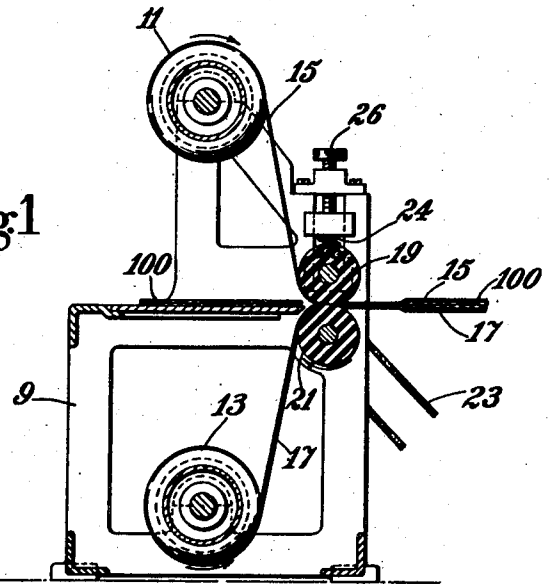
Nov. 12, 1946. V. F. HARRINGTON 2,410,878

ART OF TEMPORARILY COVERING ARTICLES

Filed Sept. 16, 1943 2 Sheets-Sheet 1

Fig.1



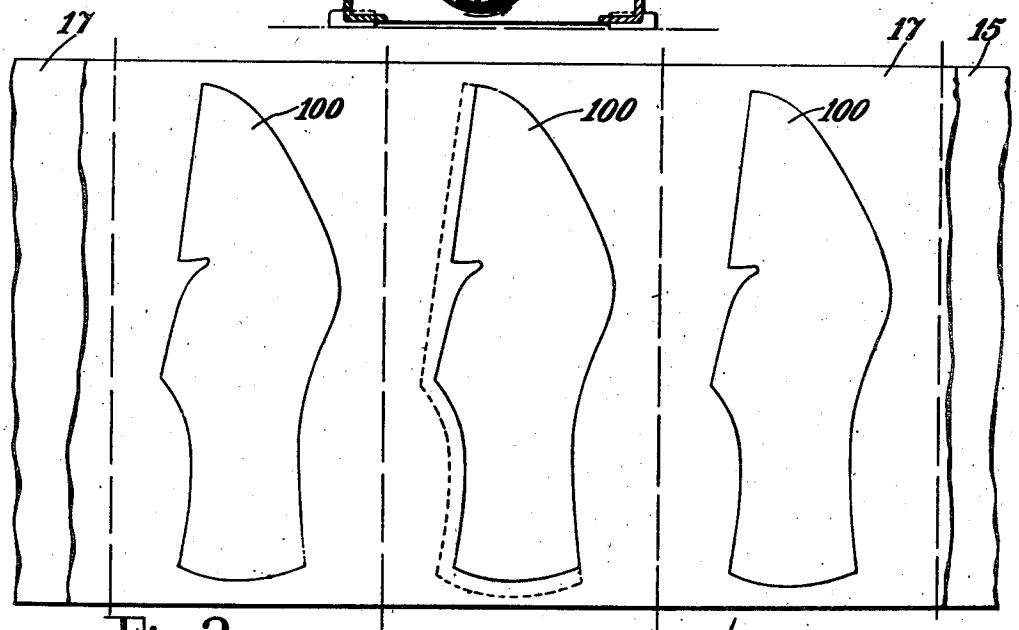


Fig.2

INVENTOR
Valentine F. Harrington
By his attorney
Thomas Ryan

Nov. 12, 1946. V. F. HARRINGTON 2,410,878

ART OF TEMPORARILY COVERING ARTICLES

Filed Sept. 16, 1943 2 Sheets-Sheet 2

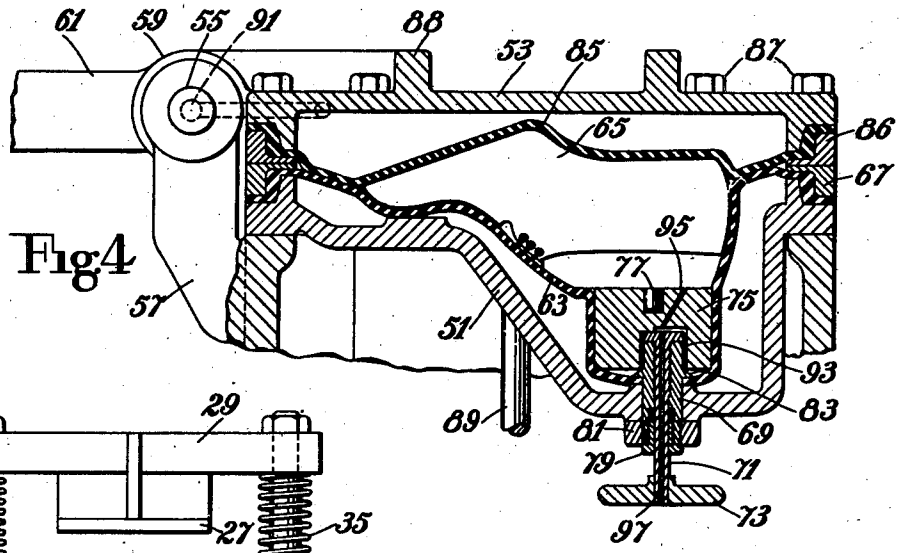


Fig.4

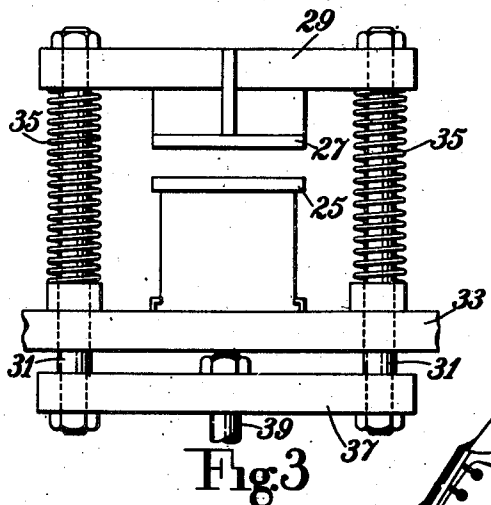


Fig.3

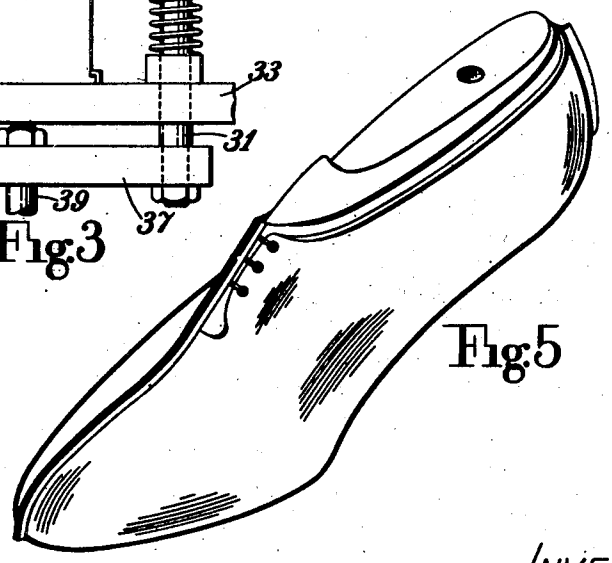


Fig.5

INVENTOR
Valentine F. Harrington
By his attorney
Thomas J. Ryan

Patented Nov. 12, 1946 2,410,878

UNITED STATES PATENT OFFICE

2,410,878

ART OF TEMPORARILY COVERING ARTICLES

Valentine F. Harrington, Newton, Mass., assignor to B. B. Chemical Co., Boston, Mass., a corporation of Massachusetts

Application September 16, 1943, Serial No. 502,646

4 Claims. (Cl. 12—142)

1

This invention relates to providing articles with temporary protective covers which may readily be removed when they have served their purpose, and is herein illustrated with respect to protecting the uppers of shoes from being soiled or stained during various shoemaking operations.

In the manufacture of shoes it is desirable to apply to the upper a temporary protective cover which will prevent soiling and/or staining the upper while various shoemaking operations are being carried out and which may be readily peeled off when it has served its purpose. Among these shoe manufacturing operations, depending upon the type of shoe being manufactured, are certain ones in which a pressure of considerable magnitude is exerted upon the toe portion of the upper. For example, in shoes the soles of which are attached by cement a pressure of from 300 to 600 pounds or more per square inch may be applied, through the toe pad of the sole-attaching machine, to a locality in the toe portion of the upper for an interval which may be as long as sixty seconds. Such a pressure of considerable magnitude, which is applied to a locality of the upper during the manufacture of the great majority of shoes, has prevented the use of covers carrying a coating of so-called "pressure sensitive" adhesive to cause them to adhere to the upper. If a cover comprising sheet material having on one side a coating of ordinary pressure-sensitive adhesive is used, a pressure of considerable magnitude upon a locality of the covered upper will increase the adhesion of the cover to the upper, in the area over which the pressure is applied, to such an extent that removal from the upper of that portion of the cover which has been subjected to the heavy pressure will be prevented or seriously interfered with. Moreover, in the manufacture of shoes a temporary protective cover must remain on the shoe for a considerable period which may be as long as two weeks; and if a cover of the kind last referred to, having a coating of tacky pressure-sensitive adhesive, is used, the adhesion of such a cover to the upper increases steadily, even if no pressure other than the light finger pressure necessary to attach it to the upper is encountered, with the result that, even in such case, the cover cannot be readily removed.

According to the present invention there is pressed against the article, with a pressure applied for an interval sufficient to cause it to adhere lightly to the article, a cover comprising thin, flexible, non-fibrous sheet material having firmly bonded to one side thereof a coating which will

2

adhere lightly to the article when pressed against it with a pressure of approximately 100 to 500 pounds per square inch for an interval of approximately one to five seconds and the adhesion of which will not objectionably increase if left in place for a considerable period, whereby neither a pressure of considerable magnitude applied later to a locality of the covered article nor the leaving of the cover on the article for a considerable period will interfere with the ready removal of the cover when it has served its purpose.

Referring to the accompanying drawings:

Fig. 1 is an end elevation of a machine for applying two strips of cover material one to each side of a folded upper;

Fig. 2 is a plan of the work as it leaves the machine of Fig. 1;

Fig. 3 is an elevation of a portion of a machine for exerting heavy pressure upon the strips of cover material with the uppers between them;

Fig. 4 is a vertical longitudinal section of a portion of a machine for pressing a cover against the upper of a lasted shoe; and

Fig. 5 is a perspective of a covered lasted shoe.

Conveniently the method of the invention may be practiced with the aid of certain apparatus illustrated and in the manner described below in which the covering of a closed upper before it has been mounted on a last will first be described. Cover material in the form of a thin, flexible non-fibrous film or sheet having on one side a coating which is firmly bonded to the film and which will adhere to the shoe part to be covered, and then only lightly, when the cover material is pressed against said shoe part with considerable force, is first prepared in the form of strips of a width a little greater than the lengths of the uppers to be covered.

Referring to Fig. 1, the machine there shown comprises a base or frame 9 having upper and lower reels 11, 13 which carry respectively coils of strips 15 and 17, the leading ends of which pass between and are gripped by rubber rolls 19, 21. The lower roll 21 is rotated in the direction indicated by the arrow by means of a belt 23 driven from any suitable source of power, the rolls being geared together so that the strips are pulled from their reels when the rolls are rotated. Springs, one of which is shown at 24, the tension of which may be varied by turning a screw 26, press the rolls together. The uppers 100 are first prepared by folding them longitudinally along their middle lines with their display surface exposed; and then the operator presents these folded uppers one after another, crosswise

of the strips, to the bite of the rolls whereby the strips are pressed one against each side of the folded uppers and are pressed together where they are not separated by the uppers. The result is shown in Figure 2, the uppers being clearly visible through the strips which are here shown as transparent. The nature of the coating on the strips is such that it will adhere to itself when pressure is employed. The strips are consequently bonded together where they are not separated by the uppers.

The pressure applied by the rolls 19, 21 may or may not be of considerable magnitude. Assuming that it is not but is merely sufficient to cause the strips 15, 17 to adhere to each other so as to locate the uppers properly between them, the two strips with the uppers between them are fed through a press such as that shown in Fig. 3. This press comprises a stationary platen 25, and a plunger or presser 27, the plunger being fast to a cross-bar 29 carried at the upper ends of two upright rods 31 vertically slidable through bores in a heavy plate 33, which may be the top of a bench upon which the platen 25 rests. A crossbar 37 connects the lower ends of the rods 31, said crossbar being connected to the upper end of a rod 39 to the lower end of which is connected a hydraulically operated piston (not shown), which pulls down the rod 39, and with it the plunger 27, the construction being such that any desired force may be applied to pull down the plunger 27 and to hold it under said pressure for any desired interval. The springs 35 raise the plunger when the piston is released. Here the two strips with the uppers between them (Fig. 2) are subjected to a heavy pressure which may be from 100 to 500 pounds per square inch for an interval of from one to five seconds, the coating on the strips, as has been explained, being of such nature that it adheres only lightly to the uppers when a pressure of that magnitude is employed.

Although the coating has been described above as one which will adhere lightly when pressed against the shoe part with a heavy pressure for a short interval, it should be understood that this is a characterization of the nature of the coating and that such a coating may be made to adhere lightly if the pressure is lighter and the time interval is longer. In practice it is preferable to make the time interval short, and to accomplish this a heavy pressure is used. The coating is non-tacky; that is, it will not adhere when pressed against an article with the fingers in the ordinary manner, and is thus quite different from the tacky coatings known as "pressure-sensitive" coatings, commonly used on sheets or tapes, in that "pressure-sensitive" coatings will adhere when pressed lightly, as for example by the fingers of an operator, against a shoe part and then adhesion will increase very materially if allowed to remain for, say, several days. A non-tacky coating such as is employed in the present invention will give the following test. A strip of thin, flexible sheet material 3½ inches wide, having a coating firmly bonded to one side thereof, is pressed against a glass plate in such manner that no air is entrapped. This pressing may be done, for example, by means of a hand-operated rubber roller. The strip is then pulled off at the rate of 30 inches per minute and in such direction that the strip, as it is pulled off, makes an angle of from 15 to 20 degrees with the surface of the glass plate. The pull is a measure of the tack or surface adhesion and in the case of the non-tacky coating of the present invention will not be above 1,000 grams, plus or minus 10%.

The two strips may then be cut on the broken lines of Fig. 2 so as to facilitate the operation of cutting out the covered uppers. This cut is in register with the bottom of the upper but is spaced somewhat from the top and rear end as indicated in dotted lines for the middle one of the three uppers shown in Fig. 2. Each covered upper is thus open along its bottom but closed by the bonded together surfaces of the cover at the top. The operator thrusts a hand up through the covered upper to open the top sufficiently and mounts it, together with an insole, upon a last as shown in Figure 5. The edges of the halves of the cover remain bonded together at the rear end of the lasted shoe as well as along the longitudinal middle of the forepart; while the edges around the opening extend slightly above the corresponding edges of the upper thereby protecting said last-named edges.

Various shoemaking operations such as pulling-over, lasting, roughing the overlasted margin of the upper during which the overlasted margin of the cover is removed, and sole-attaching, sole-laying and sole-leveling may be performed; and thereafter, when the cover has served its purpose, it is removed by peeling it from the upper. In the sole-attaching operation, for example, there is commonly applied through the toe pad of the cement-sole-attaching machine a pressure of from 300 to 600 pounds or more per square inch for an interval which may be as long as sixty seconds; and, owing to the nature of the coating on the cover, a pressure of this order will not materially increase the adhesion of the cover to the upper, that is, will not increase said adhesion sufficiently to interfere with the ready removal of the cover.

The application of the cover material to the upper has been described as taking place in two steps and upon an upper which has been folded throughout its length. A two-step method however is not essential, it being possible for example to apply the cover with sufficient pressure in a single operation. As to applying the cover to a closed upper folded throughout its length, if a closed upper to be covered is of such construction or of such material that the forepart cannot be folded and pressed in the manner described without detriment to said forepart, for example if the upper contains a toe stiffener or if the material of the forepart is of such nature that folding and pressing it in the manner described would leave an objectionable crease, the method may be modified for example by folding the rear part, applying the strips of cover material crosswise of the upper to both sides of said rear part, severing the strips by cuts at the top and the bottom of the partially covered upper, and then opening the upper, spreading the forepart out and applying cover material to the display side of said forepart. Although in the procedure described above the covers are applied to closed uppers, they may be applied if desired at any other suitable stage of the manufacture, for example while the shoe part is in the flat or to the skins out of which the shoe parts are cut.

There has been described above a procedure of applying a cover to a shoe part before it is mounted on a last. Another procedure is one in which the covers are applied after the shoes have been lasted; and Figure 4 shows a portion of a machine for applying a cover with heavy pressure to a lasted shoe.

This figure shows a pressure box which is substantially like one of the two pressure boxes of the machine of the patent to Stuart No. 1,337,532 dated April 20, 1920. The box comprises a lower member 51 and an upper or cover member 53, the cover being hinged to the frame (not shown) of the machine by means of a shaft 55 passing through an aperture in a stationary bracket member 57 and through an apertured boss 59 projecting rearwardly from the cover member 53. An arm 61 projects from the boss 59 and carries an adjustable weight (not shown) to counterbalance the weight of the cover member. Disposed within the lower member 51 of the pressure box is a flexible diaphragm 63 shaped to conform roughly to the upper portion of a last 65 (herein shown bottom side up), its margins being clamped between the flanged upper portion of the wall of the member 51 and a flanged clamping ring 67. The lower wall of the diaphragm 63 is apertured to receive a bushing 69, a stem 71 being threaded into the bushing so that, when the stem is rotated by means of a handle 73, the stem may be moved upward or downward to adjust the position of a block 75 upon which the last 65 rests, the block being provided with a pin 77 to fit into a hole in the last. At its lower end, the bushing 69 is cored out to receive a packing which is compressed by means of a threaded plug 79. The bushing projects below the lower member 51 of the box and is threaded to receive a nut 81 so that the lower portion of the lower diaphragm 63 may be clamped between the inner surface of the wall of the lower member 51 of the pressure box and a flange 83. The upper diaphragm 85 is clamped in position in the cover member 53 by means of a flanged ring 86 secured in position by a series of cap screws 87. The cover 53 is locked in closed position by latches, not shown, which engage ribs 88 on the cover. Compressed air is forced through a pipe 89 into the space beneath the lower diaphragm and through an axial bore 91 in the pivot-shaft 55 into the space above the upper diaphragm 85. It is desirable that the air between the diaphragms and the lasted shoe be permitted to escape. To this end the last holder or block 75 is provided with ducts 93, 95 in communication with a duct 97 formed in the adjusting stem 71. No further description of the machine will be given, reference being made to the patent for parts not herein referred to.

When this machine is used to carry out the pressing step of applicant's method, a cover of a shape to fit roughly over a lasted shoe is prepared from the same material as that of the strips 15, 17 described above, said cover having on its inner face a coating which will adhere to the upper of the lasted shoe, and then only lightly, when the cover is pressed into place with considerable pressure, for example a pressure of 100 to 500 pounds per square inch, for an interval of from one to five seconds. A cover of this kind is placed on the lasted shoe, the cover 53 of the pressure box is raised, the lasted shoe is placed in the pressure box, the cover 53 of the box is closed and locked, and air at the desired pressure is forced into the box above and below the two diaphragms 65 and 63. The resulting product is exactly the same as is shown in Figure 5, namely, a lasted shoe having a temporary protective cover adhering lightly to its upper so that it may readily be peeled off and yet adhering sufficiently so that it will remain in place during subsequent manufacturing operations and thus protect the upper.

The film or sheet of the covering material may

be rubber hydrochloride, sold under the trade name of Pliofilm, although other thin, flexible sheets or films such, for example, as Saran (polymerized vinylidene chloride) or ethyl cellulose may be used. These films possess particularly advantageous characteristics, being tough, transparent, flexible films which are somewhat stretchable. The film may be only .001 of an inch thick, the whole covering material having a total thickness of .0017 of an inch. The capability of stretching and of becoming quickly fatigued is particularly advantageous in the pulling-over operation where the cover material will stretch with the upper without breaking and will not exert an undue pressure when stretched. The thinness, flexibility and transparency of the material greatly aid in the roughing of the overlasted margin of the upper. The roughing operator should begin his roughing cut along the feather line of the insole, that is, along the line of the edge of the insole. Since the cover material is so thin, the feather line of the insole is sharp and clearly visible, and the roughing cut can be very accurately done so as to leave the edge of the cover just on a level with the bottom of the insole. This prevents any cement which may later be squeezed out during the sole-attaching operation from getting upon the upper and allows the sole to make a tight joint with the bottom of the insole. If the cover is thick, the feather line is not sharp, and there is a tendency on the part of the roughing operator to begin the roughing cut too far from the feather line. It may be noted here that the cover material which extends over upon the bottom of the shoe can be removed by the action of the wire brush which is commonly used to rough the overlasted margin of the upper. The removal of the overlasted margin of the cover and the roughing of the overlasted margin of the upper are thus both accomplished in a single operation.

Below are examples of cover materials of the kind described above, each comprising thin, flexible, non-fibrous sheet material having firmly bonded to one side thereof a coating which will cause the sheet material to adhere to the article, and then only lightly, when the cover is pressed against the article with a pressure of considerable magnitude, and the adhesion of which will not increase objectionably if the cover is allowed to remain in place for a considerable interval. In Examples I, II and III, the base coat may be applied to the sheet or film and allowed to dry, after which the top coat is applied over the base coat and allowed to dry. In Example IV, where a single coat is used, this coat is also allowed to dry. In each case the coating material is bonded firmly to the film and all the coating material is peeled off when the film is peeled off.

Example I

The film is Pliofilm (rubber hydrochloride). The base coat is 1% each of Pliolite and neoprene in 60% Solvesso No. 1 and 40% naphtha. The top coat is 15% Vistanex polybutene (molecular weight about 120,000) in naphtha.

Example II

The film is Saran (polymerized vinylidene chloride). The base coat is 1% chlorinated Vistanex polybutene (molecular weight about 120,000, chlorine content 20%) in 60% Solvesso No. 1 and 40% naphtha. The top coat is 15% Vistanex polybutene (molecular weight about 120,000) in naphtha.

Example III

The film is Pliofilm. The base coat is 1% each of rubber and Durez 5117 (phenylated rubber) in 60% Solvesso No. 1 and 40% methyl ethyl ketone. The top coat is 12–15% unmilled rubber in naphtha.

Example IV

The film is ethyl cellulose. The single coat is 15% Vistanex polybutene (molecular weight about 120,000), 1½% Nypene resin and 1½% diamyl naphthalene in naphtha.

Pliofilm (rubber hydrochloride) and Pliolite (a cement particularly designed for use with Pliofilm) are put out by The Goodyear Tire & Rubber Company of Akron, Ohio. Solvesso No. 1 (a petrol solvent) is put out by the Standard Oil Company of N. J. Saran (polymerized vinylidene chloride) is put out by The Dow Chemical Company of Midland, Michigan. Vistanex polybutene is put out by the Advance Solvents & Chemical Corporation of New York. Nypene resin is put out by The Neville Company of Pittsburgh, Pennsylvania.

Coatings such as have been described have so little flow that a cover may remain in place for a comparatively long interval, such for example as a week or more, and/or may be subjected to heavy pressure, such for example as that of the toe pad of a cement sole attaching machine, without having its adhesion increased sufficiently to interfere with the ready peeling off of the cover when it has served its purpose.

Although the invention has been set forth in connection with the covering of a shoe upper, it should be understood that the invention is applicable to the covering of other similar fibrous materials.

Having thus described the invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. The method of providing the closed upper of a shoe with a temporary protective cover, which comprises folding the upper in such manner that the display surface of the upper is exposed, pressing upon each side of the folded upper sheet material having firmly bonded to one side thereof a coating, with the coating between said material and the adjacent display side of the upper, and subsequently severing the sheet material in proximity to the edges of the folded upper.

2. The method of manufacturing shoes, which comprises folding an upper in such manner that its display surface is exposed part on one side and part on the other side of the folded upper, applying to each side of the folded upper a strip of thin, flexible, non-fibrous material having bonded firmly to it on the side adjacent to the upper a coating, the two strips being united by the coating where they are not separated by the uppers, severing the two strips along edges of the folded upper, opening the upper at top and bottom, mounting the covered upper upon a last, performing manufacturing operations upon the covered lasted shoe, and thereafter removing the cover.

3. The method of manufacturing shoes, which comprises folding an upper in such manner that its display surface is exposed, part on one side and part on the other side of the folded upper, pressing the folded upper between two layers of thin, flexible, non-fibrous sheet material whereby the layers are united where they are not separated by the upper, severing the two layers in proximity to the edges of the upper, opening the upper at top and bottom, mounting the covered upper upon a last, performing manufacturing operations on the covered lasted shoe, and thereafter removing the cover.

4. The method of manufacturing shoes, comprising folding an upper in such manner that its display surface is exposed part on one side and part on the other side of the folded upper, applying to each side of the folded upper with a pressure of from 100 to 500 pounds per square inch for an interval of from one to five seconds a strip of thin, flexible, non-fibrous material having on the side adjacent to the upper a coating firmly bonded to it, said coating being of such nature that it will adhere lightly to the upper when said pressure is applied, the two strips being united where they are not separated by the uppers, severing the two strips along edges of the folded upper, opening the upper at top and bottom, mounting the covered upper upon a last, performing manufacturing operations upon the covered lasted shoe, and thereafter removing the cover.

VALENTINE F. HARRINGTON.