Aug. 20, 1935. C. D. TURNER 2,011,696

MANUFACTURE OF SHOES

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Fig. 3.

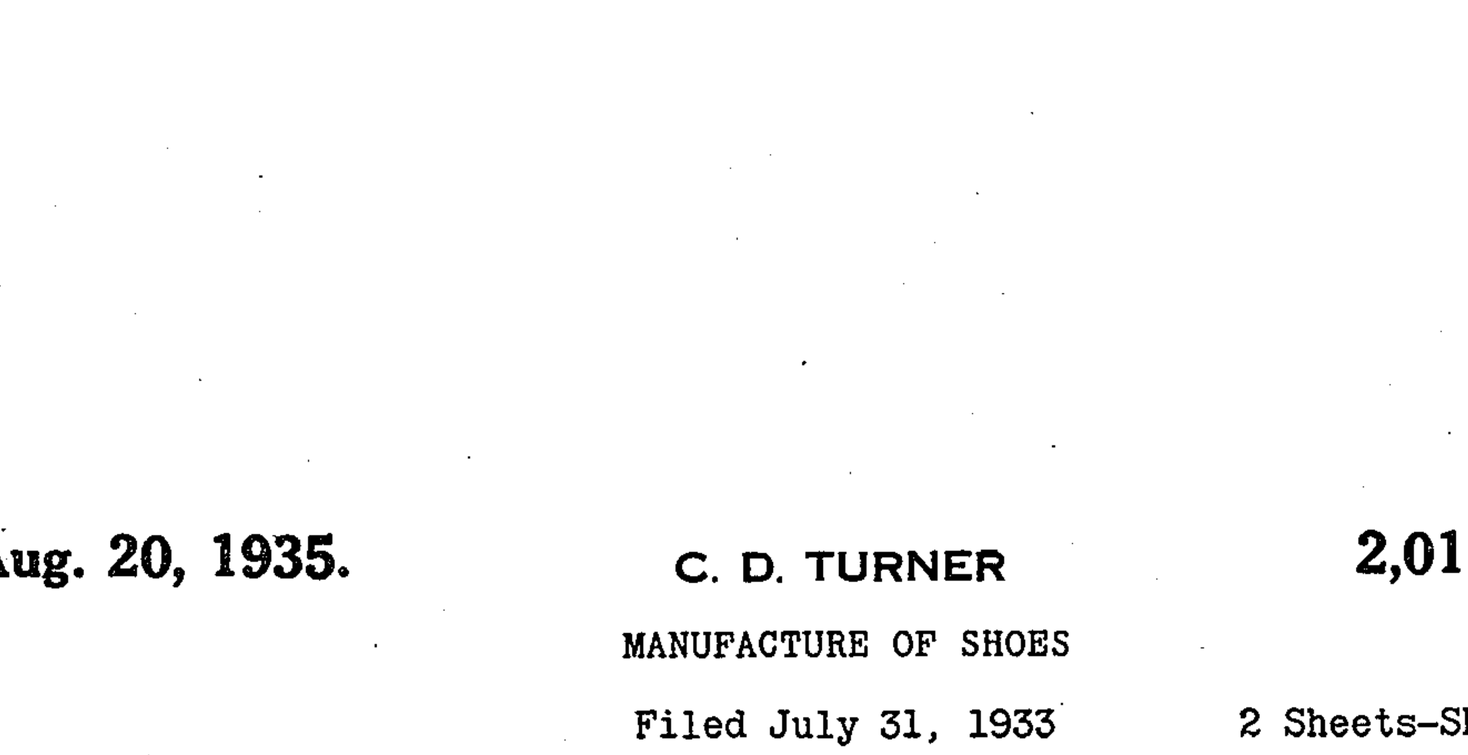

Fig. 1.

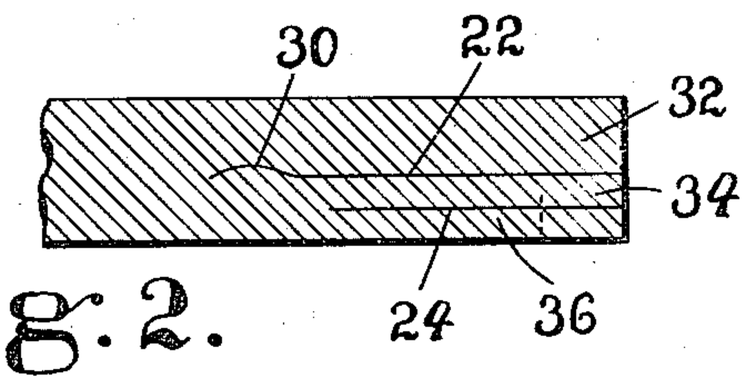

Fig. 2.

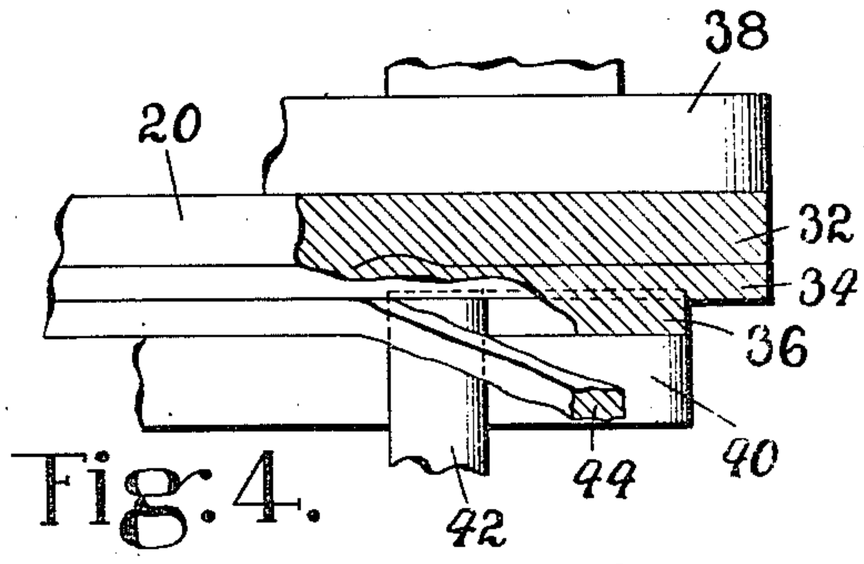

Fig. 4.

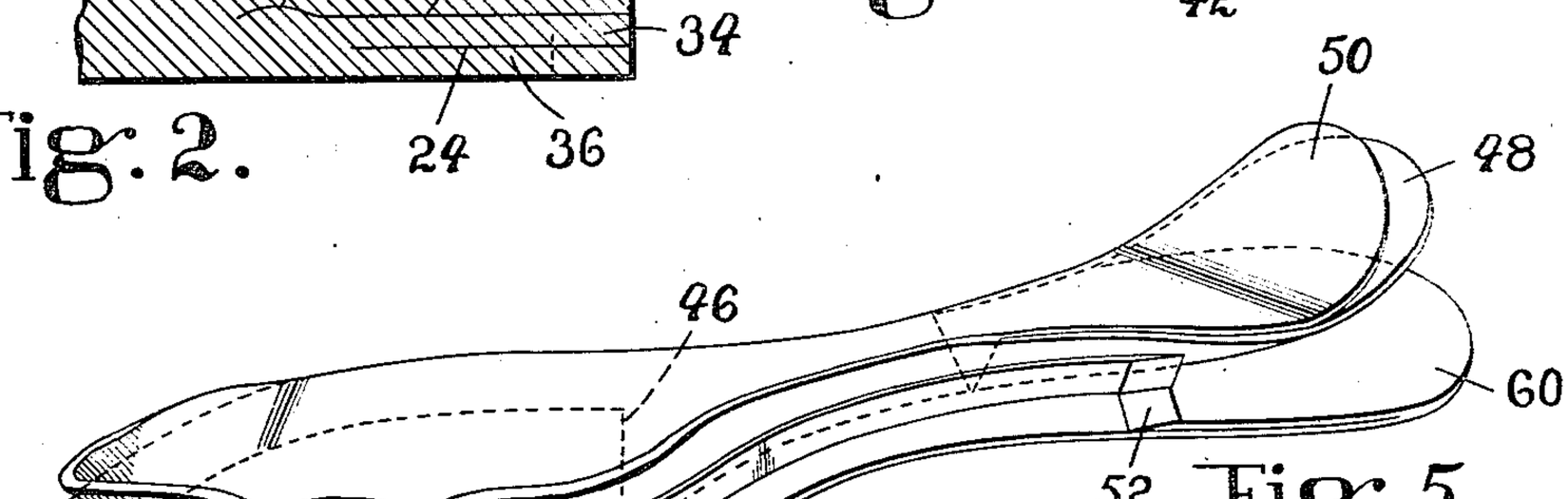

Fig. 5.

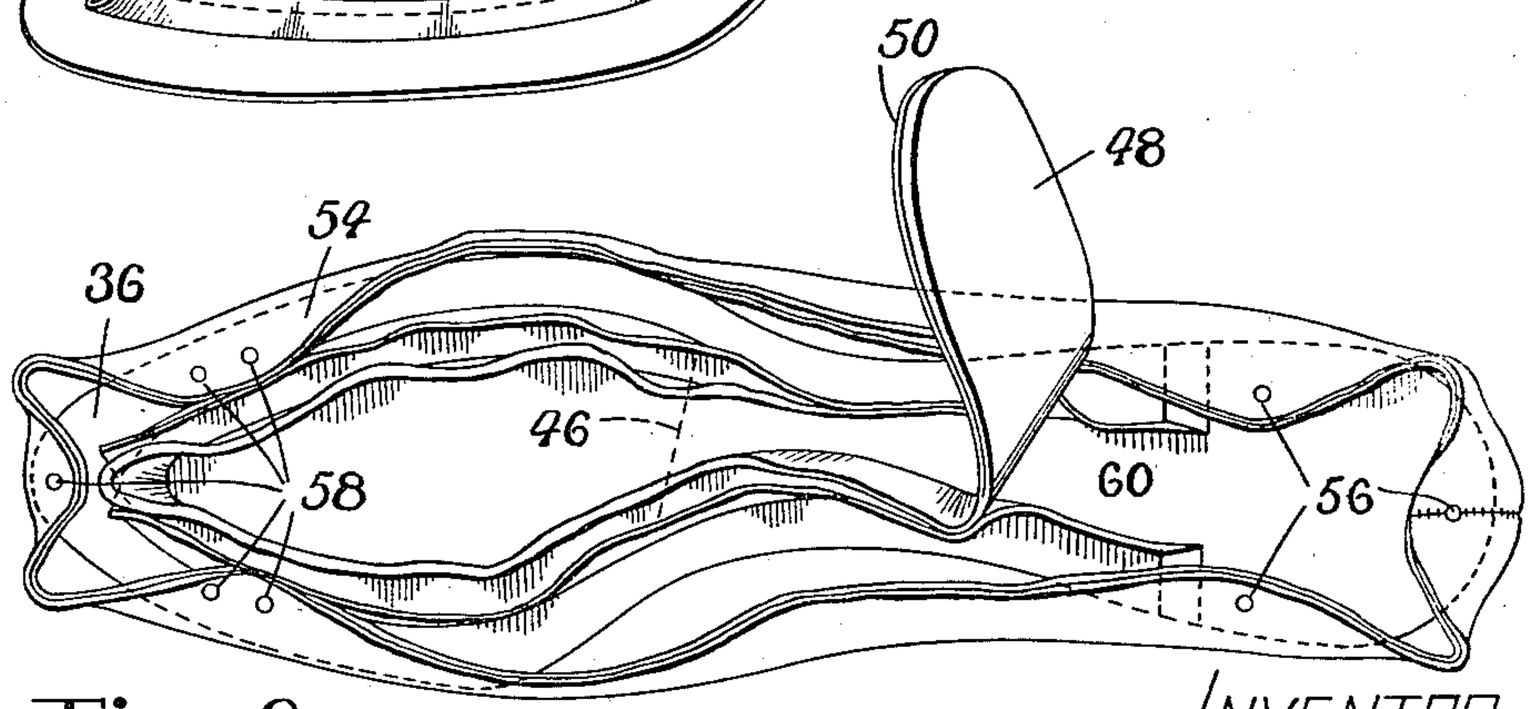

Fig. 6.

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MANUFACTURE OF SHOES

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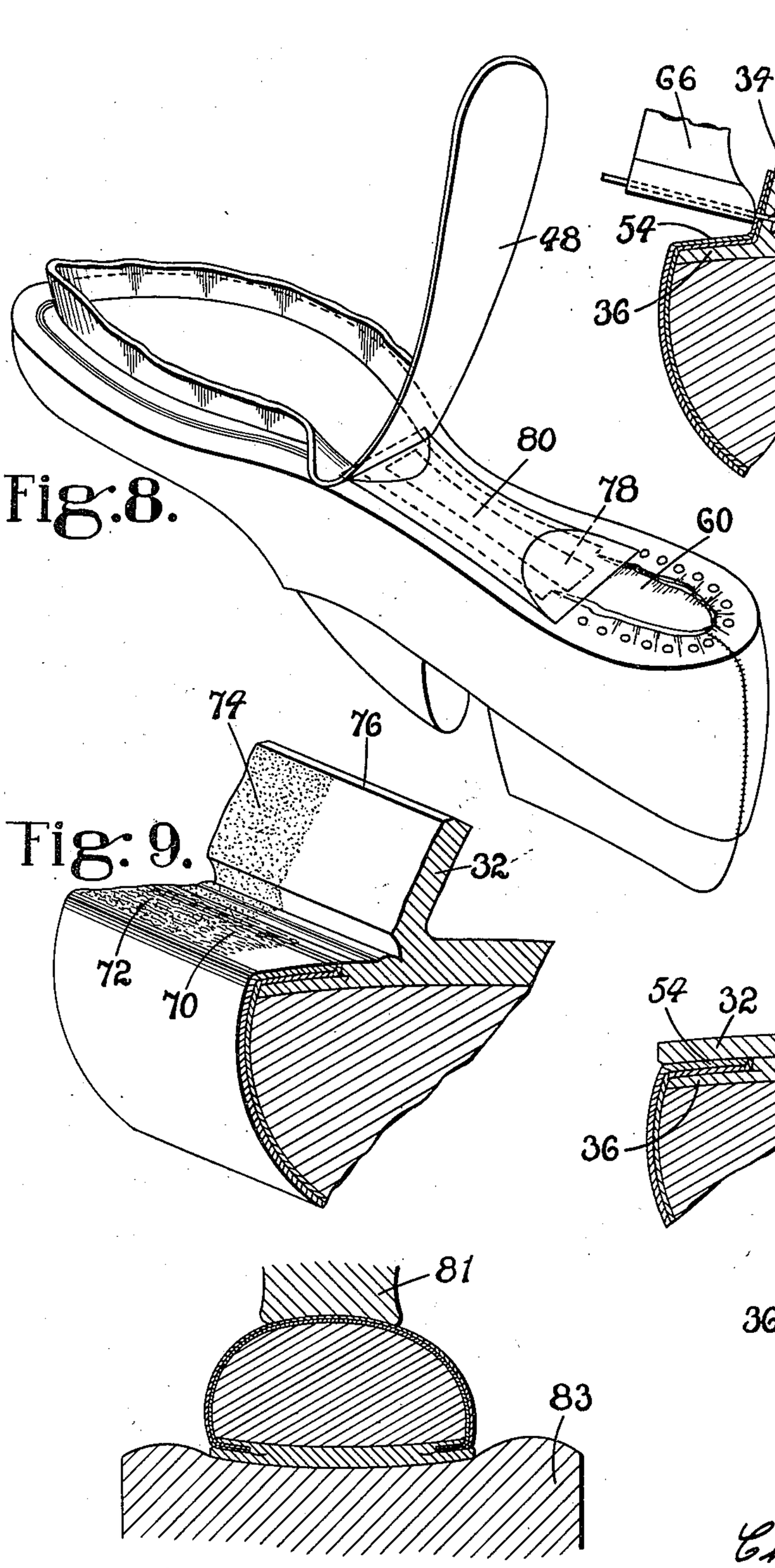

Fig. 8.

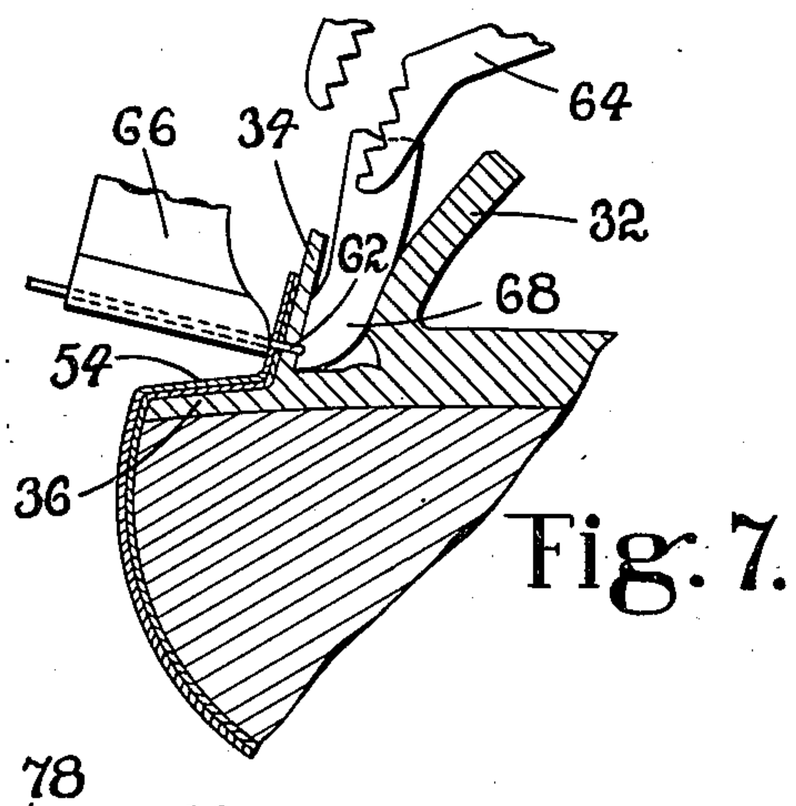

Fig. 7.

Fig. 9.

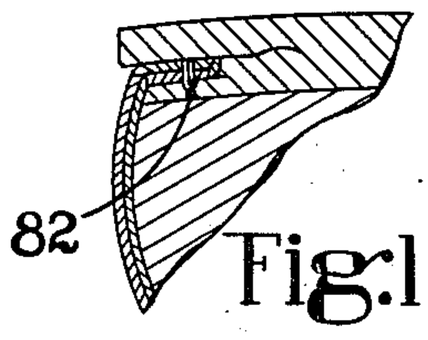

Fig. 12.

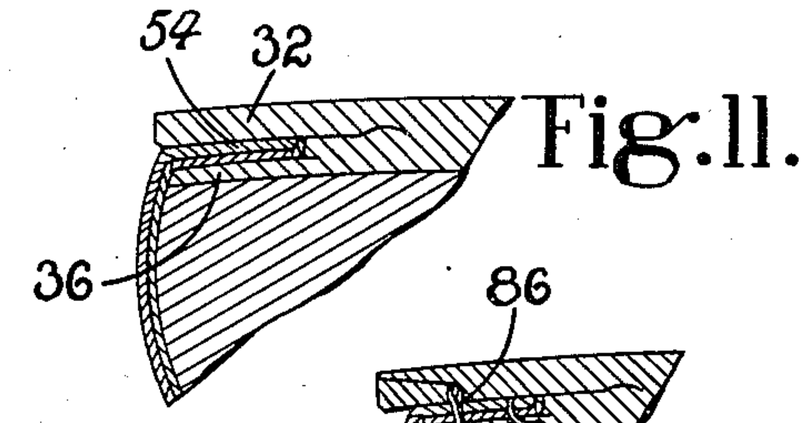

Fig. 11.

Fig. 10.

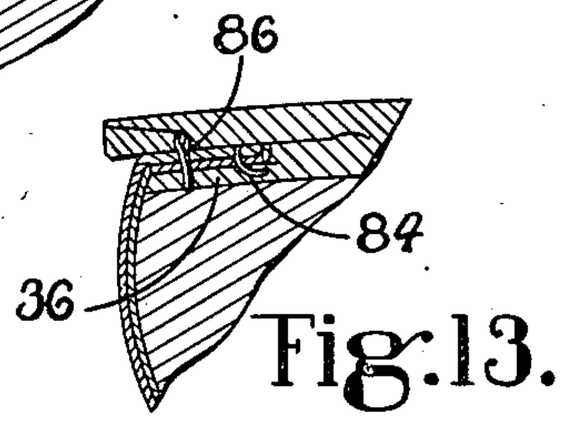

Fig. 13.

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Patented Aug. 20, 1935

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UNITED STATES PATENT OFFICE

2,011,696

MANUFACTURE OF SHOES

Chester D. Turner, Manchester, N. H., assignor to United Shoe Machinery Corporation, Paterson, N. J., a corporation of New Jersey

Application July 31, 1933, Serial No. 682,949

11 Claims. (Cl. 12—142)

This invention relates to the manufacture of shoes, particularly to shoe soles and to methods for use in the manufacture of shoes with the aid of such soles.

Various attempts have been made, as the prior art shows, to manufacture single-sole unturned shoes by splitting or grooving the sole from its edge face inwardly, working the upper into the slit thus formed, and securing together the flaps formed by splitting the sole with the upper between them. This method of shoemaking, however, has failed to attain commercial importance because adequate methods of lasting the upper and securing it in lasted position in the slit of the sole were wanting.

Objects of this invention are to facilitate the manufacture of single-sole unturned shoes and to provide a commercially practicable method of working the uppers of such shoes into lasted position and securing them to the insoles. The method, as illustrated herein, comprises channeling in from the edge face of the sole in two planes and to different distances, thus forming a sole having at its edge three flaps. The outer flap may be styled the sole flap, the inner one the insole flap, and the intermediate one the upper-attaching flap. Since an insole should be smaller than its corresponding outsole, the insole flap is preferably reduced in width an amount corresponding to that desired for the projection of the outsole beyond the insole flap. Preferably the thickness of the outsole flap is about half the entire thickness of the sole and at its inner portion the outsole flap is preferably made thinner so that it will readily bend into an upright position substantially perpendicular to the plane of the body portion of the sole. The thickness of the intermediate flap preferably corresponds substantially to the thickness of the upper materials. This flap also is bent into a position substantially perpendicular to the body of the sole and, by reason of the fact that the slit between it and the insole flap is not so deep as the slit between it and the outsole flap, the upturned edge of the upper-attaching flap will be spaced outwardly from the upturned outsole flap to permit the insertion between them of an operating instrumentality of a lasting machine, for example the anvil of a staple lasting machine.

While the fitting of the sole as described may extend all around the sole or from the breast line around the forepart to the breast line again, it is desirable, particularly in narrow shank shoes, completely to split the sole from the heel end to the ball line by extending the outer or outsole-flap-forming slit clear across the sole. The sole thus fitted is assembled with an upper upon a last in the usual manner and the shoe pulled over, the assembling and pulling-over tacks being driven through the upper and the insole flap. The sides of the upper are then lasted, cement being applied to the insole flap, to the lining, and between the lining and the upper. Successive portions of the upper are then tensioned about the last and secured progressively to the upturned upper-attaching flap by metallic fastenings, preferably staples, driven through the upper and the upper-attaching flap close to but slightly above the plane of the sole-flap-forming slit. After the cement has set permanently to hold the upper in lasted position, the upper-attaching flap and the portion of the upper secured to it, including the staples, are trimmed away, substantially in the plane of the outer face of the overlasted portion of the upper which, since the thickness of the upper-attaching flap corresponds to the thickness of the upper materials, will be also in the plane of the outsole-flap-forming slit. The outer face of the overlasted margin of the upper is roughened, the roughening operation preferably extending to include the surface from which the inner portion of the outsole flap was split, and these surfaces, as well as the outer surface of the outsole flap, are coated with cement, for example pyroxylin cement, by which the outsole flap may be secured permanently to the overlasted upper without the use of other fastenings. After the cement has dried, it will be activated by the application thereto of solvent and the shoe placed in the cement sole attaching press, by which the outsole flap will be pressed at its outer portion firmly against the overlasted margin of the upper and at its inner portion against the surface from which it is split.

Furthermore, it may be desirable, particularly at the shank portion of the shoe, to dispense with the upper-attaching flap and to secure the upper in overlasted position by means of curved staples which penetrate the upper and are anchored in the substance of the insole flap without penetrating its inner surface.

These and other features of the sole and aspects of the method will appear more fully from the following detailed description when read in connection with the accompanying drawings and will be pointed out in the appended claims.

In the drawings,

Fig. 1 is a perspective view of a rounded sole ready for the sole-fitting operation;

Fig. 2 is an enlarged, fragmentary, sectional

view of the marginal portion of the sole after the flap-forming slits are made;

Fig. 3 is a perspective view of the knife employed for making the outsole-flap-forming slit;

Fig. 4 is an enlarged, fragmentary view, partly in section, illustrating the operation of rounding the insole flap to reduce its size;

Fig. 5 is a perspective view illustrating the fitted sole after the outsole flap and the upper-attaching flap have been turned upwardly;

Fig. 6 is a plan view of the bottom of a shoe after the assembling and pulling-over operations have been performed;

Fig. 7 is an enlarged view in elevation illustrating the upper-securing instrumentalities and showing a shoe in section;

Fig. 8 is a perspective view of the shoe after the upper has been trimmed, the heel-seat lasted and the shank stiffener placed in position;

Fig. 9 is an enlarged, fragmentary view in perspective and partly in section showing the upper lasted and trimmed, the roughening operation performed and the cement partly applied;

Fig. 10 is a diagrammatic sectional view showing the shoe under pressure of a yielding pad to press the sole flap against the upper;

Fig. 11 is an enlarged, sectional view of the forepart of the shoe after the outsole-flap-cementing operation;

Fig. 12 illustrates a modification in which the upper is attached to the insole flap by means of through-and-through lockstitches; and

Fig. 13 illustrates a modification in which the upper is secured in lasted position by means of curved staples and the outsole flap, upper and insole flap are secured together by through-and-through lockstitches.

In the manufacture of single-sole unturned shoes in accordance with the present method, a rounded outsole **20**, shaped, as illustrated in Fig. 1, almost to its final form, is split in from its edge face in the manner illustrated in Fig. 2 by two slits **22**, **24** which may be parallel to the tread face of the sole. The slit **22**, which preferably is located substantially midway of the thickness of the sole, extends farther inwardly of the sole than the slit **24** and is preferably formed by means of a knife **26**, such as illustrated in Fig. 3, which has in its inner end a gouge-shaped portion **28** which forms at the inner edge of the slit **22** a curved portion **30** which extends first toward the outer or tread face of the sole and then back to the plane of the major portion of the slit **22**. This forms at the base of an outsole flap **32** a thinner portion which facilitates the bending of the flap **32** into an upright position. The slit **24** is preferably formed by a straight knife and produces on one side of the slit an upper-attaching flap **34** and on the other side an insole flap **36**. The insole flap **36** should be reduced in width in order that the proper projection of the outsole flap **32** may be provided. This is preferably performed on a sole-rounding machine, as illustrated in Fig. 4, where the outsole pattern **38** previously used in rounding the sole engages the tread surface of the sole **20** and an insole pattern **40** engages the inner face of the insole flap **36**. By lining up the edge of the sole with the edge of the pattern previously used in rounding the sole and placing it in the sole rounding machine with the corresponding insole pattern, the edge of the insole pattern will be properly located with respect to the outer edge of the sole so that a rounding knife **42**, guided by the insole pattern **40**, will trim away the proper amount from the marginal portion of the insole flap **36**. Preferably the knife **42** is adjusted to cut into but not through the upper-attaching flap **34**. The chip removed from the insole flap **36** by the knife **42** is indicated at **44**.

Preferably, as indicated in Fig. 5, the heel and shank portion of the sole are split from the heel end to the line **46** substantially at the ball line in a plane corresponding to the plane of the outer portion of the slit **22**. Also, the outsole-forming portion **48** may be split, if desired, to form a heel-breast-covering flap **50**. At the breast line the upper-attaching flap **34** may be cut through on a bevel, as illustrated at **52** in Fig. 5, to permit the heel-seat portion of the flap **34** to remain flat when the remainder of the flap is turned up.

A sole fitted in the manner described and as illustrated in Fig. 5 is assembled with an upper **54** upon a last and the upper is pulled over in the usual manner, as illustrated in Fig. 6, the assembling tacks being indicated at **56** and the pulling-over tacks at **58**, the pulling-over tacks passing through the upper and the insole flap **36** and the assembling tacks passing through the upper and the insole-forming portion **60**. The insole portion **60** and the outsole portion **48** are, of course, formed by the split extending from the heel end of the sole to the ball line **46** midway of the thickness of the sole. A cement, such for example as water-dispersed rubber cement commonly known as latex adhesive, is applied at the sides of the shoe to the outer face of the insole flap **36**, to the inner face of the lining, and to the adjacent faces of the layers of upper material. The upper **54** is then worked into lasted position and secured by suitable fastenings, such as metallic staples **62**, to the upstanding upper-attaching flap **34**, as illustrated in Fig. 7, this operation being carried on progressively from the tip line to the breast line at each side of the shoe. The lasting machine disclosed in Letters Patent of the United States No. 1,796,451, granted March 17, 1931, on application of George Goddu, is admirably suited for performing the side lasting operation on the shoe. The upper-tensioning grippers of such a machine are indicated at **64** (Fig. 7), the staple nozzle at **66**, and the anvil at **68**. Preferably the anvil **68** for this work is made to extend more nearly perpendicularly to the sole of the shoe than is illustrated in said Letters Patent in order to lessen the pressure of the outsole flap **32** against it. The toe and heel portions of the shoe may be lasted in any usual or suitable manner, the toe portion being preferably cement-lasted on a bed lasting machine and the heel end lasted on a heel-seat lasting machine or a bed lasting machine.

After the cement has set the flap **34** and the portion of the upper attached thereto, including the staples, are trimmed off flush with the overlasted portion of the upper. This leaves a surface on the shoe substantially in the plane of the slit **22** to which the outsole flap **32** may be secured.

The overlasted portion of the upper is next roughened, as indicated at **70** (Fig. 9), this roughening extending preferably to the base or root of the outsole flap **32**. Usually no roughening of the split surface of the outsole flap will be required. Cement, such as pyroxylin cement, is applied to the overlasted portion of the upper, as indicated at **72**, the cement preferably extending over the insole portion to the root of the flap **32**. Cement will also be applied to the split surface of the outsole flap **32**, as indicated at **74**, and after the cement has dried the edge of the corner **76**

of the outsole flap **32** may be chamfered so that there will be no cement thereon which will extend beyond the upper when the flap is laid in position against the upper. A shank piece **80**, comprising a steel shank stiffener **78** secured to a piece of leather or similar material having its ends and sides chamfered off to a thin edge, is secured to the shank portion of the shoe bottom, the side edges of the shank piece preferably extending outwardly just beyond the inner edge of the overlasted upper. A shoe with such a shank piece in place is illustrated in Fig. 8. At the shank portion of the shoe bottom cement will be applied to the roughened overlasted margin of the upper, to the shank piece **80**, and to the inner face of the outsole portion **48** as far back as the breast line.

After the cement has dried, all the cemented surfaces will be activated with a suitable solvent, and the shoe, with the flap **32** turned down and the outsole portion laid against the shank piece and heel-seat, will be placed in a cement sole attaching machine, as illustrated in Fig. 10, and pressure applied to conform all portions of the single sole to the bottom of the last and cause the cemented surfaces firmly and permanently to adhere. A section of the forepart of a shoe thus completed is shown in Fig. 11.

Under some conditions it may be desirable to omit the cement during the lasting operation and after the upper has been lasted by staples to the flap **34** to secure the upper permanently in lasted position by means of a lockstitch seam **82** as shown in Fig. 12. The insertion of such a seam, of course, requires the removal of the last, which will be again inserted, the upper trimmed, and the outsole flap **32** cemented in position as previously described. It is also contemplated that at the shank portion of the shoe the flap **34** may be omitted or cut off and the upper worked into lasted position and secured by curved staples **83** to the insole flap **36**, as illustrated in Fig. 13, for example, by means of a machine such as that disclosed in Letters Patent of the United States No. 1,815,297, granted July 21, 1931, upon an application of George Goddu. In this construction, or in the construction illustrated in Fig. 12, the outsole flap **32** may, if desired, be secured by through-and-through stitches **86**, preferably lockstitches, the stitches being preferably concealed by a suitable channel in the outsole flap **32**. Of course either the seam **82** or the seam **86** may be employed in addition to cement for securing the parts together if desired. The outsole portion **48** at the heel end may be fitted to receive a wood heel in the usual manner and the breast flap **50** secured to the breast of the heel, the necessary trimming and finishing operations being performed in the usual manner.

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

1. That improvement in methods for use in the manufacture of shoes which consists in channeling a sole from its edge face inwardly in two planes separated from each other a distance substantially equal to the thickness of the upper materials, the channel nearest the tread face of the sole extending farther inwardly than the other channel, assembling the sole and an upper upon a last, working the upper into lasted position over the inner flap of the insole, and securing the outer flap in contact with the outer surface of the overlasted upper.

2. That improvement in methods for use in the manufacture of shoes which consists in forming the margin of a sole into three flaps, turning the two outer flaps into upright positions, assembling the sole and an upper upon a last, lasting the margin of the upper over the inner flap and securing it by fastenings to the middle flap, trimming out the excess of material of the upper and middle flap, and securing the outer flap in contact with the overlasted upper.

3. That improvement in methods for use in the manufacture of shoes which consists in forming the margin of a sole into three flaps, assembling the sole and an upper upon a last, lasting the margins of the upper over the inner flap of the sole and securing it by staples to the middle flap, trimming out the excess of material of the upper and middle flap, and securing the outer flap in contact with the overlasted upper.

4. That improvement in methods for use in the manufacture of shoes which consists in forming the margin of a sole into three flaps, turning the two outer flaps into upright positions, assembling the sole and an upper upon a last, lasting the margins of the upper over the inner flap of the sole and securing it by staples to the middle flap, trimming out the excess of material of the upper and middle flap, and securing the outer flap in contact with the overlasted upper.

5. That improvement in methods for use in the manufacture of shoes which consists in forming the margin of a sole into three flaps, turning the two outer flaps into upright positions, assembling the sole and an upper upon a last, lasting the margin of the upper with cement over an inner flap of the insole and securing it by fastenings to the middle flap, after the cement has set trimming out the excess of material of the upper and middle flap including the fastenings, and securing the outer flap in contact with the overlasted upper.

6. That improvement in methods for use in the manufacture of shoes which consists in channeling inwardly from the edge face of the sole in two planes separated by an amount equal to the thickness of the upper materials thus forming three flaps at the sole edge, assembling the sole and an upper upon a last, lasting the upper over upon the flap and securing it by staples to the middle flap, after the cement has set trimming off the middle flap and the excess of upper material, and permanently attaching the outer flap in contact with the overlasted upper.

7. That improvement in methods for use in the manufacture of shoes which consists in channeling inwardly from the edge face of the sole in two planes separated by an amount equal to the thickness of the upper materials thus forming three flaps at the sole edge, assembling the sole and an upper upon a last, applying cement to the opposed surfaces of the upper materials and to the margin of the inner flap, lasting the upper over upon the flap and securing it by metallic fastenings to the middle flap, after the cement has set trimming off the middle flap and the portion of upper secured thereto including the metallic fastenings, roughening the upper, and permanently cement-attaching the outer flap in contact with the overlasted upper.

8. That improvement in methods for use in the manufacture of shoes which consists in channeling inwardly from the edge face of the sole in two planes thus forming three flaps at the sole edge, assembling the sole and an upper upon a last, applying cement to the opposed surfaces of the upper materials and to the margin of the

inner flap, lasting the upper over upon the inner flap and securing it by staples to the middle flap, after the cement has set trimming off the middle flap and the portion of upper secured thereto including the staples, roughening the upper, and permanently cement-attaching the outer flap in contact with the overlasted upper.

9. That improvement in methods for use in the manufacture of shoes which consists in channeling inwardly from the edge face of the sole in two planes separated by an amount equal to the thickness of the upper materials, the outer channel being deeper than the inner channel, thus forming three flaps at the sole edge, the outer flap being wider than the middle flap, assembling the sole and an upper upon a last, applying cement to the opposed surfaces of the upper materials and to the margin of the inner flap, lasting the upper over upon the flap and securing it by staples to the middle flap, after the cement has set trimming off the middle flap and the portion of upper secured thereto including the staples, roughening the upper, and permanently cement-attaching the outer flap partly in contact with the overlasted upper and partly in contact with the surface from which the outer flap was cut.

10. A sole for shoes having slits extending inwardly from its edge face different distances, one flap thus formed being utilized as an outsole, another as an insole and another in securing the upper in lasted position, the slit between the outsole flap and the upper-attaching flap being the deeper and extending at its inner portion toward the outer face of the sole.

11. A sole for shoes having slits extending inwardly from its edge face two different distances, the outer flap thus formed being utilized as an outsole, the inner as an insole and the middle flap as a lip to which the upper is secured in lasted position, the outer flap being thinner near its base to facilitate its being bent into an upright position to permit access to the upper-securing lip.

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