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C. H. CHACE ET AL

2,213,545

METHOD OF ATTACHING RUBBER TRIM TO FABRIC SHOE PARTS

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2 Sheets-Sheet 1

Fig. 1.

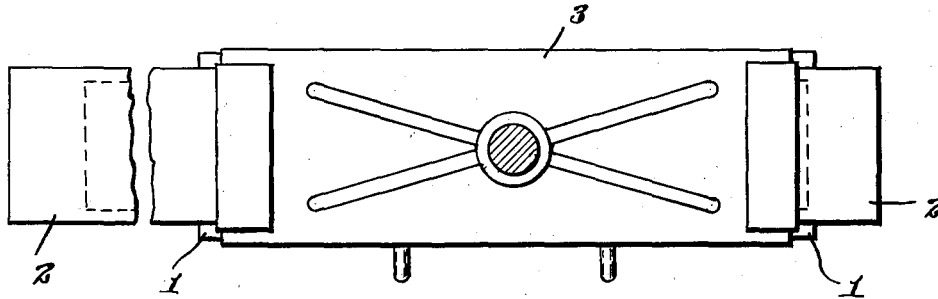


Fig. 2.

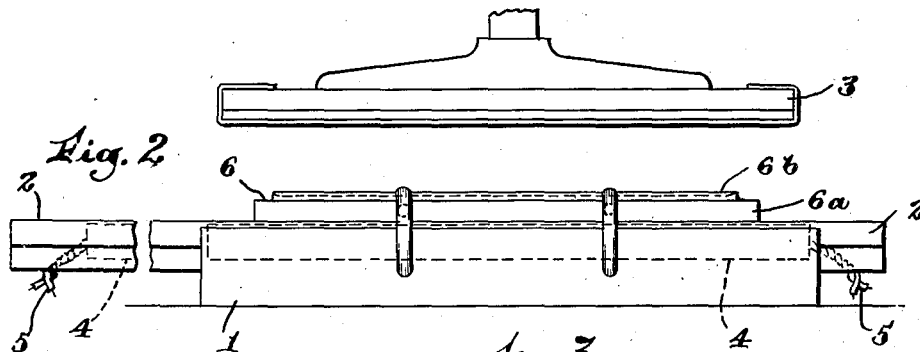


Fig. 3.

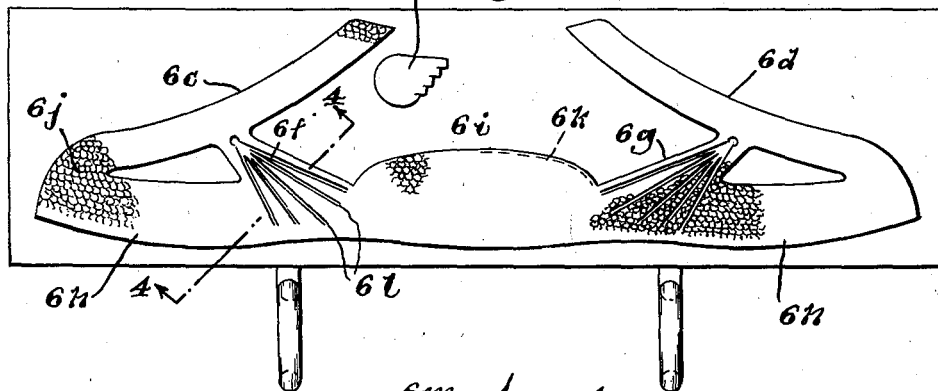
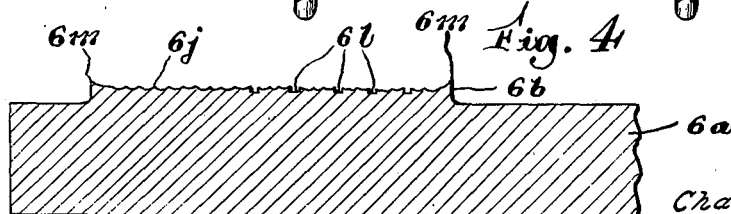


Fig. 4.



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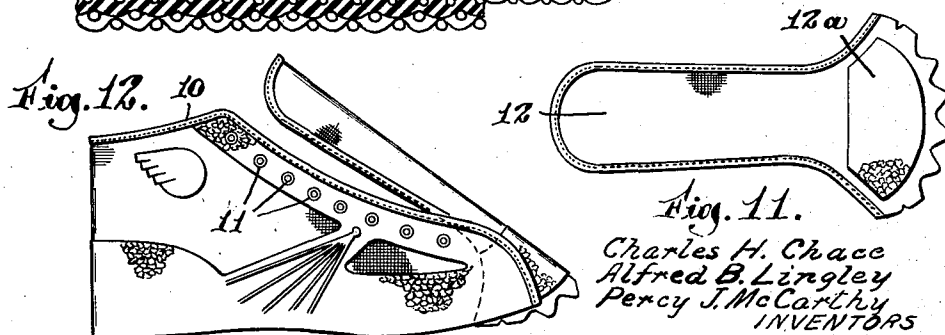
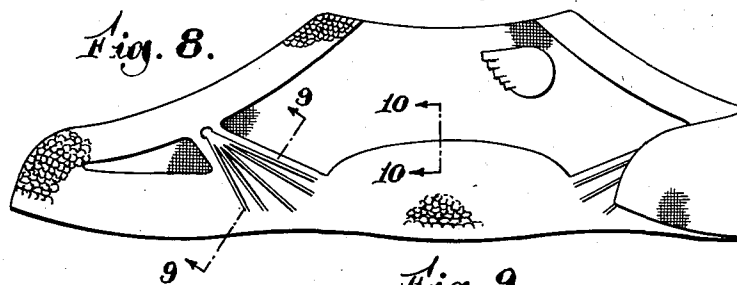
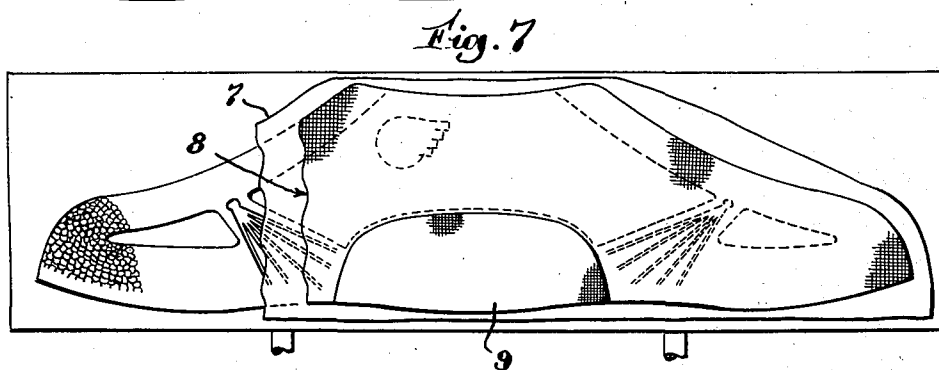
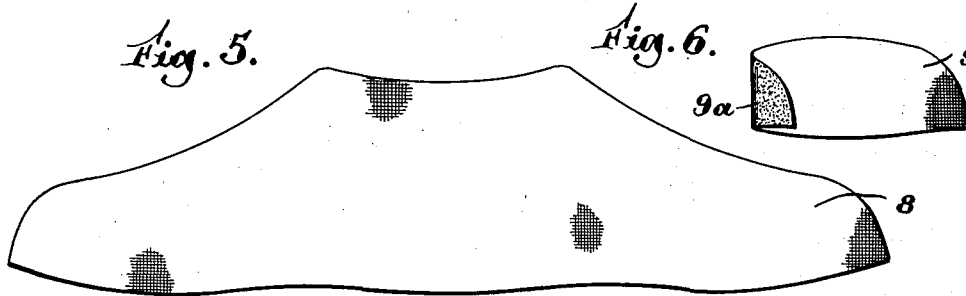
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2 Sheets-Sheet 2



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METHOD OF ATTACHING RUBBER TRIM
TO FABRIC SHOE PARTS

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Application August 5, 1938, Serial No. 223,230

1 Claim. (Cl. 12—146)

This invention relates to an improved method of attaching rubber trim to fabric shoe parts and more particularly to fabric shoe uppers.

It has long been common practice to attach separate pieces of preformed rubber trim to a preformed fabric part of a shoe. These separate pieces of trim have been attached separately by adhesion or by stitching. More recently another method has been suggested wherein a piece of fabric from which the upper is to be made and a sheet of vulcanized rubber are applied to each other in flat or planar form and then pressed between a suitable support and a die member, the latter having pressing or cutting edges shaped to correspond to the outline along which the applied sheets are to be connected together. According to this suggested method the attaching of the fabric piece and rubber sheet is performed at ordinary room temperatures, or at temperatures but slightly in excess thereof, and at relatively high pressure. Because the fabric material is used in sheet form the wastage thereof is excessive since the method does not permit nesting of the uppers and this wastage occurs whether the die is provided with a cutting edge capable of severing the fabric sheet or whether the cutting out of the uppers is performed in a subsequent operation.

A principal object of the present invention is to provide an improved method of applying rubber trim to fabric uppers in such manner that the above-mentioned difficulties are avoided. To this end the improved method provides that the uppers shall be preformed or cut out of fabric stock before any trim is applied thereto. It is a feature of the improved method to employ a die which is shaped to and conforms exactly with the outline of an upper and has portions corresponding to all of the trim that is to be attached to the upper. A sheet of rubber material is placed on the die and on this sheet is positioned the preformed upper, care being taken that the upper on one side of the sheet registers exactly with the die on the other side of the rubber sheet. The method then involves forcing the upper and rubber sheet toward the die under relatively light pressure while the die is maintained at a rather high temperature, thus causing the rubber to conform to the delineations of the die which determine the trim elements. Under this light pressure and the influence of the high temperature the rubber readily moulds into the delineated parts of the die and also enters the mesh of the fabric throughout the portions of the fabric which are to be covered by the trim. Upon the pressure being removed and the pressed upper and rubber sheet being taken from the die the portions of the rubber sheet which do not form part of the trim can readily be torn away and this rubber material can be used again.

The best mode in which we have contemplated practicing our improved method is shown in the accompanying drawings, but these are to be taken as merely illustrative because it is intended that the patent shall cover by suitable expression in the appended claim whatever features of patentable novelty reside in the method disclosed.

In the drawings:

Figure 1 is a plan view of means whereby the light pressure and relatively high temperature conditions may be imposed;

Figure 2 is a side elevation of the means shown in Figure 1 with a die in position to receive the rubber sheet and fabric upper;

Figure 3 is a plan of a die by which our improved method may be practiced;

Figure 4 is a section in elevation through a portion of the die taken as along line 4—4 of Figure 3;

Figure 5 is a plan view of a preformed fabric upper;

Figure 6 is a perspective view of an internal counter which preferably is used with the upper;

Figure 7 is a plan showing a sheet of rubber material, an internal counter, and the preformed fabric upper laid on a die;

Figure 8 is a view showing the completed upper with the trim elements and internal counter secured thereto;

Figure 9 is a section through a portion of the completed upper taken as along line 9—9 of Figure 8;

Figure 10 is another such section taken as on line 10—10 of Figure 8;

Figure 11 is a plan view of a tongue and toe cap member to be assembled with the trimmed upper; and

Figure 12 is a view in side elevation of a completely assembled upper.

Referring now more particularly to the drawings, the improved method is conveniently practiced by employing means capable of exerting a rather light pressure against a die heated to a relatively high temperature. Such means are suggested in Figures 1 and 2. A fixed base member 1 is provided with a slidable table 2 of such length that when one half of the table is in position below a pressure plate 3, the other half extends clearly to one side thereof. Each half of the table is preferably provided with a heating element 4, indicated by dotted outline, to which electric current may be supplied through cables 5. Obviously the flow of current may be controlled by suitable thermostatic means (not shown) to maintain any desired temperature.

Above the heating element on the portion of the table at one side of the pressure plate, a die 6 is laid which may be preheated if desired by any suitable means. When placed on the table the

die is maintained at the desired temperature by the conduction of heat from the heating element. As will more particularly be described, a sheet of unvulcanized rubber is laid on this die and on the sheet of rubber is laid a preformed upper of a fabric shoe, together, if desired, with a preformed counter. The table 2 is then moved along the base 1 until the die and its superimposed material are brought under the pressure plate 3. The latter is then lowered against the upper and counter and a light pressure applied. While this is taking place another die on the other half of the table is similarly prepared with another piece of rubber stock and another upper and counter. When the pressing operation is completed the table is again moved to bring the second die and its material under the pressure plate. While the second attaching operation takes place, the completed upper is removed from the first die which is again prepared with fresh stock. Thus the removal of a completed upper from one die and the assembly of the material thereon for another upper may be accomplished while the rubber trim is being attached by another die.

Referring now to the die 6, this has a base portion 6a which rests on the table 2 and upstanding on this base portion is what may be termed the die proper 6b. The outline of the die proper coincides with the outline of the shoe upper to which the rubber trim is to be applied. The die is shaped to define all of the rubber trim that is to be attached to the upper. For example, as seen in Figure 3, the die has portions 6c and 6d corresponding to the eyelet stays, a portion 6e for the ankle patch, portions 6f and 6g for the arch straps, and a portion 6h for the foxing along the bottom edge of the upper, this latter portion preferably including a portion 6i for the outside counter which may be of greater thickness than the remainder of the trim. Provision, as regards the depth of this counter portion, may be had for the inside counter which may be applied to the upper simultaneously with the trim. As indicated at 6j the surface of the die may be engraved to simulate grains of leather, or as indicated at 6k marked to simulate stitches, or as shown at 6l may be provided with grooves to produce ridges on the finished trim.

In carrying out the improved method of attaching the trim, a piece 7 of sheet stock of rubber material is first laid on the die. This piece of rubber stock need not be of any particular shape or configuration provided only that it is of sufficient extent to fully overlie the die proper 6b. Preferably the thickness of this rubber sheet will be slightly more than the most shallow portions of the die and not quite as great as the most deep portions of the die. This enables the rubber to adjust itself to the different depths of the die without being forced outward beyond the delineating edges thereof.

A preformed upper 8 is next laid on the rubber material, care being taken to see that the peripheral edge of the upper coincides with the outer edge of the die, as shown in Fig. 7. On the upper may be placed a preformed inside counter 9 which is prepared of stiff fabric stock coated on one side with a suitable rubber adhesive or layer of rubber 9a.

As above described, a light pressure in the

neighborhood of 60 pounds per square inch is imposed on the counter and upper to press them together with the rubber stock toward the die. The latter is maintained at a temperature around 115°-116° C. or about 239° F. As the rubber heats up it not only readily moulds into the portions of the die but it also enters into the interstices of the fabric thereby making an exceedingly strong bond with the latter.

At the counter portion 6i of the die, which is somewhat more depressed than the portions of the die prepared for the remainder of the trim, the rubber of the trim on one side of the upper joins with the rubber adhesive on the counter as is shown in Figure 10. Thus the inside counter and the outside counter portion of the trim are both firmly bound to the interposed layer of fabric and to each other, as it were.

After a suitable period during which the light pressure and high temperature are maintained, the material is removed from the die, and the excess of rubber stock is readily torn away. Indeed, it may already have been partially severed from the adhered trim by the edges of the die proper which stand up from the die face and may be formed sharp as seen at 6m in Figure 4. This excess rubber stock may be returned to the mill and used again so that there is no wastage. And because the fabric uppers and counters are separately cut from stock, the cutting dies can be nested close to one another and thus reduce the wastage of the fabric to an avoidable minimum.

The completely trimmed upper with attached counter is shown in Fig. 8. A strip of binding tape 10 is next stitched around the top edge and along the forward depending edges of the upper. Eyelets 11 are then attached and finally a tongue 12 and toe cap 12a. The tongue is preformed from fabric and has applied thereto, by the same method as just described, a rubber toe cap 12a. The tongue may be stitched to the upper or a rubber adhesive may be applied to the inner surface of the upper and the tongue fastened thereto by a bonding action between the rubber adhesive and the rubber toe cap.

The fully completed upper can now be applied to a last and the subsequent operations performed to complete a shoe.

What we claim is:

The method of attaching rubber trim to fabric shoe parts which comprises placing a sheet of rubber material upon a metal die having an upstanding section shaped to conform with the outline of the shoe part to be trimmed and having portions of the said section shaped to delineate the trim, placing a preformed fabric shoe part upon the rubber sheet with the outline of the said part in register with the outline of the said die section, heating said die to a temperature between 235° and 245° F. and, while said temperature exists, applying a pressure of approximately sixty pounds per square inch against the exposed surface of said shoe part to press it toward said die and thereby cause the rubber material within the confines of said trim delineations to enter the interstices of the fabric and become bound thereto.

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