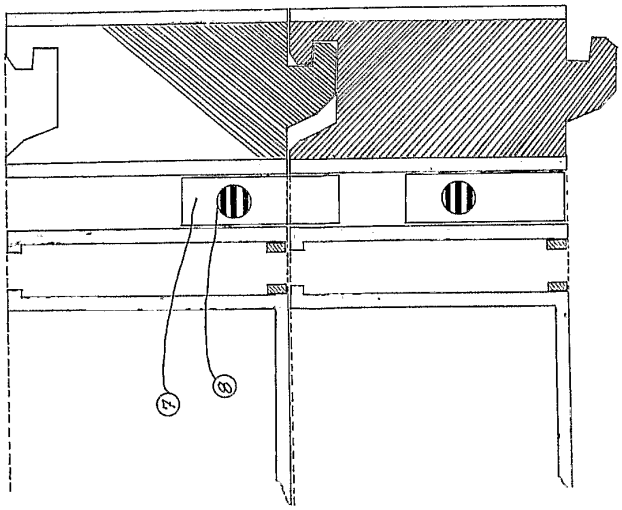



Fig. 5



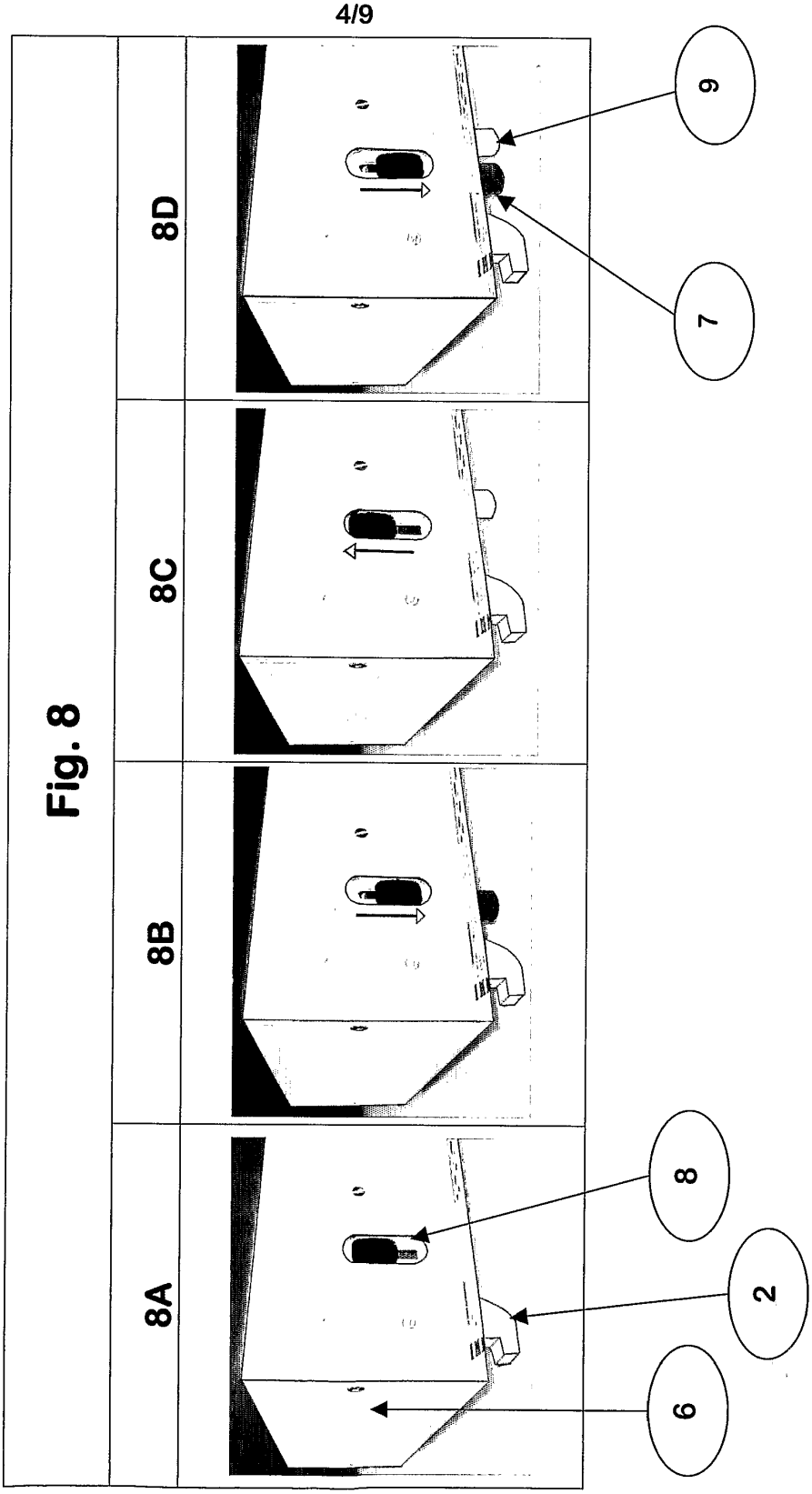
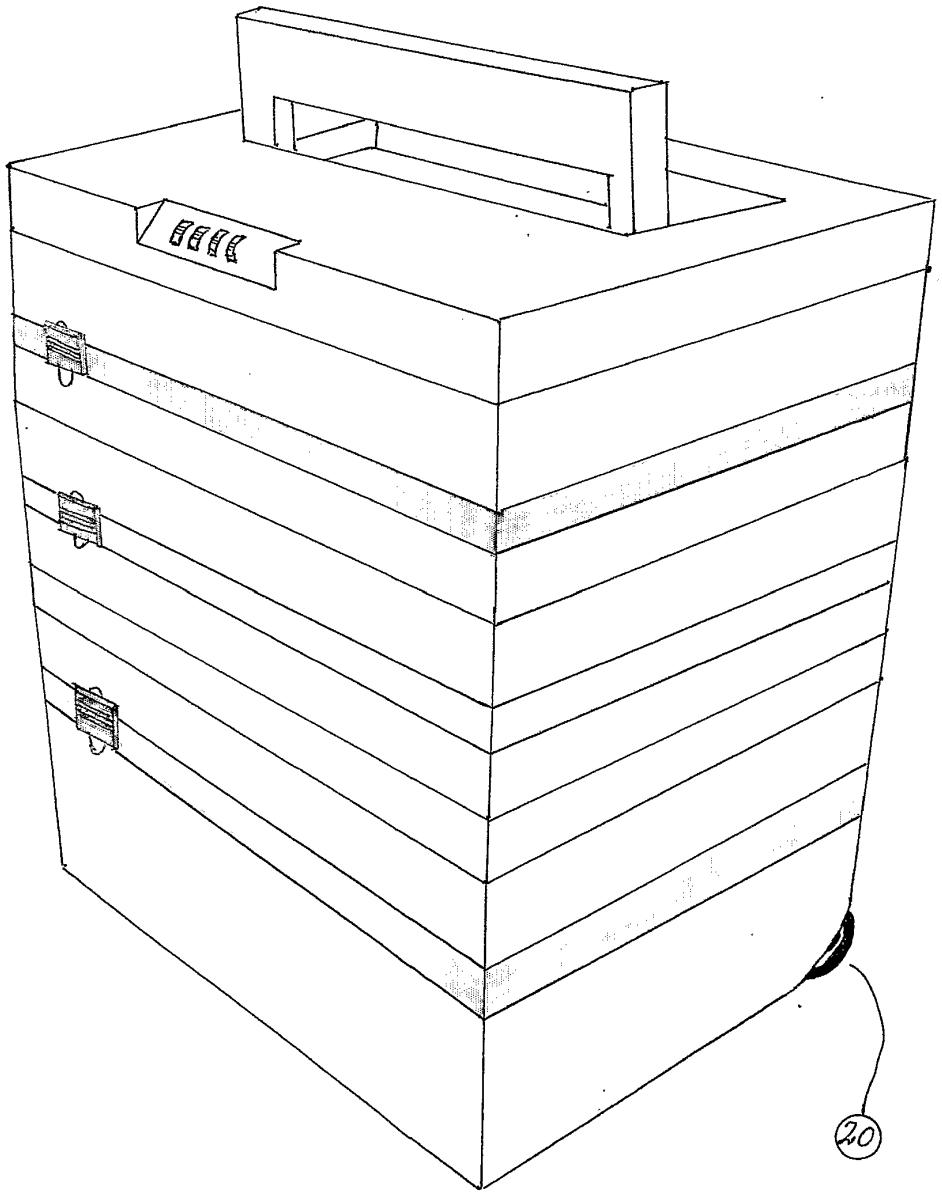



Fig. 8

# Fig. 9



# Fig. 10

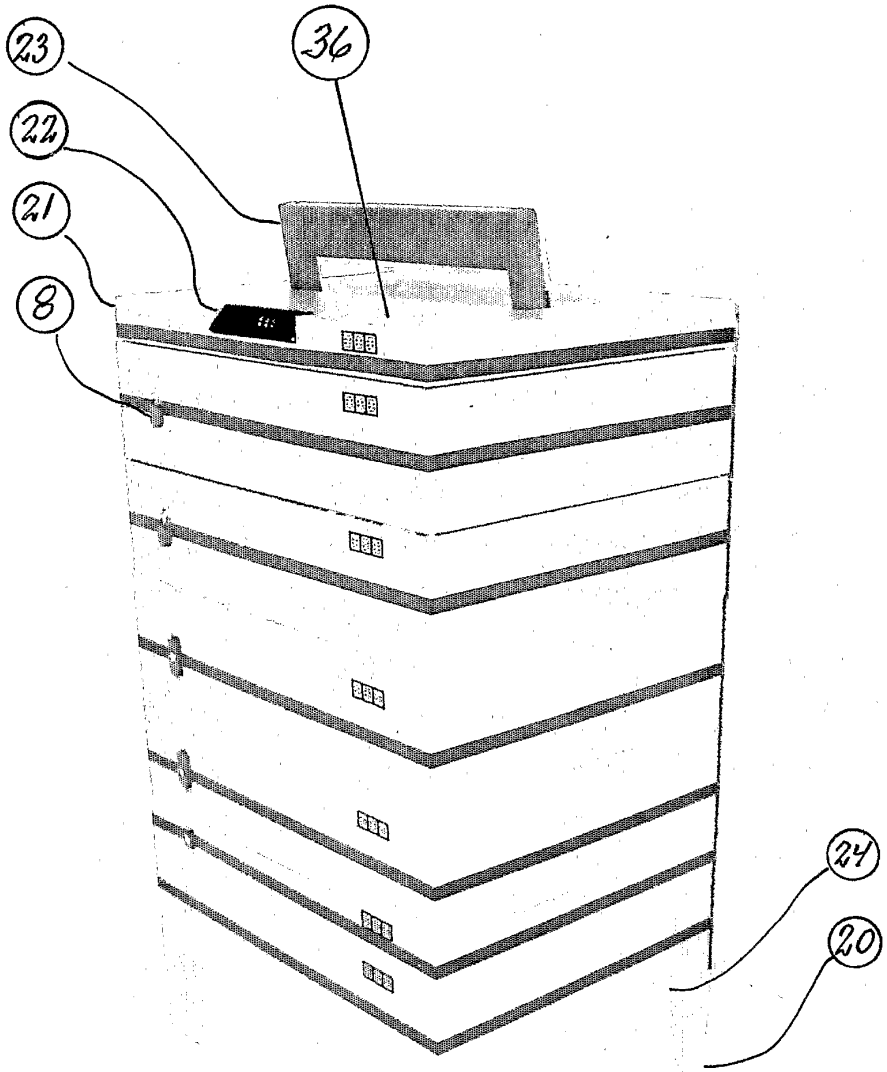


Fig. 11

Fig. 12

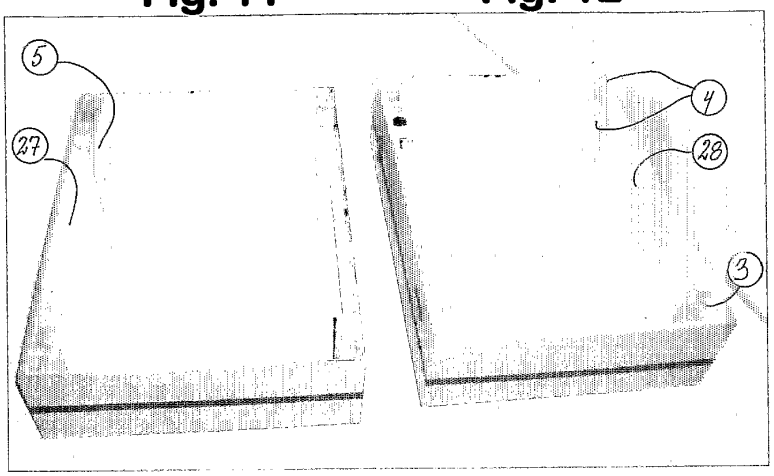



Fig. 13

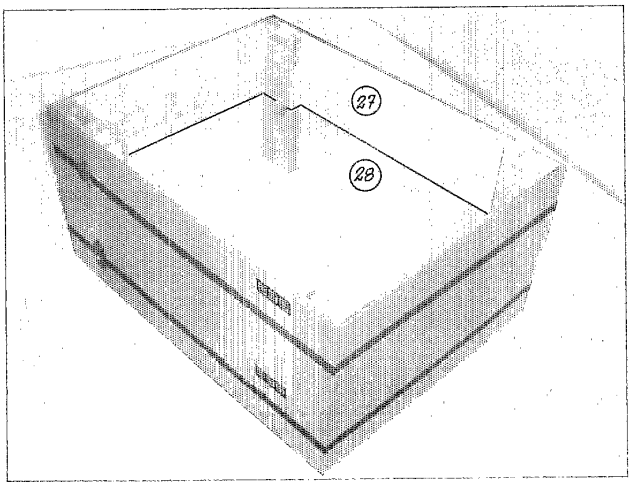
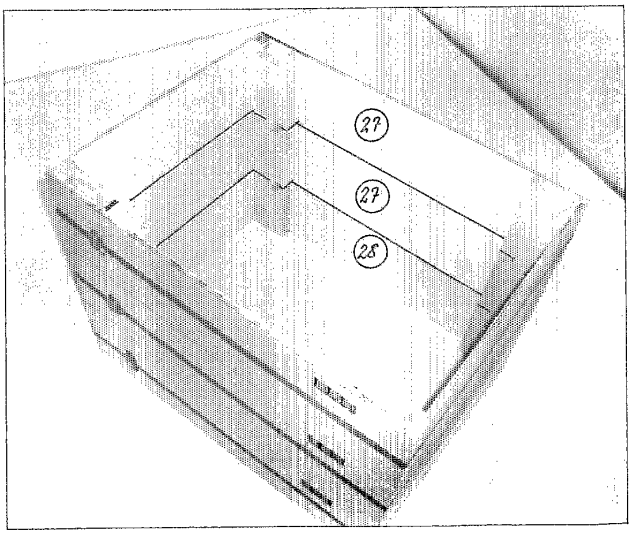



Fig. 14



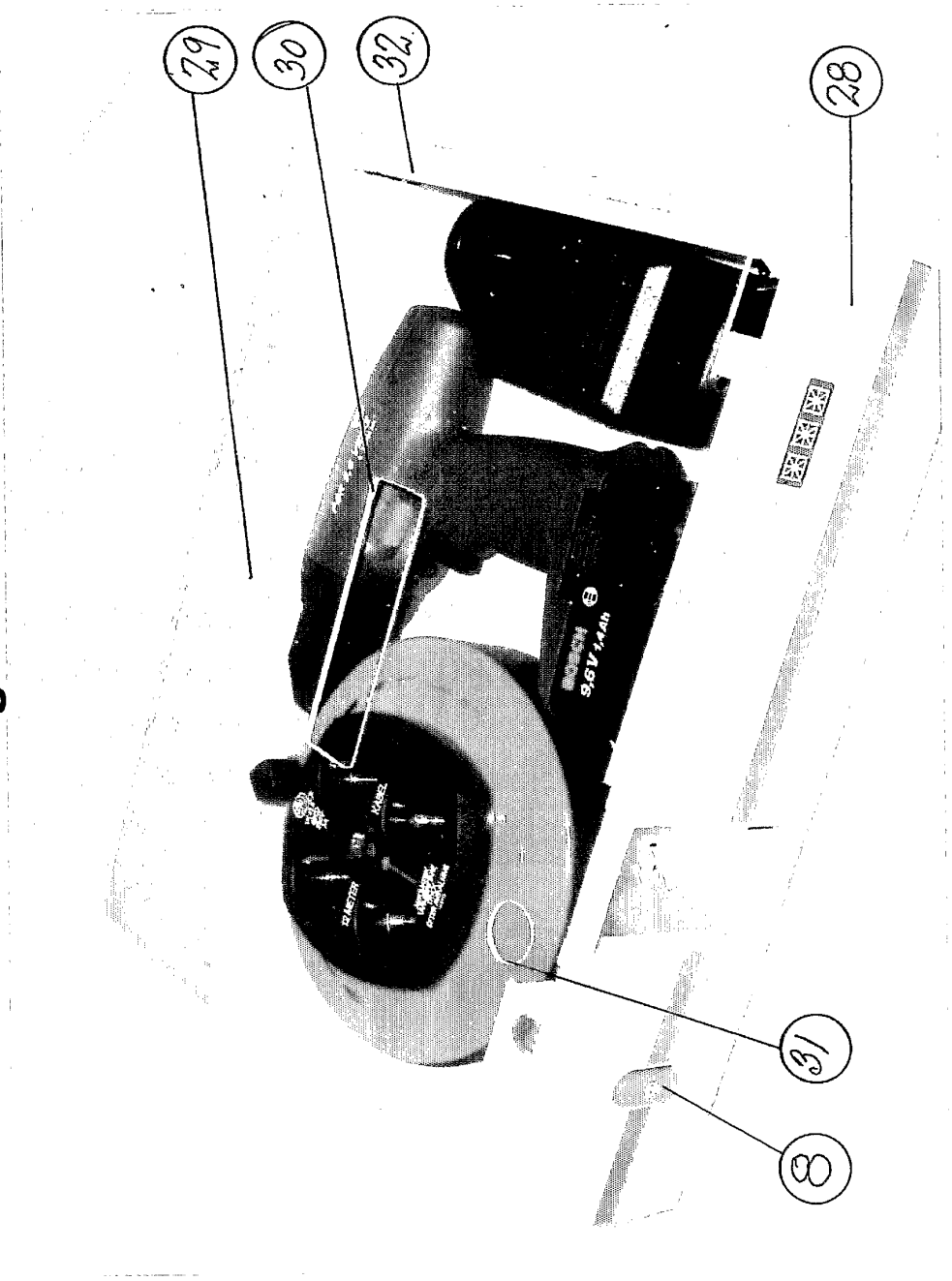



Fig. 15

Fig. 16

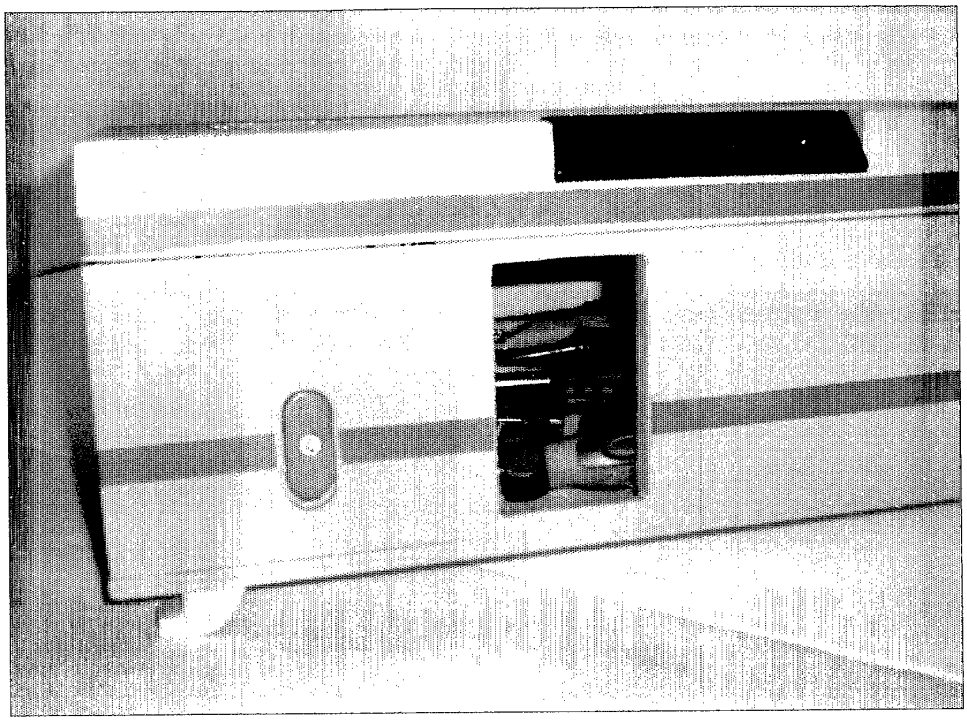
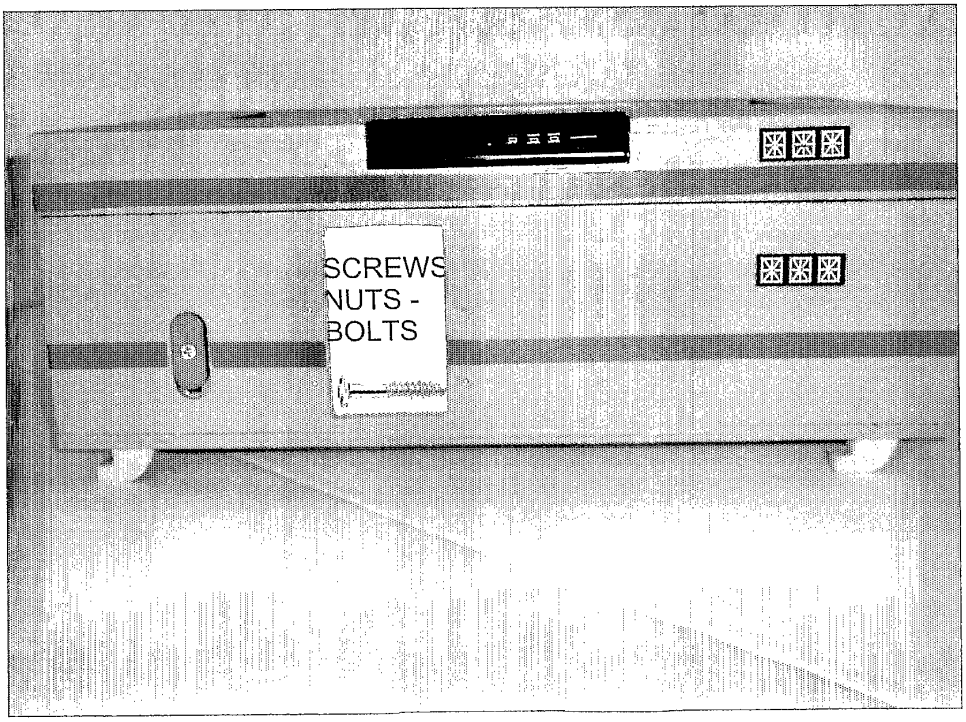


Fig. 17



# INTERNATIONAL SEARCH REPORT

International application No.
PCT/DK2009/000107

A. CLASSIFICATION OF SUBJECT MATTER

B65D 21/032 (2006.01), B25H 3/02 (2006.01)
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

B65D, B25H, E05B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

None

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPODOC, WPI

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
| A | WO 2005/021221 A1 (CARBONE) 10/March/2005 | 1-14 |
| A | US 4293072 A (HILL et al.) 6/October/1981 | 1-14 |

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:
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"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
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| Date of the actual completion of the international search | Date of mailing of the international search report |
|---|---|
| 06 August 2009 | 18 August 2009 |
| Name and mailing address of the ISA/<br>Nordic Patent Institute<br>Helgeshøj Allé 81, 2630 Taastrup, Denmark | Authorized officer<br>Lisbet Hansen |

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