J. H. ORDWAY.

MEANS FOR STIFFENING BOX TOES.

APPLICATION FILED JAN. 26, 1917.

1,251,914. Patented Jan. 1, 1918.

Fig. 1.

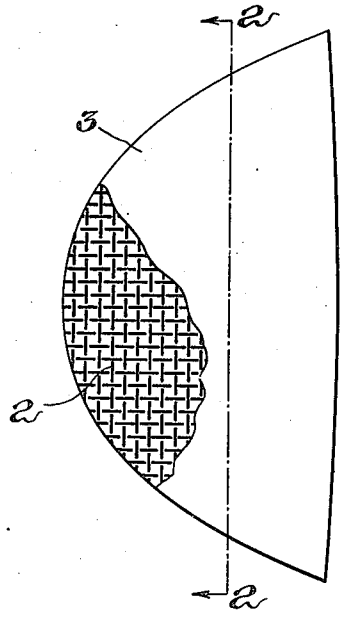


Fig. 2.

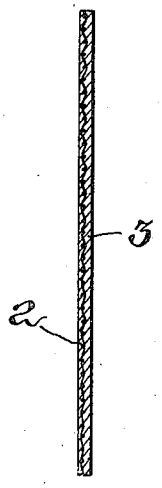


Fig. 3.

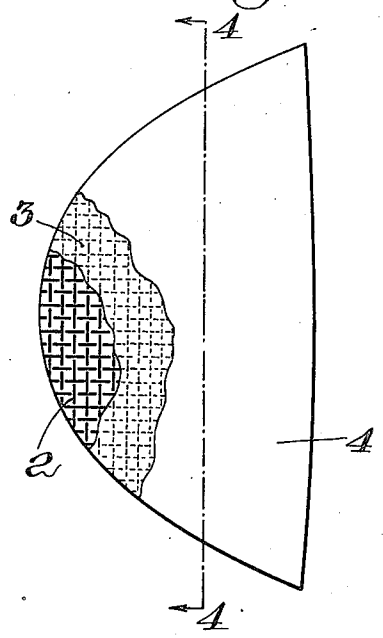


Fig. 5.

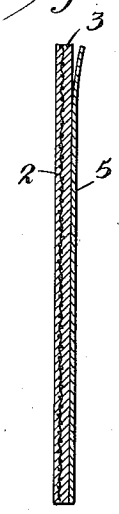


Fig. 4.

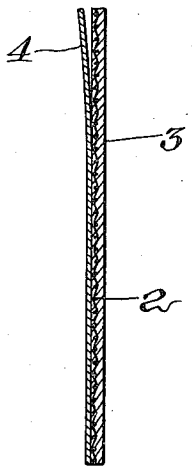
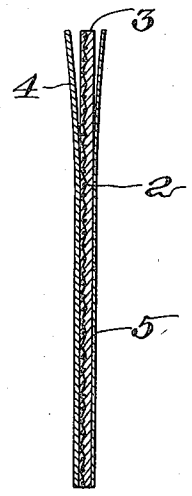


Fig. 6.



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MEANS FOR STIFFENING BOX-TOES.

1,251,914. Specification of Letters Patent. Patented Jan. 1, 1918.

Application filed January 26, 1917. Serial No. 144,659.

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 Means for Stiffening Box-Toes, of which the following is a specification.

This invention relates to the manufacture of shoes having box toes which are molded to shape during the process of lasting, and has for its object the provision of improved stiffening means for such box toes.

A box toe made in accordance with my invention is characterized by the inclusion therein of a layer of woven wire which not only serves in itself to impart stiffness to the box toe but is also utilized as a carrier or reinforcement for additional stiffening material which is self-hardening but can be softened sufficiently to enable the upper to conform to the last during the lasting process, and my stiffener as preferably constructed is particularly adapted and intended to be used in the manner set forth in a co-pending application for Letters Patent (filed January 18, 1917, Serial No. 142,989), in which I have described and claimed a process of making box toes which includes the insertion into a shoe upper, before lasting, of a sheet of box toe stiffening compound in solid form but adapted to be rendered sufficiently plastic to penetrate a layer of absorbent fabric included in the toe portion of the upper, and the lasting of the upper after the compound has been rendered plastic, whereby the soft compound is forced into the absorbent fabric and the latter is simultaneously molded to the shape of a box toe conforming to the toe portion of the last.

In the accompanying drawing illustrating my invention,

Figure 1 is a plan view of a box toe stiffener composed of a layer of woven wire combined with a stiffening compound, the latter being partly broken away;

Fig. 2 is a section on the line 2—2 in Fig. 1;

Fig. 3 is a plan view of a stiffener similar to that illustrated in Fig. 1, but having a backing applied to the compound;

Fig. 4 is a section on the line 4—4 in Fig. 3; and

Figs. 5 and 6 are sections similar to Fig. 4, illustrating modifications.

The stiffener illustrated in Figs. 1 and 2 has the form of a flat sheet of a size and shape appropriate for insertion into the toe portion of a shoe upper, and comprises a layer of woven wire 2 embedded in a mass of box toe stiffening compound 3 in solid form, with the compound exposed on both sides of the woven wire. The latter is preferably made of a rather fine and springy wire but has a coarse mesh, for reasons which will hereinafter appear. The compound employed may be any one of a number of well-known box toe stiffening compounds which are adapted to be softened sufficiently to render them plastic, but I prefer to employ a compound which is thick and viscous when soft and is of such nature that it is not liable to chip or break away from the woven wire when hard. This form of stiffener is adapted and intended to be employed in connection with an upper having two layers of absorbent textile fabric in its toe portion, with which the stiffener is combined by inserting it between the two layers of fabric in proper position with respect to the toe portion of the upper, then softening the compound and subjecting the parts to pressure until they are united by adhesion, and lasting the upper with the compound in a soft condition as explained in my prior application above referred to. By the lasting operation the woven wire is given the shape of the underlying surface of the last, to which it is enabled to conform without wrinkling by the capacity of the individual wires to move laterally, due to the coarseness of the mesh, and the form of the resulting box toe is made permanent by the combined effect of the stiffened layers of textile fabric and the layer of woven wire between them, all of which are united into a unitary structure.

The stiffener shown in Figs. 3 and 4 is composed of the same parts as that shown in Figs. 1 and 2 and, in addition, a backing 4 which covers the compound on one side of the stiffener and preferably consists of a sheet of thin textile material held in place by adhesion. The employment of such a backing results in causing the softened compound to be forced wholly or mainly into that layer of textile fabric in the upper which is located next to the exposed compound, and which will ordinarily be the inner layer of fabric. If the upper also contains a layer of textile fabric located

on the outer side of the stiffener the cementing together of the several layers may be accomplished by employing a backing 4 which is somewhat permeable to the compound, while by employing an impervious backing the compound may be confined wholly to the inner layer of textile fabric.

In case the compound in which the woven wire 2 is embedded is of such a nature that it is liable to chip off or break away from the wire during transportation or while being handled, loss of the compound in this manner may be prevented by covering it with an adherent backing 5 of textile fabric or other flexible material, as shown in Fig. 5. In such case it is desirable to locate the woven wire close to one side of the stiffener and to apply the backing 5 to the other side, the wire itself serving to prevent loss of the compound from that side of the stiffener in which it is embedded. The woven wire is shown as similarly located in Figs. 2 and 4, but there is no particular advantage in this, since the compound, when soft, can readily pass through the open meshes from one side to the other.

A stiffener having a backing 5 may also be provided on its opposite face with a backing 4 as in Fig. 4, if desired, such a modification being shown in Fig. 6. In such case it is desirable to employ backings of which one at least is permeable to the compound when softened, in order that enough of the soft compound may reach the textile fabric in the upper to secure the stiffener in position by adhesion. It will be evident, however, that a stiffener having an impervious backing on each side may be secured in proper position in the upper by stitching or stapling it therein, and the box toe will then be stiffened by the combined effect of the woven wire, the backings and the stiffening material inclosed by the latter.

Each form of stiffener above described is most conveniently obtained by first preparing a flat sheet of considerable size and uniform thickness, and containing the desired parts properly combined, 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. The stiffening compound 3 may be graded in thickness as desired, according to the quantity of compound which is required for stiffening purposes in a given size and style of shoe, and the individual sheets may be subsequently subjected to a preliminary molding operation while the compound is in a soft condition and thereby made thicker at one point than at another as explained in my prior application above referred to, wherein various other advantages obtainable from such a stiffener are pointed out in detail.

I have found that by the employment of a stiffener constructed as above described it is possible to produce a box toe in which the necessary stiffness is combined with elasticity to an extent which is unobtainable by the use of a stiffened textile fabric alone, and that the woven wire itself imparts so much stiffness to the box toe that it is unnecessary to include therein the extra layer of textile fabric which is sometimes required in order to provide enough absorbent material for the reception of the stiffening compound. Furthermore, when my stiffener is used in the manufacture of shoes in which the stiffened portion of the upper has to be turned inward under the bottom of the last, as in McKay shoes, it has the important advantage that the freedom of the individual wires composing the layer 2 enables them to be spread apart or crowded together without forming folds beneath the toe portion of the last, thus avoiding a difficulty which occurs in the use of stiffened box toe blanks of felt and the like and which has frequently made it necessary heretofore to provide such blanks with marginal notches in order to remove the excess material.

I claim:

1. As an article of manufacture, a box toe stiffener in the form of a sheet having a size and shape appropriate for insertion into an unlasted shoe upper and comprising a layer of woven wire embedded in a self-hardening stiffening compound which is adapted to be softened to enable the upper to conform to the last.

2. As an article of manufacture, a box toe stiffener in the form of a sheet having a size and shape appropriate for insertion into an unlasted shoe upper and comprising a layer of woven wire embedded in a self-hardening stiffening compound which is adapted to be softened to enable the upper to conform to the last, said sheet being provided with a flexible backing.

3. As an article of manufacture, a box toe stiffener in the form of a sheet having a size and shape appropriate for insertion into an unlasted shoe upper and comprising a layer of woven wire embedded in a relatively thick layer of self-hardening stiffening compound which is adapted to be softened to enable the upper to conform to the last, said woven wire being located adjacent to one side of the layer of compound, and a flexible backing covering the other side of the layer of compound.

4. As an article of manufacture, a box toe stiffener in the form of a sheet having a size and shape appropriate for insertion into an unlasted shoe upper and comprising a layer of woven wire embedded in a self-hardening stiffening compound which is adapted to be softened to enable the upper to conform to the last, each side of the layer of compound being covered by a flexible backing.

5. As an article of manufacture, a box toe stiffener in the form of a sheet having a size and shape appropriate for insertion into an unlasted shoe upper and comprising a layer of woven wire embedded in a self-hardening stiffening compound which is adapted to be softened to enable the upper to conform to the last, said sheet being provided with a flexible backing which is permeable to the compound when soft.

Signed at Boston, Mass., this 24th day of January, 1917.

JOSEPH H. ORDWAY.