Feb. 28, 1939. E. BROTHERS 2,148,528

MACHINE FOR EFFECTING RELATIVE MOVEMENT BETWEEN LASTS AND SHOES

Filed Oct. 12, 1936 3 Sheets-Sheet 1

Fig. 1.

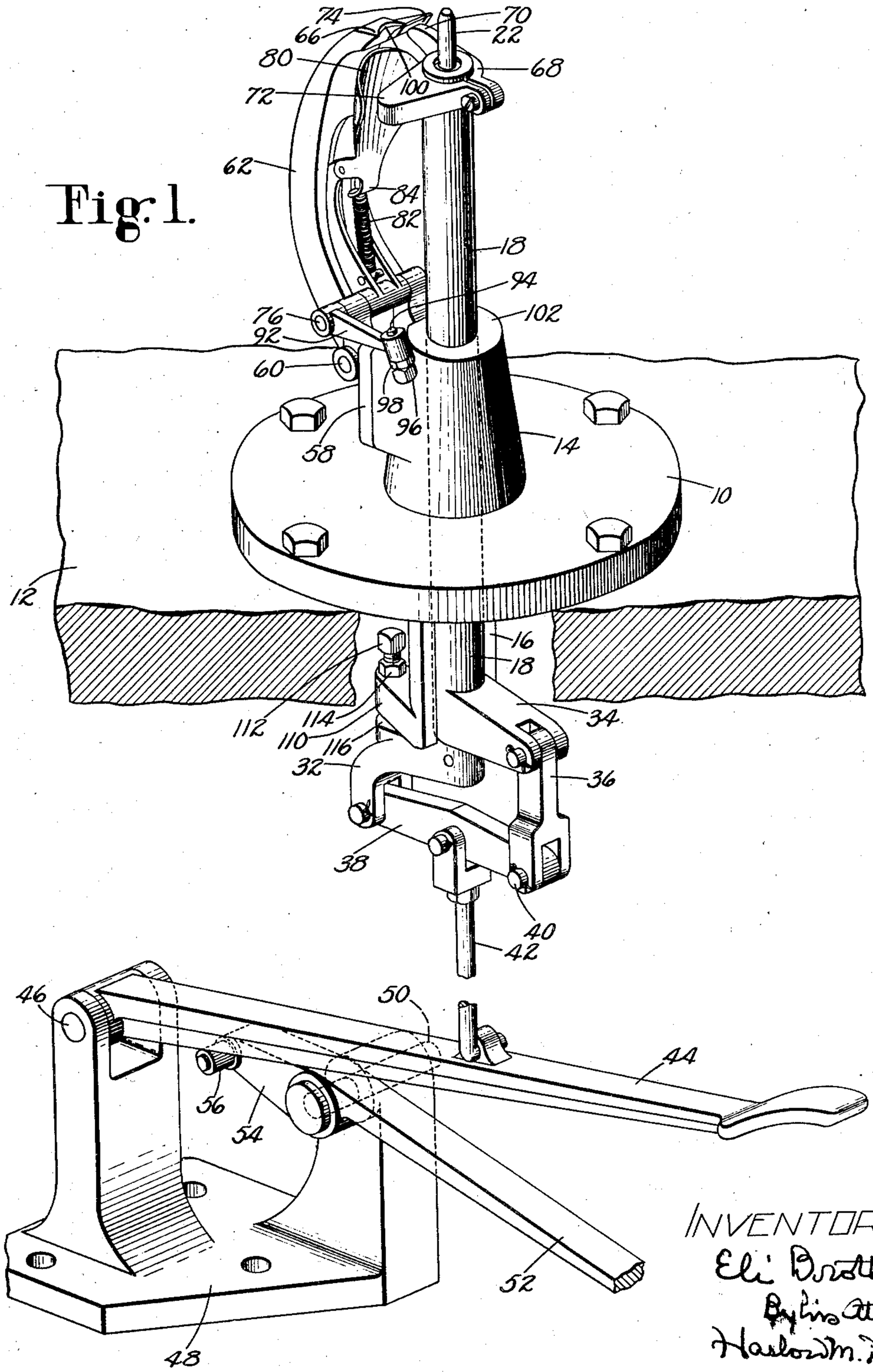

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Fig. 2.

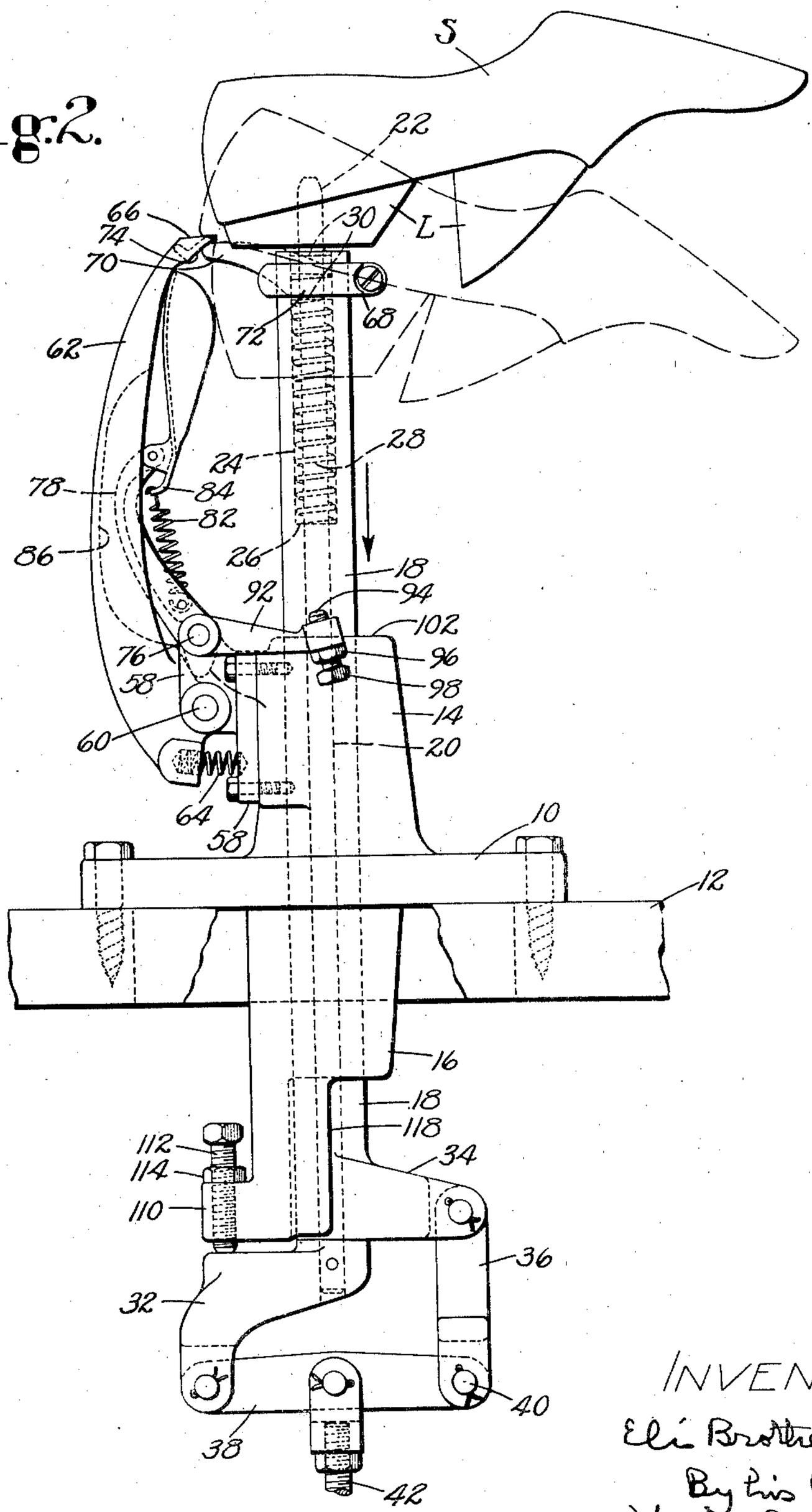

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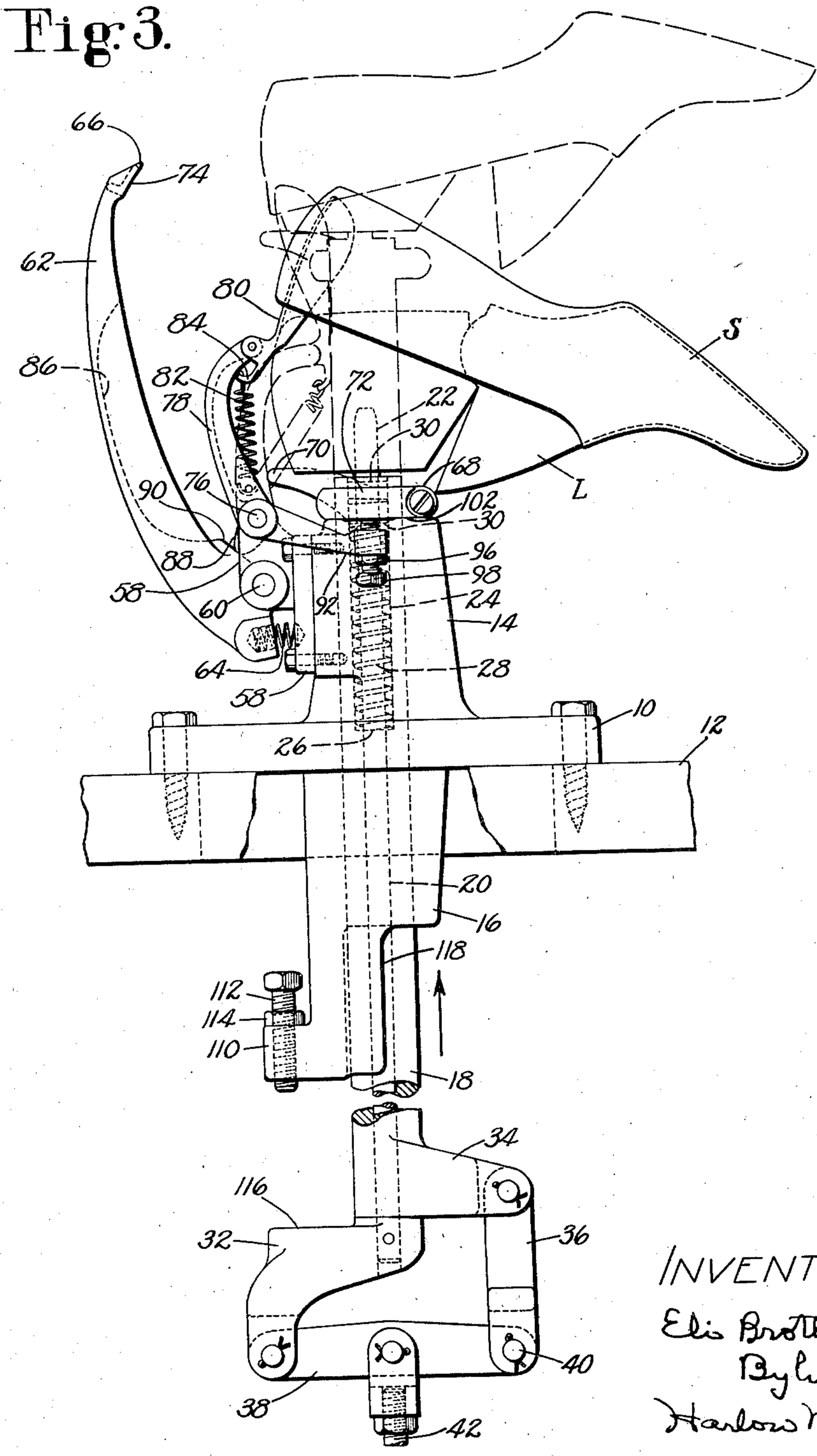
Fig. 3.



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Patented Feb. 28, 1939

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MACHINE FOR EFFECTING RELATIVE MOVEMENT BETWEEN LASTS AND SHOES

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Application October 12, 1936, Serial No. 105,211

12 Claims. (Cl. 12—15)

This invention relates to a machine for effecting relative movement between shoes and lasts and is herein illustrated and described as embodied in a machine suitable both for last pulling and for relasting. The illustrated machine is treadle-operated and has an upstanding last pin upon which the last is supported. Separate tools are provided for the last pulling and relasting operations.

It is an object of the invention to provide an improved machine suitable for use both in last pulling and in relasting. In accordance with a feature of the invention, the illustrated machine is provided with a tool engageable with the edge of the upper at the rear of a shoe to hold the rear portion of the shoe stationary while the rear portion of a last is withdrawn from the shoe. The means for supporting the last consists of a last pin carried by a slide, the slide in turn being operated by a treadle. In addition to the above-mentioned tool which is used for last pulling, the illustrated machine is provided with a relasting horn. The above-mentioned slide is moved by a treadle mechanism in one direction when the machine is used for last pulling and in the opposite direction when the machine is used for relasting, separate treadles being provided for effecting the respective movements.

The invention will be described with reference to the accompanying drawings and pointed out in the claims.

In the drawings,

Fig. 1 is a view in perspective of the improved machine;

Fig. 2 is a view in side elevation illustrating the use of the machine for removing lasts from shoes; and

Fig. 3 is a view in side elevation illustrating the use of the machine for relasting.

The supporting structure of the machine consists of a base plate 10 adapted to be secured upon a work bench 12. Formed upon the plate 10 are upwardly and downwardly extending bosses 14 and 16, respectively. Extending through the base plate 10 and the bosses 14 and 16 is a vertical guideway in which is slidably mounted a sleeve 18. Slidably mounted within the sleeve 18 is a rod 20 the upper end portion of which extends beyond the upper end of the sleeve 18 and constitutes a last pin 22. The upper portion of the passage in the sleeve 18 which accommodates the rod 20 is counterbored, as indicated by the reference numeral 24, the lower end of the counterbore terminating in a shoulder 26. Surrounding the rod 20 within the counterbore 24 is a coiled compression spring 28 the lower end of which abuts against the shoulder 26 and the upper end of which abuts against a collar 30 secured upon the rod 20. The spring 28 thus tends to urge the rod 20 upwardly with respect to the sleeve 18. The expansion of the spring 28 is limited by a bracket 32 secured upon the lower end portion of the rod 20 below the lower end of the sleeve 18. The engagement of the bracket 32 with the lower end of the sleeve 18 serves thus to limit the height to which the last pin 22 can be raised by the spring 28 relatively to the sleeve 18.

Extending laterally from the lower portion of the sleeve 18 is a lug 34 upon which is pivotally secured a depending link 36. Pivotally mounted in the bracket 32 is a laterally extending link 38. The free ends of the links 36 and 38 are pivotally connected by a pin 40. Pivotally connected to the intermediate portion of the link 38 is the upper end of a treadle rod 42 the lower end of which is pivotally connected to a treadle 44 fulcrumed upon a pin 46 which is secured in a bracket 48 mounted upon the floor. The bracket 48 supports also a second fulcrum pin 50 upon which is pivotally mounted a second treadle 52 having a rearwardly extending arm 54. Extending laterally from the arm 54 and arranged to engage the under surface of the treadle bar 44 is a projection 56. It is evident that downward pressure upon the treadle 44 will cause a downward pull to be exerted upon the treadle rod 42 while depression of the treadle 52 will cause an upward thrust to be exerted through the treadle rod 42.

Extending laterally from the lower portion of the boss 16 is a lug 110 through which is threaded a stop screw 112 which may be secured in any desired position of adjustment by a lock nut 114. The screw 112 acts as a stop for the bracket 32 as the latter moves upwardly, the lower end of the screw 112 being engaged by an upper surface 116 of the bracket 32. The lower portion of the boss 16 is cut away opposite the lug 110, as indicated by the reference numeral 118, to accommodate the lug 34 under circumstances which will later be explained.

Secured upon a lateral surface of the boss 14 is a bracket 58 in which is mounted a pin 60 upon which is fulcrumed an upwardly extending lever 62. A compression spring 64 having its ends received in recesses formed, respectively, in the bracket 58 and in a portion of the lever 62 extending below the pin 60 tends to urge the lever 62 in a clockwise direction, as viewed in Figs. 2 and 3. The lever 62 has an upper end portion 66 in which is formed a concave edge 100 for en-

gaging the heel end of a last. The upper surface of the portion 66 is flat for engagement with the edge of the upper of a shoe to effect removal of the shoe from the last. The inner surface of the portion 66 below the edge 100 is relieved sufficiently to clear the last.

Clamped upon the upper end portion of the sleeve 18 is a bracket 68 having a laterally extending lug 70 and another laterally extending lug 72. The portion 66 of the lever 62 has a laterally extending web having an inclined under surface 74 suitably shaped, as will presently be more particularly described, to engage the end of the lug 70 to control the position of the shoe-engaging portion 66 of the lever 62. While the concave edge 100 is centered relatively to the last pin 22, the cam surface 74 and the lug 70 are both laterally offset from the last pin 22.

Secured upon a pin 76 which is journaled in bearings formed in the bracket 58 above the pin 60 is an arm 78 in the upper end of which is pivotally mounted a relasting horn 80. A tension spring 82 having its lower end anchored in the lower portion of the arm 78 exerts a downward pull upon a downwardly extending tail 84 of the horn 80 tending to maintain the horn in upright position. As shown in Fig. 2, the arm 78 is normally received within a recess 86 formed in the inner surface of the lever 62. When the horn 80 is to be used for relasting purposes it is desirable to move the lever 62 to an out-of-the-way position. This is accomplished automatically by an arm 88 (Fig. 3) extending from the pin 76 and engageable with a surface 90 formed on the lever 62. Control of the arm 88 is effected through an arm 92 secured upon the pin 76 and provided with an adjustable abutment in the form of a screw 94 having its end arranged to be engaged by the under surface of the lug 72 as the lug descends. The screw 94 is provided with a head 96 and is maintained in adjusted position by a lock nut 98.

The operation of the machine when used for last pulling is illustrated in Fig. 2. In that figure is shown a last L having mounted thereon a shoe S. The last is supported in inverted position in the usual manner upon the last pin 22, as indicated by the solid line showing of Fig. 2. It will be noted that at the beginning of the last pulling operation the treadle 44 is up and the treadle 52 is down. The lug 70, which is at its uppermost position, holds the shoe-engaging tool just out of contact with the last. The spring 64 holds the cam surface 74 against the lug 70. The lug 72 is far removed from the screw 94, leaving the arm 78 free to assume an out-of-the-way position in the recess 86 as the surface 90 presses against the arm 88.

The operator now depresses the treadle 44, exerting a downward pull through the rod 42 upon the link 38. The link 38 exerts a downward pull through the bracket 32 upon the rod 20 and through the link 36 and the lug 34 upon the sleeve 18. The rod 20 and the sleeve 18 will move downwardly in unison, the spring 28 serving to maintain the rod 20 in its uppermost position relatively to the sleeve 18. As the sleeve 18 descends the lug 70 will travel downwardly in contact with the cam surface 74. This surface is so shaped as to enable the lever 62 to swing inwardly toward the last under the influence of the spring 64 and particularly to enable the concave edge 100 of the shoe-engaging portion 66 to engage that portion of the last L which extends outside of the shoe S. Further downward movement of the sleeve 18 will cause the edge of the rear portion of the shoe upper to engage the flat upper surface of the portion 66 of the lever 62. The edge 100, being held yieldingly against the last by the spring 64, will move in or out as occasioned by the heightwise curvature of the last. Further downward movement of the treadle 44 will cause the rear portion of the last to be withdrawn from the rear portion of the shoe inasmuch as the shoe being held by the flat upper surface of the portion 66 can no longer descend. The upward thrust of the shoe-engaging member tends to tilt the last, thereby cramping the last pin within the thimble hole of the last to prevent slipping of the last pin. The operator may assist the action of the machine, particularly in the case of hinged lasts, by a downward pressure of his hand upon the forepart of the sole of the shoe, tending to break the last and also insuring that the last pin will cramp. The broken line showing of Fig. 2 indicates the positions of the last and of the shoe with the last in broken condition and with the rear portion of the shoe almost off the last. As soon as the rear portion of the shoe is free from the last the operator removes the forward portion of the shoe by hand from the last. Continued downward movement of the treadle causes the bracket 68 to engage the upper end, indicated by the reference character 102, of the boss 14, thereby holding the sleeve 18 against further downward movement. The spring 28 now yields to enable the rod 20 to be drawn downwardly by the bracket 32 and the link 38, thereby causing the last pin 22 to retract within the sleeve 18. The upper end of the sleeve 18 will engage the cone of the last and as the last pin is retracted the last will be freed from the last pin and will fall into a suitable receptacle.

The action of the machine for relasting is illustrated in Fig. 3. In this case the operation is begun with the treadle 44 depressed and the treadle 52 elevated. The last L with the forepart of the shoe S already mounted thereon by hand is supported in the usual manner upon the last pin 22. The lug 72, which occupies its lowermost position, bears against the screw 94, holding the arm 78 in toward the shoe and also, through the arm 88, holding the lever 62 in an out-of-the-way position.

The operator now swings the horn 80 inside of the rear portion of the shoe, as indicated by the solid line position in Fig. 3. He then depresses the treadle 52, causing an upward thrust in the rod 42 and causing the sleeve 18 and the rod 20 to move upwardly in unison. The operator grasps the rear end of the shoe firmly by hand and presses downward upon the heel portion of the shoe as the last is forced upwardly. As the last begins to enter the shoe the horn will be gripped between the shoe and the last. At this point the lug 72 rises out of contact with the screw 94, leaving the lever 78 free to assume whatever position it will as the horn is gripped still more tightly between the shoe and the last. The horn is thus enabled to guide the shoe over the last with a minimum of effort and without unduly stretching the shoe. The broken line showing of Fig. 3 indicates the positions of the various members when the last has been fully seated within the shoe. Still further depression of the treadle will cause the surface 116 to engage the stop screw 112, thereby holding the bracket 32 and the rod 20 against upward movement while the spring 28 yields and the sleeve 18 continues to move upwardly. The upper end of the sleeve 18 will

thus abut the cone of the last and push the last off the last pin 22 while the latter is held stationary. The purpose of the recess 118 is to accommodate the lug 34 in this final upward movement of the sleeve 18.

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

1. A last pulling machine comprising a support for a last pin, a member movable toward the rear portion of a last on said last pin and engageable with the edge of the upper at the rear of a shoe on the last to hold the rear portion of the shoe stationary, said movable member normally occupying a position removed from the position occupied by the last to avoid interference with the placing of the last on the last pin, resilient means for moving said member toward the last and into position for operative engagement with the edge of the shoe upper, and means for moving said last pin support to withdraw the rear portion of the last from the shoe held by the movable member.

2. A last pulling machine comprising a support for a last pin, a member pivotally mounted for movement toward the rear portion of a last on said last pin and engageable with the edge of the upper at the rear of a shoe on the last to hold the rear portion of the shoe stationary, said pivotally mounted member normally occupying a position removed from the position occupied by the last to avoid interference with the placing of the last on the last pin, means for moving said pivotally mounted member toward the last and into position for operative engagement with the shoe upper, means for moving said last pin support to withdraw the rear portion of the last from the shoe held by said pivotally movable member, and means for coordinating the movement of the pivotally movable member toward the last with the movement of the means for moving the last pin support to insure the arrival of said pivotally movable member into operative position in time to engage the edge of the shoe upper during the movement of the last.

3. A last pulling machine comprising a last pin upon which may be mounted a last with a shoe thereon, means for moving said last pin in a direction to withdraw the rear portion of the last from the shoe, means for holding a portion of the shoe against movement while the last is being withdrawn, and means for holding the last against movement after withdrawal from the shoe and during continued movement of the last pin to remove the last from the last pin.

4. A last pulling machine comprising a rod having an end portion which constitutes a last pin upon which may be mounted a last with a shoe thereon, a sleeve surrounding said rod, a spring for yieldably maintaining said sleeve positioned upon said rod with said last pin end of said rod extending beyond an end of said sleeve, means for moving said rod in a direction to withdraw the rear portion of the last from the shoe, means for holding the shoe while the last is being withdrawn, and means operable after withdrawal of the shoe in opposition to said spring to effect a relative retraction of the last pin end of said rod relatively to said sleeve whereby said end of said sleeve will engage the cone of the last and the last pin end of said rod will be withdrawn from the last.

5. A machine for effecting relative movement between lasts and shoes, comprising a support for a last with a shoe thereon, means for moving said last support in both directions along a path substantially heightwise with respect to the last, means for holding the heel portion of a shoe stationary while the last support is moved in a direction to withdraw the heel portion of the shoe from the last, means for holding the heel portion of a shoe stationary while the last support is moved in a direction to force the heel portion of the last into the shoe, and supports for said holding means constructed and arranged to enable said holding means to be moved between out-of-the-way and operating positions.

6. A machine for effecting relative movement of shoes and lasts comprising a last pin for supporting in inverted position a last with a shoe thereon, a treadle, a connection between said treadle and said last pin for raising and lowering said last pin upon movements of the treadle in opposite directions respectively, a tool engageable with a shoe on the last to hold the rear portion of the shoe against downward movement when the last pin is being lowered, thereby effecting separation of the rear end of the shoe and a last, and a horn insertable between the interior of a shoe upper and last when the last pin is being raised to assist in seating the last in the shoe.

7. A machine for effecting relative movement between lasts and shoes comprising a support for a last with a shoe thereon, a horn for use in relasting, a tool for use in separating shoes from lasts, a treadle, operating mechanism constructed and arranged, upon movements in opposite directions respectively of said treadle, to effect relative movement between said support and said relasting horn in a direction to cause the horn to assist in the relasting of a shoe which is partially on a last, and upon depression of the other treadle to effect relative movement between said support and said tool to assist in removing a last from a shoe, and a second treadle constructed and arranged when depressed to raise the first-mentioned treadle.

8. A machine for effecting relative movement of shoes and lasts comprising a last pin for supporting a last with a shoe thereon, a shoe-removing tool, a relasting tool, means for effecting relative movement between said last pin and said shoe-removing tool to cause removal of a shoe from a last on said last pin, said means operating also to effect relative movement between said last pin and said relasting tool to relast a shoe on a last on said last pin, and means operable by each of said tools in moving into operating position to move the other tool into an out-of-the-way position.

9. In a relasting machine, a last pin for supporting a last with a shoe thereon, an abutment engageable with the cone of the last, and means for retracting said last pin relatively to said abutment to cause said abutment to push the last off the last pin after the shoe has been relasted.

10. A machine for effecting relative movement of lasts and shoes comprising a support for a last, shoe-engaging means, and operating means constructed and arranged upon movement in one direction to cause a relative movement between said last support and said shoe-engaging means in a direction to effect separation between the last and a shoe on the last, said operating means being also constructed and arranged upon movement in the opposite direction to cause a relative movement between the last support and said shoe-engaging means in a direction to effect the relasting of a shoe on the last.

11. A machine for effecting relative movement of lasts and shoes comprising a support for a last with a shoe thereon, a shoe-removing tool, a relasting tool, an operating member, and means operable by a movement of said operating member in one direction to cause a relative movement between said last support and said shoe-removing tool in a direction to separate a shoe from the last, said means being constructed and arranged upon movement of said operating member in the opposite direction to cause a relative movement between the last support and the relasting tool in a direction to relast a shoe on the last.

12. A machine for effecting relative movement between lasts and shoes comprising a last pin arranged for heightwise movement for supporting in inverted position a last with a shoe thereon, a horn for use in relasting when the last pin is raised, a tool for separating shoes from lasts when the last pin is lowered, supports constructed and arranged to hold said horn and said tool against heightwise movement in the performance of their respective functions and also to enable said horn and said tool to be moved into and out of operating position, a treadle, a connection between said last pin and said treadle for lowering the last pin to effect the separation of a shoe from its last upon depression of the treadle and for raising the last pin upon the raising of the treadle, and a second treadle constructed and arranged upon depression to raise the first-mentioned treadle for the relasting operation.

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