

J. H. ORDWAY.
MANUFACTURE OF BOX TOES.
APPLICATION FILED JAN. 18, 1917.

1,252,298.

Patented Jan. 1, 1918.
2 SHEETS—SHEET 1.

Fig. 1.

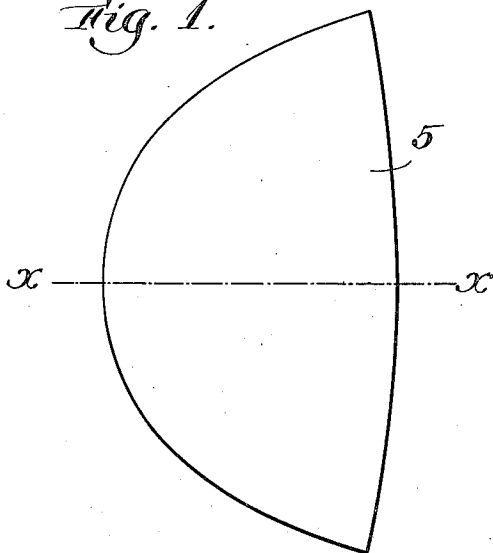


Fig. 2.

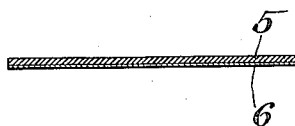


Fig. 3.

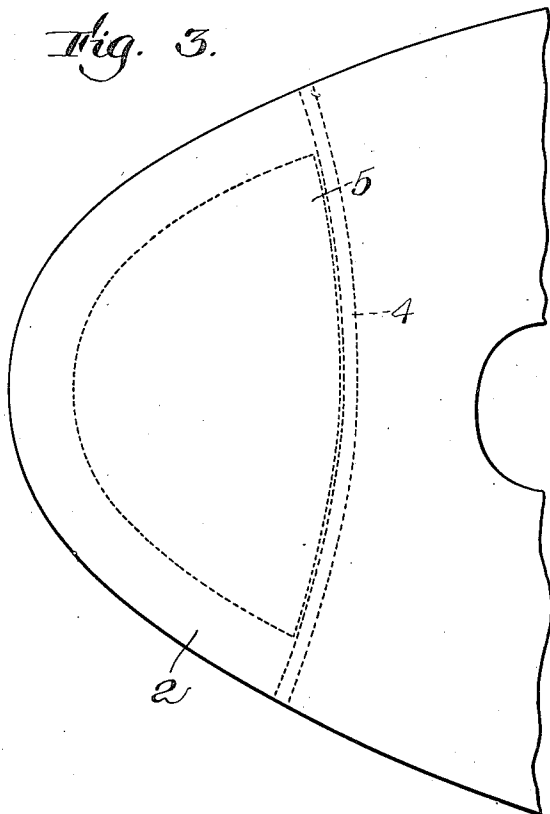
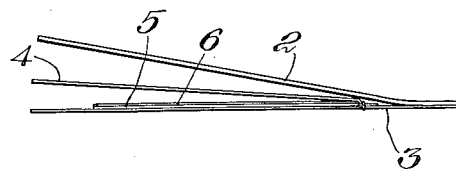


Fig. 4.

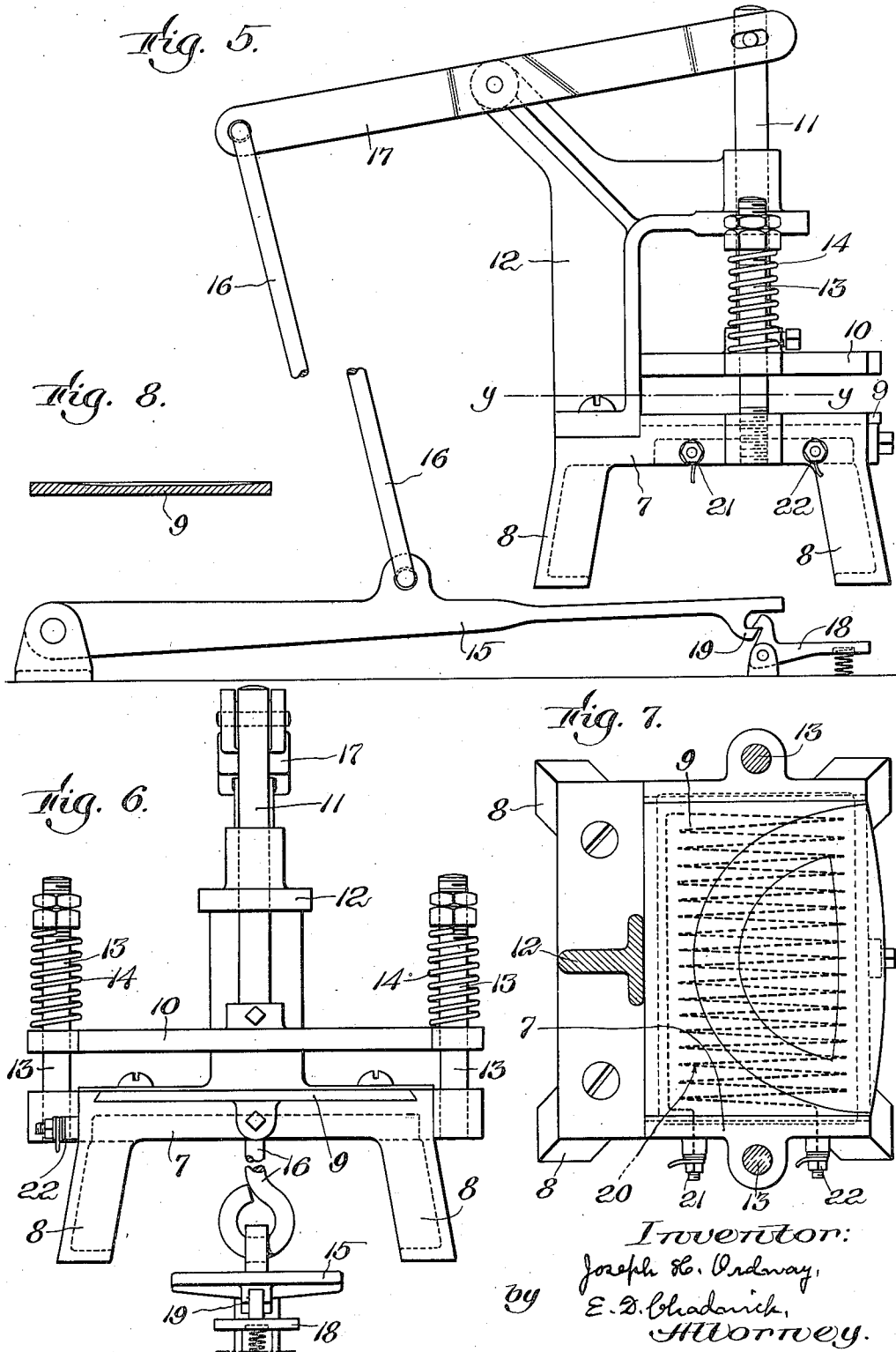


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UNITED STATES PATENT OFFICE.

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MANUFACTURE OF BOX-TOES.

1,252,298.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JOSEPH H. ORDWAY, a citizen of the United States, residing at Brookline, in the county of Norfolk and State of Massachusetts, have invented certain new and useful Improvements in the Manufacture of Box-Toes, of which the following is a specification.

This invention relates to the manufacture of boots and shoes having box toes which are formed by applying a stiffening compound to one or more sheets of fabric forming a part of the toe portion of the upper, lasting the upper while the stiffening compound is in a plastic condition and thereby molding the box to the desired shape, which is preserved by the subsequent hardening of the compound. In manufacturing such footwear it has been the practice heretofore to apply the stiffening compound while in a viscous condition by means of a brush or spatula manipulated by hand, but this practice has various disadvantages, due mainly to the difficulties involved in applying just the right amount of compound, in properly distributing it within the upper and in preventing it from reaching parts of the upper where it is not wanted. If the mass of applied compound is irregular in thickness, bunches are liable to be formed in the surface of the overlying leather when the shoe is lasted, thereby injuring its appearance, while if the compound extends too near the margin of the upper it will interfere with the process of lasting.

The present invention has for its object the production of a box toe of the character above referred to in such manner that the difficulties previously encountered will be avoided and certain other advantageous results will be obtainable, as hereinafter explained.

In practising my invention the boot or shoe upper may be composed of the same parts which have heretofore been employed in the case of shoes having the stiffening compound applied by a brush. In such an upper the toe portion contains one or more layers of absorbent fabric, usually two in number and of a fleecy nature on their adjacent sides, which are included in the upper when its parts are stitched together and to which the stiffening compound is applied, but instead of applying the compound with a brush I introduce it into the upper

in the form of a flat sheet consisting essentially of the solid compound and cut to suitable size and shape. This sheet is placed next to the fabric above referred to in proper position with respect to the toe portion of the upper, and is then caused to adhere to the fabric by softening the compound or otherwise rendering it adhesive and subjecting the parts to pressure, whereby the sheet of compound is permanently secured in place. The upper may then be lasted immediately, assuming that the stiffening compound has been sufficiently softened, or it may be laid aside and lasted subsequently, in which case the stiffening compound will be suitably softened before lasting. During the lasting operation the tension put upon the upper causes the softened compound to be subjected to a strong pressure which forces it into the fabric, and at the same time the shaping of the toe portion of the upper around the last results in giving the box the desired form, which is made permanent by the subsequent hardening of the compound.

The stiffening compound employed may be any one of a number of well-known compounds which have heretofore been used for stiffening box toes and my invention is not to be regarded as limited to any specific compound, but I prefer to use a compound which has considerable density and stiffness when hard and is thick and viscous when soft. The sheets of compound which are introduced into the uppers can be prepared and sold as articles of manufacture, and in order to prevent them from breaking during transportation I provide them with a suitable reinforcement which may consist, for example, of a backing of fabric or similar flexible material to which the compound will adhere when soft. Such sheets are most conveniently obtained by first preparing a sheet of considerable size and then cutting the individual sheets from it by means of dies of appropriate sizes and shapes, according to the patterns of the uppers in which they are to be used. In such case, by spreading the soft compound over the backing to a uniform depth and cutting out the individual sheets after the compound has hardened and become united by adhesion to the backing it is an easy matter to provide individual sheets of compound of different thicknesses, graded ac-

according to the quantity of the compound which is required for stiffening the box toe in a given size and style of shoe.

It is an important feature of my invention that the individual sheets of stiffening compound can be subjected while in a soft condition to a preliminary molding operation, whereby they may be made thicker at one point than at another. In a man's heavy shoe, for example, the box toe stiffener should be relatively thick at the top of the toe and should taper from that point to the side and front edges of the toe cap. In a plain-toed shoe the stiffener should be reduced to a thin edge at its rear in order to prevent the formation of a transverse ridge which will be visible in the completed shoe. Such formations are readily imparted to the individual sheets of compound by pressing them while soft between dies of appropriate shapes, which may be done at the time when the sheets and the fabric in the uppers are pressed together and caused to adhere to each other, and by the same dies. In the accompanying drawings illustrating my invention,

Figure 1 is a plan view of one of the individual sheets of stiffening compound;

Fig. 2 is a transverse section through the same on the line $x-x$ in Fig. 1;

Fig. 3, which is on a smaller scale, shows in plan view the front portion of the upper of a plain-toed shoe, with one of the sheets of compound properly located therein;

Fig. 4 is an edge view of the parts shown in Fig. 5, slightly separated;

Fig. 5 is a side elevation of a press hereinafter described;

Fig. 6 is a front elevation of the same;

Fig. 7 is a plan view in section on the line $y-y$ in Fig. 5; and

Fig. 8 is a transverse section through the lower die of the press.

The shoe upper illustrated in part in Figs. 3 and 4 comprises a vamp 2, a sheet of fabric 3 secured to its under side and constituting a vamp lining, and a so-called "plug" 4 consisting of another sheet of fabric corresponding in size and shape to the toe portion of the upper and stitched at its rear edge to the vamp lining between the latter and the vamp. The upper lining commonly employed is not illustrated. 5 indicates an individual sheet of stiffening compound provided on one side with a backing 6 of relatively thin fabric, the outline of the sheet being shown in Fig. 1. This sheet is placed between the vamp lining 3 and plug 4, preferably with the exposed surface of the compound located next to and in contact with the vamp lining, and is of such size and shape that when properly positioned within the upper its side and front edges are located at a distance from the corresponding edges of the upper, thus leaving the margin

of the latter free from the compound. After the parts have been thus assembled they are permanently secured in the desired relation by softening the compound or otherwise rendering it adhesive, according to the nature of the compound employed, and then subjecting the parts to pressure, which may be done by means of any suitable press.

In case the stiffening compound employed is of such a nature that it can be softened by heating it, the heating of the compound may be accomplished by means of the same apparatus which is employed for causing it to adhere to the fabric in the upper. For example, Figs. 5 to 8 inclusive illustrate a press which is adapted to heat the compound and also to mold it after it has been softened, and comprises a horizontal bed plate 7 supported on legs 8 and carrying a concave die 9 above which is located a horizontal presser plate 10 secured to the lower end of a rod 11 mounted to slide vertically in an overhanging frame 12 secured to the bed plate. At its ends the plate 10 is guided by vertical rods 13 carried by the bed plate, and is subjected to downward pressure by means of springs 14 surrounding said rods. A foot treadle 15 connected by a link 16 and a lever 17 to the upper end of the rod 11 enables the presser plate to be lifted by the operator against the pressure of the springs 14, and a spring-actuated latch 18 arranged to automatically engage a projection 19 on the treadle 15, when depressed, serves to hold the presser plate in its elevated position, shown in Figs. 5 and 6, during the insertion and removal of the parts to be acted upon by the press. The die 9 is removable from the bed plate 7, so that interchangeable dies of different sizes and contours may be used in the same press, and with this die is associated an electric heating coil 20 located in a recess in the under side of the bed plate and connected to terminals 21 and 22, through which it may be supplied with current from any suitable source.

After the parts of the upper have been assembled, as shown in Figs. 3 and 4, the toe portion of the upper is laid upon the die 9 and the presser plate 10 is then released by pressing downward on the front end of the latch 18, whereupon the parts beneath the presser plate are subjected to pressure exerted by the springs 14 until the stiffening compound has been softened by the heating coil 20 and molded to the shape of the die 9. At the same time it is caused to adhere to the fabric 3. The particular die illustrated is of such shape as to reduce the sheet of compound to a thin edge all the way around and leave its central portion flat, as is desirable in the case of a plain toed shoe, but the die may obviously have any other contour desired. After the compound has been molded as above described the upper is re-

leased from the press and may then be lasted immediately or put aside and lasted subsequently, as may be preferred, it being understood that in the latter case the compound must again be softened before lasting.

The process of lasting is performed in the usual way, and is facilitated by the fact that the marginal portion of the upper is free from the stiffening compound, so that it can be firmly grasped by the lasting pincers without gumming them with the compound and thereby rendering them slippery. For the same reason it retains the flexibility which is desirable in folding it on the under side of the last, and after the shoe has been lasted the excess material in the folds can be removed without gumming and clogging the trimming wheel usually employed for this purpose. During the lasting process the soft compound is forced into the fabric 3 by the pressure developed and the parts are molded at the same time into the desired form of the box toe, which is retained by the stiffened fabric when the compound hardens therein.

The extent to which the compound is caused to permeate the fabric will depend somewhat upon the softness of the compound employed and its capacity for penetration when soft. If thick and pasty a portion of it may remain as a thin layer on the surface of the fabric, but this will not affect its efficiency as a stiffening agent.

When the sheet of stiffening compound is to be introduced between two layers of fabric, as in the upper illustrated, the backing 6 employed is preferably made of a material which is somewhat permeable to the softened compound when subjected to pressure, in order that enough of the compound may be forced through the backing to adhere to the outer layer of fabric and unite both layers into a unitary structure. If preferred, however, the compound may be applied to a single layer of fabric only, in which case the backing employed should be impermeable to the compound.

It will be seen from the foregoing description that my invention makes it possible to introduce exactly the right amount of box toe stiffening compound into a shoe upper in a convenient and cleanly way and distribute it in the most advantageous manner with respect to those areas of the upper which are required to be stiffened, leaving the remainder of the upper flexible. The disadvantages involved in introducing such a compound by means of brush are thus completely avoided, as well as those attendant upon the introduction of a previously-stiffened box toe blank of felt or the like, which has to be stitched or stapled in place and can be reduced to a thin edge only by skiving it.

The sheet of stiffening compound above described, considered as an article of manu-

facture, is not claimed herein, as it forms the subject-matter of a divisional application.

1 claim:—

1. A process of making box toes which includes inserting a previously-prepared sheet of stiffening compound in solid form into an upper containing a layer of fabric in its toe portion, with the compound located adjacent to the fabric, softening the compound to render it plastic, and lasting the upper with the compound in a plastic condition, thereby forcing the plastic compound into the fabric and simultaneously molding the latter to the shape of a box toe conforming to the toe portion of the last.

2. A process of making box toes which includes inserting a previously-prepared sheet of stiffening compound in solid form into an upper containing a layer of fabric in its toe portion, with the compound located adjacent to the fabric, softening the compound and subjecting it and the fabric to pressure whereby they are caused to adhere, and lasting the upper with the compound in a plastic condition, thereby forcing the plastic compound into the fabric and simultaneously molding the latter to the shape of a box toe conforming to the toe portion of the last.

3. A process of making box toes which includes inserting a previously-prepared sheet of stiffening compound in solid form into an upper containing a layer of fabric in its toe portion, with the compound located adjacent to the fabric, softening the compound and subjecting it to a molding operation under pressure, whereby the compound is properly distributed with respect to the toe portion of the upper and caused to adhere to the fabric, and lasting the upper with the compound in a plastic condition, thereby forcing the compound into the fabric and simultaneously molding the latter to the shape of a box toe conforming to the toe portion of the last.

4. A process of making box toes which includes inserting a previously-prepared sheet of stiffening compound in solid form, and having a reinforcement which is permeable to the compound when soft, into an upper containing two adjacent layers of fabric in its toe portion, with the compound located between the layers of fabric, softening the compound to render it plastic, and lasting the upper with the compound in a plastic condition, thereby forcing the soft compound into the fabric and through the reinforcement and uniting the layers into a unitary structure which is simultaneously molded to the shape of a box toe conforming to the toe portion of the last.

5. A process of making box toes which includes inserting a previously-prepared sheet of solid stiffening compound adapted to be softened by heat into an upper containing

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a layer of fabric in its toe portion, with the compound located adjacent to the fabric, heating the compound and subjecting it and the fabric to pressure whereby the compound is softened and caused to adhere to the fabric, and lasting the upper with the compound in a plastic condition, whereby the plastic compound is forced into the fabric and the latter is simultaneously molded to the shape of a box toe conforming to the toe portion of the last.

6. A process of making box toes which includes inserting a previously-prepared sheet of solid stiffening compound adapted to be softened by heat into an upper containing a layer of fabric in its toe portion, with the

compound located adjacent to the fabric, heating the compound and subjecting it to a molding operation under pressure, whereby the compound is properly distributed with respect to the toe portion of the upper and caused to adhere to the fabric, and lasting the upper with the compound in a plastic condition, thereby forcing the plastic compound into the fabric and simultaneously molding the latter to the shape of a box toe conforming to the toe portion of the last.

Signed at Boston, Mass., this 16th day of January, 1917.

JOSEPH H. ORDWAY.