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W. D. THOMAS

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MACHINE FOR SHAPING SHOES

Filed Dec. 6, 1929

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Fig. 4.

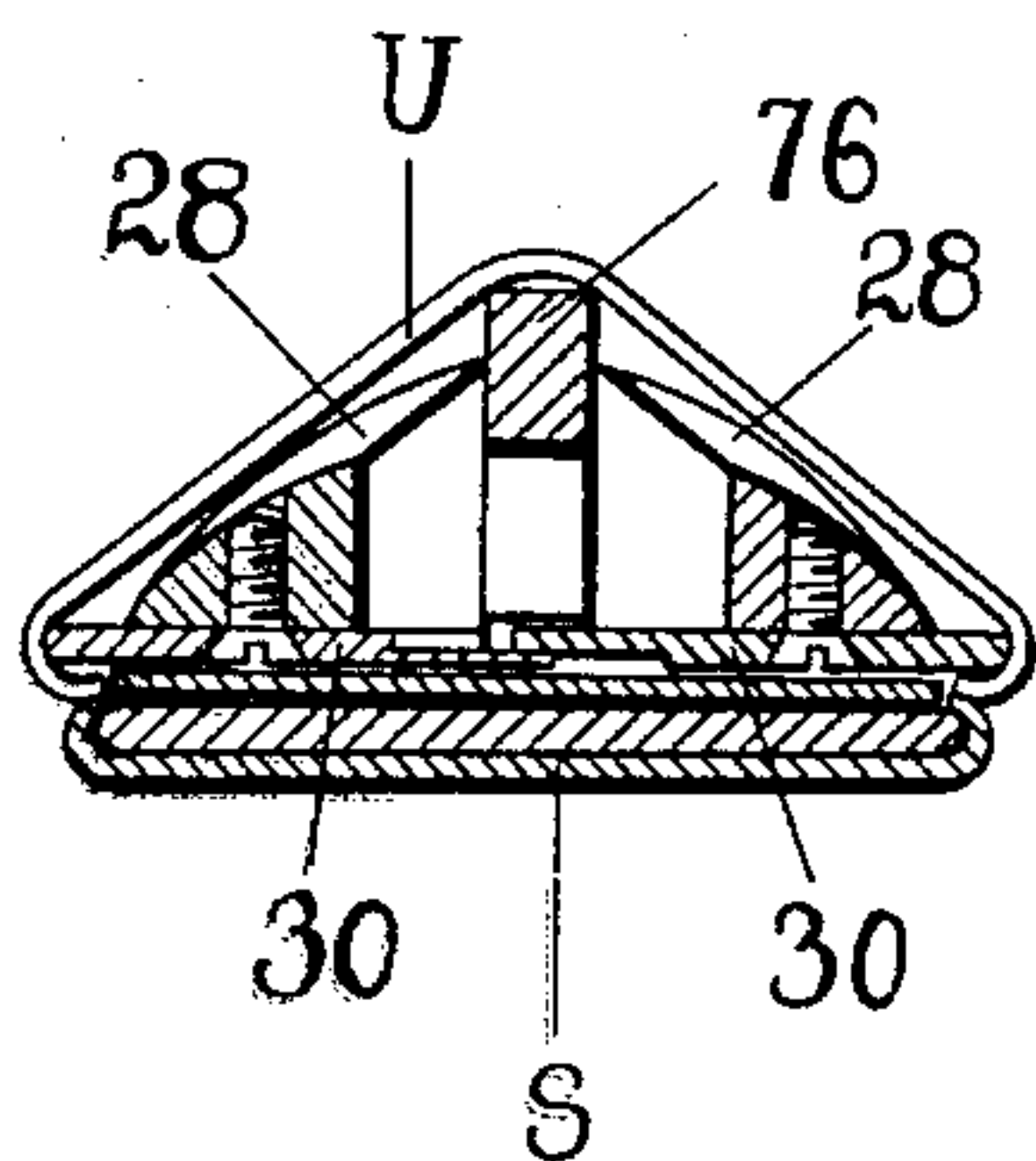
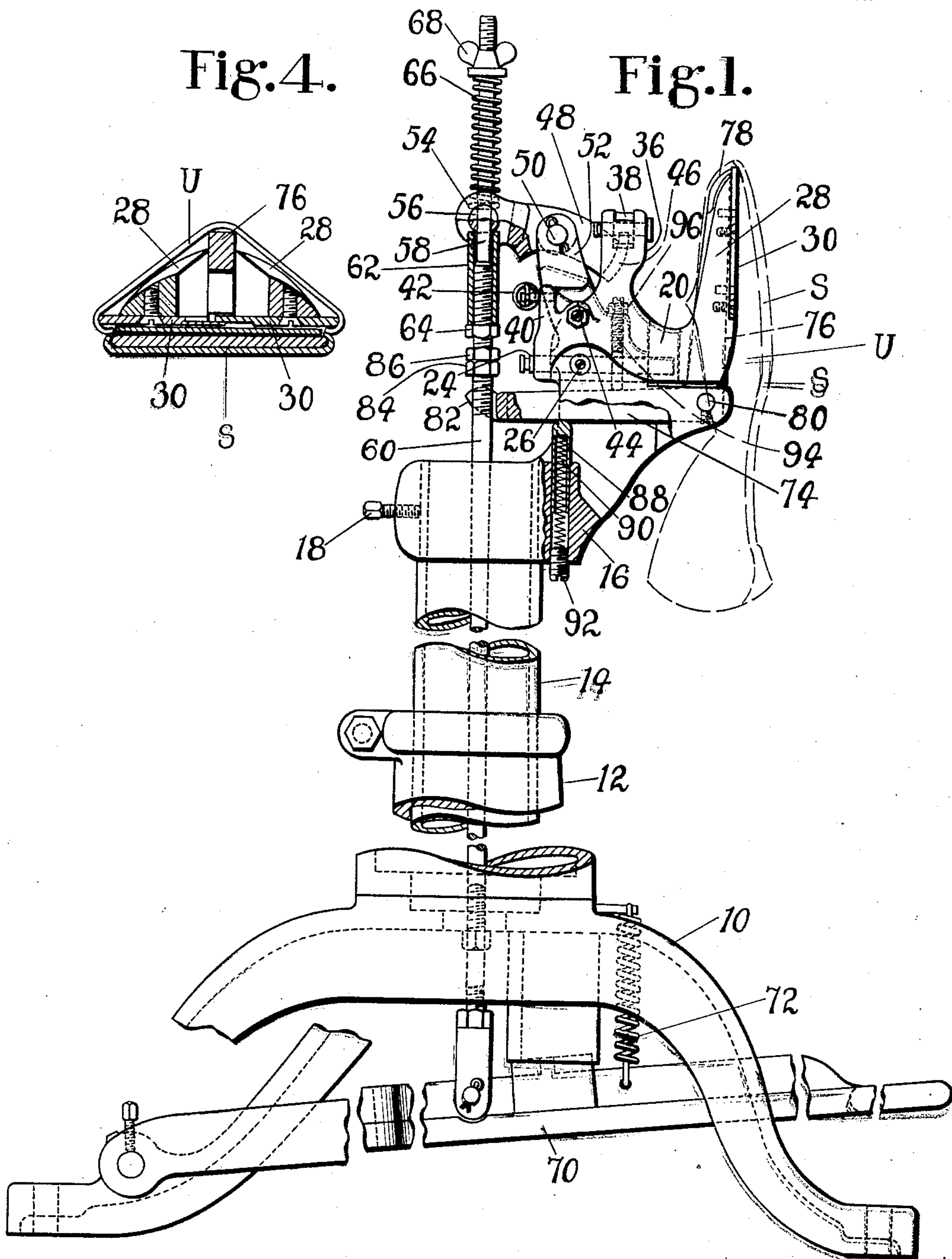


Fig. 1.



INVENTOR

William D. Thomas  
By his Attorney,  
Nelson H. Howard

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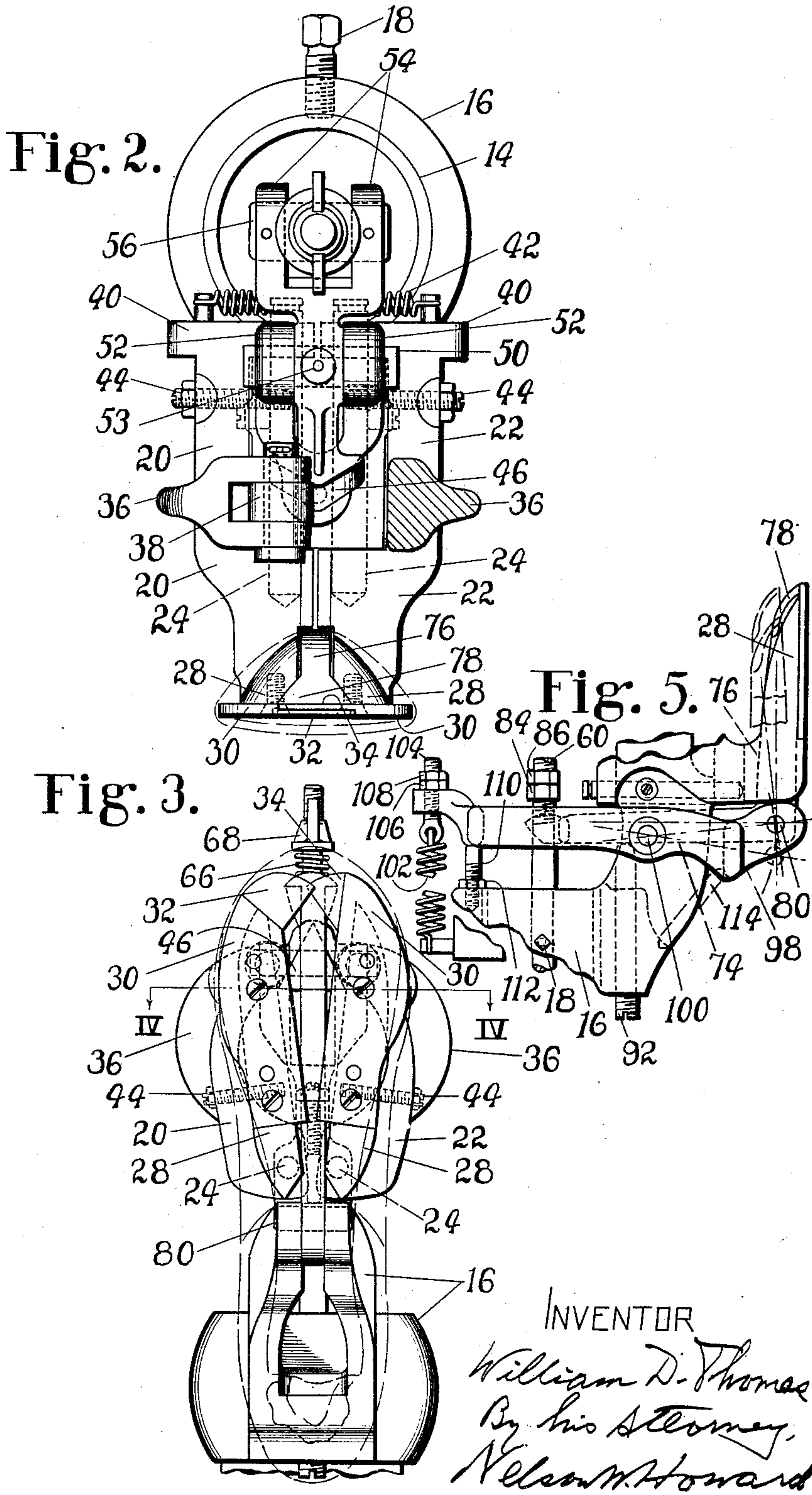
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# MACHINE FOR SHAPING SHOES

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## UNITED STATES PATENT OFFICE

WILLIAM D. THOMAS, OF LYNNFIELD, MASSACHUSETTS, ASSIGNOR TO UNITED SHOE MACHINERY CORPORATION, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY

## MACHINE FOR SHAPING SHOES

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This invention relates to machines for shaping shoes and is herein illustrated as embodied in a machine for shaping the toe portion of a turn shoe after it has been turned.

5 The illustrated machine may be used for shaping the toe portion of a special type of turn shoe known as a "comfort slipper", and the invention will be set forth in relation to this particular use, although the utility of the invention is not limited to operations upon comfort slippers.

10 In the manufacture of comfort slippers, the upper, wrong-side out, is sewed through-and-through to the sole and then turned right-side out. The toe of a shoe thus made is flat and shapeless. An object of the present invention is to provide a machine for imparting shape and fullness to the toe portion of a shoe.

15 In accordance with one feature of the invention, means are provided which are expansible within a shoe to stretch the shoe both widthwise and heightwise upon continuous movement in a single direction of an operating member, the widthwise expansion being preferably initiated before the heightwise expansion in order to maintain the sole of the shoe flat. If the heightwise expansion were to be initiated first, or even simultaneously with the initiation of the widthwise movement, the effect might be to tend to draw the edge portions of the flexible sole upwardly around the expansible means. The illustrated expansible means comprises a pair of relatively thin bladelike members constructed and arranged for edgewise engagement with the interior of the shoe. These two members are designed to present flat surfaces to the sole of the shoe and to bear with edgewise pressure against the interior of the shoe as they are expanded in a widthwise direction. Expansible members of the character above described may be received within a shoe without bulging the shoe in a heightwise direction and without, therefore, tending to pull the edges of the flexible sole upwardly around the members.

20 In accordance with a further feature of the invention, the illustrated expanding members comprise a pair of U-shaped levers, the two arms of each lever being constructed and ar-

25 ranged to extend within and outside respectively of the shoe, the outside arms serving to render the expanding members engageable for operation at a point outside of the shoe. An advantage of this construction resides in the fact that the portions of the expanding members within the shoe do not need to be recessed or otherwise weakened to provide room for an operating means. A further advantage resides in the fact that the freedom of space afforded outside of the shoe permits the engaging portions of the operating means and the expanding members to be designed in such a manner as to secure the greatest mechanical advantage and also to reduce friction.

30 The invention further consists in various features of construction and combinations and arrangements of parts herein shown and claimed, the advantages of which will be apparent to those skilled in the art from the foregoing description, reference being had to the accompanying drawings, in which,

35 Fig. 1 is a side elevation of a machine embodying the invention;

40 Fig. 2 is an enlarged plan view of the operative instrumentalities of the machine shown in Fig. 1;

45 Fig. 3 is a front elevation of the parts shown in Fig. 2;

50 Fig. 4 is a cross-sectional view taken on the line IV—IV of Fig. 3; and

55 Fig. 5 is a fragmentary side elevation showing a modification of certain mechanism illustrated in the foregoing figures.

60 The machine is provided with a suitable base 10 having an integral tubular standard 12, a tubular upright member 14 which is clamped in the standard 12 and which, in effect, constitutes an extension thereof, and a head 16 which carries the operative instrumentalities of the machine and which is secured by means of a set screw 18 to the top of the member 14.

65 For stretching the shoe in a widthwise direction a pair of members 20 and 22 are provided. The members 20 and 22 are journaled respectively upon pivot pins 24, the pivot pins 24 being parallel to each other and horizontal and each of them being secured



at its central portion by a set screw 26 to the head 16 which is bored to receive the pins 24. The members 20 and 22 are yoke-shaped so as to bear upon each of the ends of their respective pins 24 while straddling the central portion thereof. Each of the members 20 and 22 is provided with an upstanding arm 28 adapted to enter the forepart of the shoe to be treated. Each of the arms 28 has secured thereupon a relatively thin blade-like flat plate 30. The plates 30 extend outwardly beyond their respective arms 28, so that the plates 30 may enter into edgewise engagement over relatively narrow areas with the interior of the shoe upper while the flat bottom surfaces of the plates 30 are presented to the sole portion of the shoe. The plates 30 are formed so that their adjacent edges may overlap each other when the members 20 and 22 are in unexpanded position, and the plate 30 on the member 20 is provided with an extension 32 at the toe end to overlap a similar extension 34 on the toe end of the similar plate 30 on the member 22 so that even when the members 20 and 22 are in expanded position the extension 32 will overlap the extension 34. Each of the members 20 and 22 has formed thereon an upstanding arm 36 which carries a roller 38, the axes of the rollers 38 being parallel to the axes of the pivot pins 24. At the rear end of each of the members 20 and 22 is an upstanding arm 40, and connecting the arms 40 is a tension spring 42 which tends normally to hold the members 20 and 22 in unexpanded position as determined by a pair of adjustable stop screws 44 carried by the respective members 20 and 22.

The members 20 and 22 are operated to effect a widthwise movement of separation between the upstanding arms 28 by means of a wedge-shaped cam 46 which enters between the rolls 38 and forces the arms 36 outwardly. The cam 46 is carried upon the end of a lever 48 fulcrumed upon a pin 50 which is carried in a pair of upstanding ears 52 formed on the head 16. An oil hole 53 (Fig. 2) provides for lubrication of the lever 48 on the pin 50. The opposite end 54 of the lever 48 is bifurcated and carries a shaft 56 which is bored transversely to receive the reduced upper portion 58 of an operating rod 60. A sleeve 62 which is adjustably supported on the rod 60 by means of a nut 64 supports the shaft 56 against the pressure of a compression spring 66 surrounding the upper portion 58 of the shaft 60. The opposite end of the spring 66 abuts a nut 68 which is threaded upon the end of the reduced upper portion 58 of the rod 60 and which affords a means of adjusting the stress of the spring 66. The lower end of the operating rod 60 is secured to a treadle lever 70 which is normally maintained in raised position by a spring 72.

A heightwise stretching member is formed in the shape of a bell crank having a horizontal arm 74 and an upstanding arm 76 which is adapted to enter the forepart of the shoe to be treated. The upper or toe end 78 of the arm 76 is widened and also rounded to accommodate the general form of the toe of a shoe. The bell crank comprising the arms 74 and 76 is fulcrumed upon a pivot pin 80 secured in the head 16. The free end 82 of the arm 74 is bifurcated and straddles the rod 60. A nut 84 threaded upon the rod 60 and provided with a lock nut 86 engages the bifurcated end 82 of the heightwise stretching member to operate the same when the treadle 70 is depressed. A plunger 88, having a spring 90 the stress of which may be adjusted by a screw 92, is guided in the head 16 and exerts an upright thrust upon the lower surface of the arm 74 normally to maintain the heightwise stretching member in unexpanded position. A downwardly extending stop screw 94, which is threaded in the head 16, engages the upper surface of the arm 74 to limit the closing movement and thereby determines the unexpanded position of the heightwise stretching member. A lock nut 96 holds a stop screw 94 in adjusted position.

In the operation of the machine a shoe is placed in upright position upon the arms 28 and the arm 76, which extend within the forepart of the shoe, and with the plates 30 facing toward the sole of the shoe. In Figs. 1 and 4 is shown a comfort slipper having a thick, padded sole S and an upper U which has been turned and which is now to be shaped by the machine. The slipper having been placed as above described and as illustrated in Fig. 1 and Fig. 4, the treadle 70 is depressed, thereby causing the spring 66 to act upon the lever 48 and raise the cam 46 between the rollers 38. It will be noted that the arms 36 and 28, together with the body portions of the members 20 and 22, constitute U-shaped levers of which one arm 28 is adapted to extend within the forepart of the shoe and the other arm 36 is adapted to extend outside of the shoe and to afford a means for separating the arms 28 and expanding the plates 30. The raising of the cam 46 thus expands the widthwise stretching members 30 under the predetermined pressure of the spring 66. As the plates 30 expand, their outer edges exert pressure against the interior of the shoe upper, maintaining the sole taut and flat and imparting fullness to the upper. After the widthwise stretching of the slipper has thus been initiated the nut 84 engages the end 68 of the lever 74 and causes the arm 76 to move in a counterclockwise direction as viewed in Fig. 1, thereby causing a stretching of the forepart upper to produce additional fullness therein. The initiation of the movement of the heightwise stretching



arm 76 with respect to the amount of expansion of the widthwise stretching arms 28 can be varied by adjusting the nut 84 up or down on the rod 60. The nut 84 should be so adjusted with respect to the type or size of the slipper that the plates 30 will already have been expanded sufficiently to cause the distance between the outer edges of the plates 30 to exceed the width of the sole S, before beginning the movement of the arm 76. The sole of the slipper is thus held taut and flat by the bladelike plates 30, with the result that, when the arm 76 is urged against the upper U, the danger of drawing the edge portions of the flexible sole S up over the outer edges of the plates 30 is reduced to a minimum. It will be noted that, because of the positions of their respective pivots, the plates 30 and the arm 76 exert their stretching effects upon the toe portion of the slipper and that such stretching effects will be confined almost exclusively to the toe portion. While the operation of the illustrated machine has been described with particular reference to comfort slippers, the illustrated machine may be advantageously employed to conduct shaping operations upon other types of shoes.

In Fig. 5 is shown a modification of the machine whereby a wiping effect of the heightwise stretching member 76 may be obtained. In this modification, the pin 80, upon which is fulcrumed the bell crank comprising the arms 76 and 74, is not secured directly to the head 16 but to the outer end of a lever 98 which is fulcrumed at 100 upon the head 16. The inner end of the lever 98 is held down by means of a tension spring 102 secured to the head 16, the tension of the spring 102 being adjustable by means of a bolt 104 upon which are threaded a nut 106 and a lock nut 108. An adjustable stop 110 is threaded in the head 16 extending upwardly therefrom and engages the under surface of the lever 98 to limit the position thereof under influence of the spring 102 and thus to determine the normal position of the fulcrum pin 80. A lock nut 112 holds the stop screw 110 in adjustable position. The operation of this modified form of the machine is the same in all respects as has already been described except that when the downward pressure of the nut 84 on the arm 74 of the heightwise stretching member exceeds a certain amount and the arm 76 with the heightwise stretching member is prevented from further counterclockwise movement, as viewed in Fig. 5, by the shoe, the spring 102 will yield and permit the entire heightwise stretching member to move bodily, thereby causing the arm 76 to effect a wiping action upon the interior of the shoe. In case such wiping action is not desired, the outer end of lever 98 may be supported by a removable strut 114, and the operation of

this form of the machine will then be similar to that of the machine illustrated in Fig. 1.

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

1. In a machine for shaping shoes, means constructed and arranged to expand within a shoe to stretch the shoe both widthwise and heightwise, and means constructed and arranged upon continuous movement in a single direction to operate said stretching means to initiate the expansion thereof first in a widthwise direction and then in heightwise direction.

2. In a machine for shaping shoes, means constructed and arranged to expand within a shoe to stretch the shoe both widthwise and heightwise, means constructed and arranged upon a single movement to operate said stretching means to initiate the expansion thereof first in a widthwise direction and then in a heightwise direction, and means for adjusting said operating means to initiate the heightwise expansion of said stretching means after the widthwise expansion of said stretching has proceeded to a predetermined extent.

3. In a machine for shaping shoes, a pair of members constructed and arranged to expand within a shoe in a direction widthwise of the shoe to stretch the shoe, a third member constructed and arranged for relative movement with respect to the two first-mentioned members in a direction heightwise of the shoe to stretch the shoe upper, and operating means for said members constructed and arranged upon a single movement to initiate the expansion of the two first-mentioned members prior to the initiation of the relative heightwise movement of the third member.

4. In a machine for shaping shoes, a pair of relatively thin blade-like members adapted to enter into edgewise engagement with the interior of a shoe, said members being constructed and arranged for relative movement of expansion with respect to each other within the shoe to stretch the shoe.

5. In a machine for shaping shoes, a pair of relatively thin bladelike members constructed and arranged for edgewise engagement over relatively narrow areas with the interior of a shoe upper adjacent to the sole of the shoe and to present flat surfaces respectively to the sole, and means for expanding said members within the shoe widthwise of the shoe to stretch the shoe.

6. A machine for shaping shoes, comprising a pair of U-shaped levers each of which has a pair of arms adapted to extend respectively within and outside of the forepart of a shoe to be treated, each of said arms being connected by an intermediate portion adapted to extend outside of the shoe, pivotal supporting means for the intermediate por-



tions of said levers to provide for relative movement of separation between said arms which are adapted to extend within the forepart of the shoe to expand the forepart, and  
 5 operating means constructed and arranged to engage said arms which are adapted to extend outside of the shoe for causing said relative movement.

7. A machine for shaping shoes, comprising three levers each of which has a pair of arms adapted to extend respectively within and outside of a shoe, pivotal supporting means for said levers constructed and arranged to provide for movements of separation  
 10 between the inwardly extending arms of said levers to stretch the shoe in both a widthwise and a heightwise direction, and means movable in a predetermined path to operate all of said levers, the outwardly extending  
 15 arms of all of said levers being disposed in the path of movement of said operating means.

8. A machine for shaping shoes, comprising a pair of U-shaped levers each of which  
 25 has a pair of arms adapted to extend respectively within and outside of a shoe, pivotal supporting means for said levers to provide for relative movement of separation between the arms which are adapted to extend within  
 30 the shoe, said movement of separation serving to effect stretching of the shoe, a pivotally mounted bell-crank lever having an arm extending within the shoe and an arm extending outside of the shoe, the inwardly  
 35 extending arm of said bell crank co-operating with the inwardly extending arms of said U-shaped levers to effect additional stretching of the shoe, and means movable in a predetermined path to operate all of  
 40 said levers, the outwardly extending arms of all of said levers being disposed in the path of movement of said operating means.

9. In a machine for shaping shoes, means constructed and arranged to expand within  
 45 a shoe to stretch the shoe in a widthwise direction, means co-operating with said widthwise stretching means to stretch the shoe in a heightwise direction, and operating means for both of said stretching means comprising  
 50 a member constructed and arranged upon movement in one direction to engage said widthwise stretching means and then upon continued movement in the same direction to engage said heightwise stretching means.

10. In a machine for shaping shoes, means constructed and arranged to expand within  
 55 a shoe to stretch the shoe in a widthwise direction, means co-operating with said widthwise stretching means to stretch the shoe in a heightwise direction, an actuating rod, a member carried by said rod for operatively  
 60 engaging said widthwise expanding means, and a member mounted on said rod for adjustment with respect to the first-mentioned

member for operatively engaging said heightwise stretching means.

11. In a machine for shaping shoes, three members each adapted to extend partly within and partly outside of a shoe, two of said  
 70 members being constructed and arranged for relative movement of separation within the shoe to expand the shoe in a widthwise direction, and the third of said members being constructed and arranged for relative movement  
 75 within the shoe and with respect to said other two members in a heightwise direction, and operating means engaging said members outside of the shoe to cause said relative movements.

12. A machine for shaping shoes, comprising a pair of levers each of which has an arm adapted to extend within the forepart of a shoe to be treated and an arm adapted to extend outside of the shoe, pivotal supporting  
 80 means for said levers to provide for relative movement of separation between said arms which are adapted to extend within the forepart of a shoe to expand the forepart in a direction widthwise of the shoe, a third lever  
 85 having an arm adapted to extend within the forepart of the shoe and having an arm adapted to extend outside of the shoe, pivotal supporting means for said third lever to provide for relative movement of the arm of said  
 90 third lever which is adapted to extend within the forepart of the shoe, said relative movement being in a direction heightwise of the shoe and with respect to the arms of said pair of levers which are adapted to extend within  
 95 the forepart, and operating means constructed and arranged to engage said arms of said levers which are adapted to extend outside of the shoe for causing said relative movements.

13. In a machine for shaping shoes, a plurality of members constructed and arranged to provide for relative separation between them within a shoe to expand the shoe in a  
 100 direction which is transverse to the length of the shoe, and a support for one of said members, said support being mounted for yielding movement in a direction lengthwise of the shoe to enable the supported member to effect a lengthwise wiping action upon the  
 105 shoe.

14. In a machine for shaping shoes, a plurality of members constructed and arranged to provide for relative separation between them within a shoe to expand the shoe, means  
 120 for causing an additional relative movement between one and another of said members to effect a wiping action between said one member and the shoe, and means for preventing said additional relative movement when  
 125 said wiping action is not desired.

15. In a machine for shaping shoes, a pair of members constructed and arranged to provide for relative separation between them within a shoe to expand the shoe in a width-  
 130



wise direction, a third member, and pivotal supporting means for the third-mentioned member constructed and arranged to provide for consecutive movements of the third-mentioned member, first heightwise of the shoe to effect a heightwise stretching of the shoe and then lengthwise of the shoe to effect a wiping action upon the shoe.

16. In a machine for shaping shoes, means for supporting the forepart of a shoe, a bell crank lever having one arm adapted to extend inside and another arm adapted to extend outside of the forepart of the shoe, a fulcrum for said bell crank lever positioned to cause said arm which is adapted to extend inside of the shoe to exert a heightwise stretching action upon the shoe when said other arm is moved in a direction lengthwise of the shoe, and a yieldable support for said fulcrum constructed and arranged to permit said bell crank lever to move bodily in a direction lengthwise of the shoe during said lengthwise stretching action to cause said inside arm to wipe the shoe in a lengthwise direction.

17. In a machine for shaping shoes, a plurality of members constructed and arranged for relative separation between them within a shoe to expand the shoe, and a support for one of said members, said support being mounted for yielding movement to permit slippage between the supported member and the shoe, whereby the supported member exerts a wiping action upon the shoe.

18. A machine for shaping shoes, comprising a pair of relatively thin bladelike members adapted to enter into edgewise engagement with the interior of a shoe upper adjacent to the sole of the shoe, means for expanding said members within the shoe in a direction widthwise of the shoe to cause them to exert localized pressure against the interior of the shoe upper, and means operable to stretch the shoe upper in a heightwise direction while said thin bladelike members are expanded by said expanding means.

In testimony whereof I have signed my name to this specification.

WILLIAM D. THOMAS.

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