

No. 663,777.

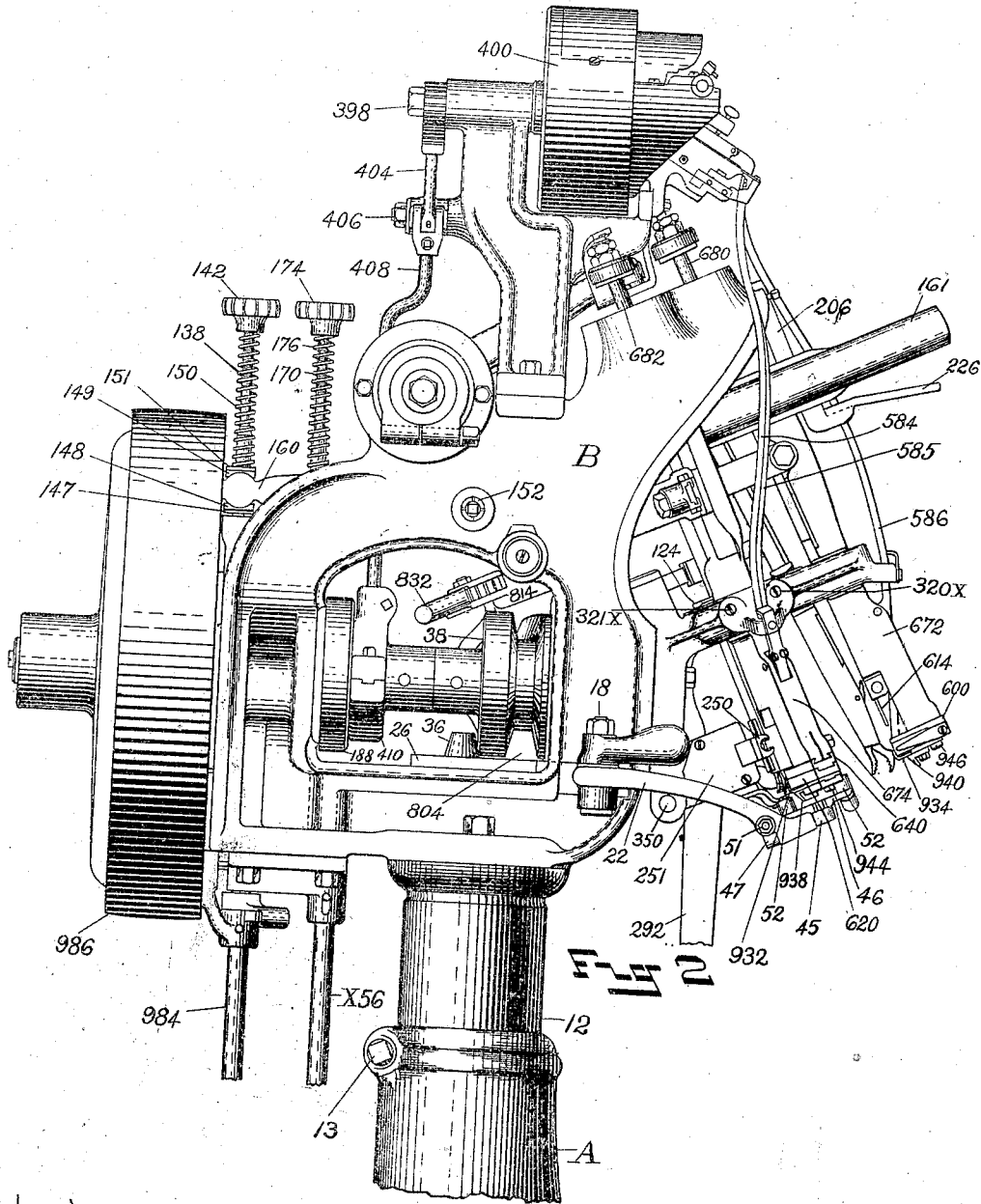
Patented Dec. 11, 1900.

R. F. McFEELY.
PULLING-OVER MACHINE.

(Application filed Sept. 19, 1899.)

(No Model.)

24 Sheets—Sheet 2.



WITNESSES
Charles H. Hoyt
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No. 663,777.

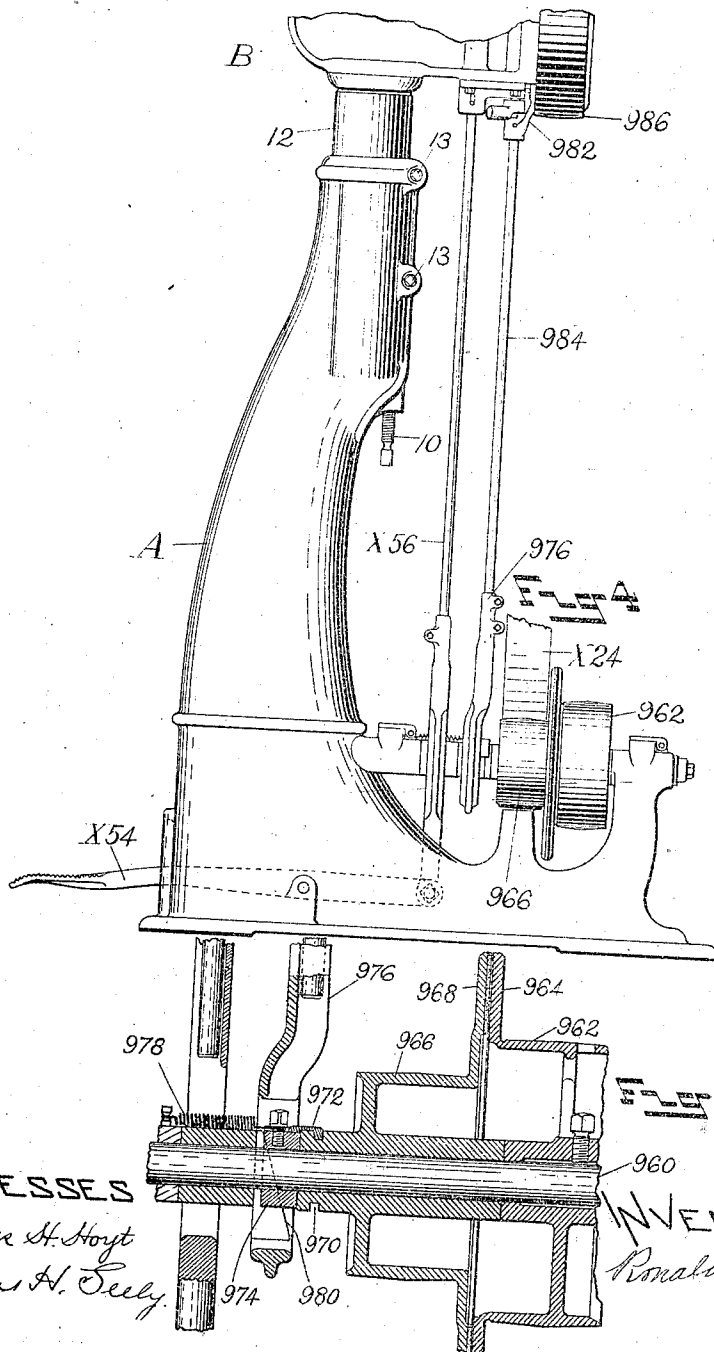
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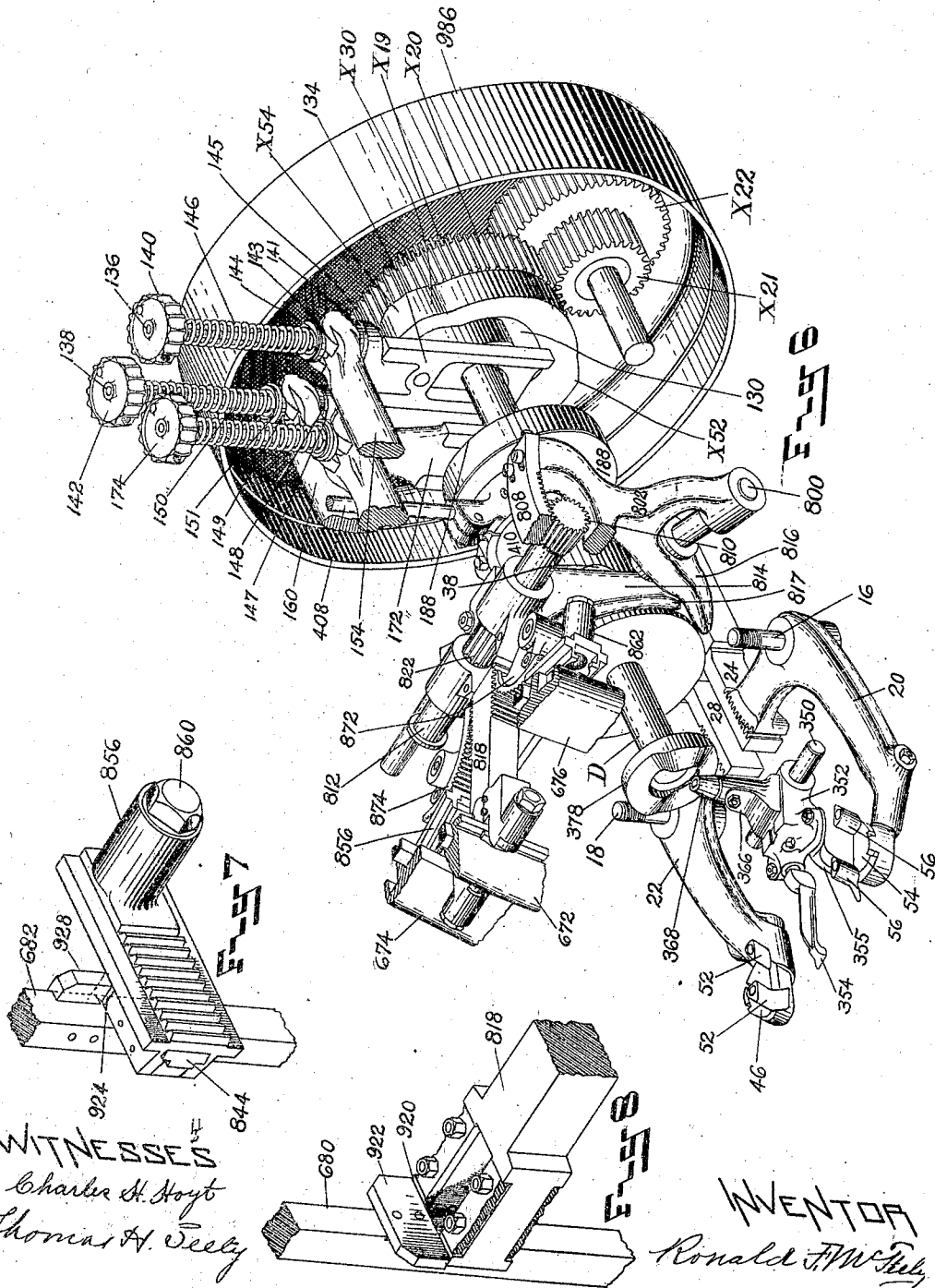
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24 Sheets—Sheet 5



WITNESSES
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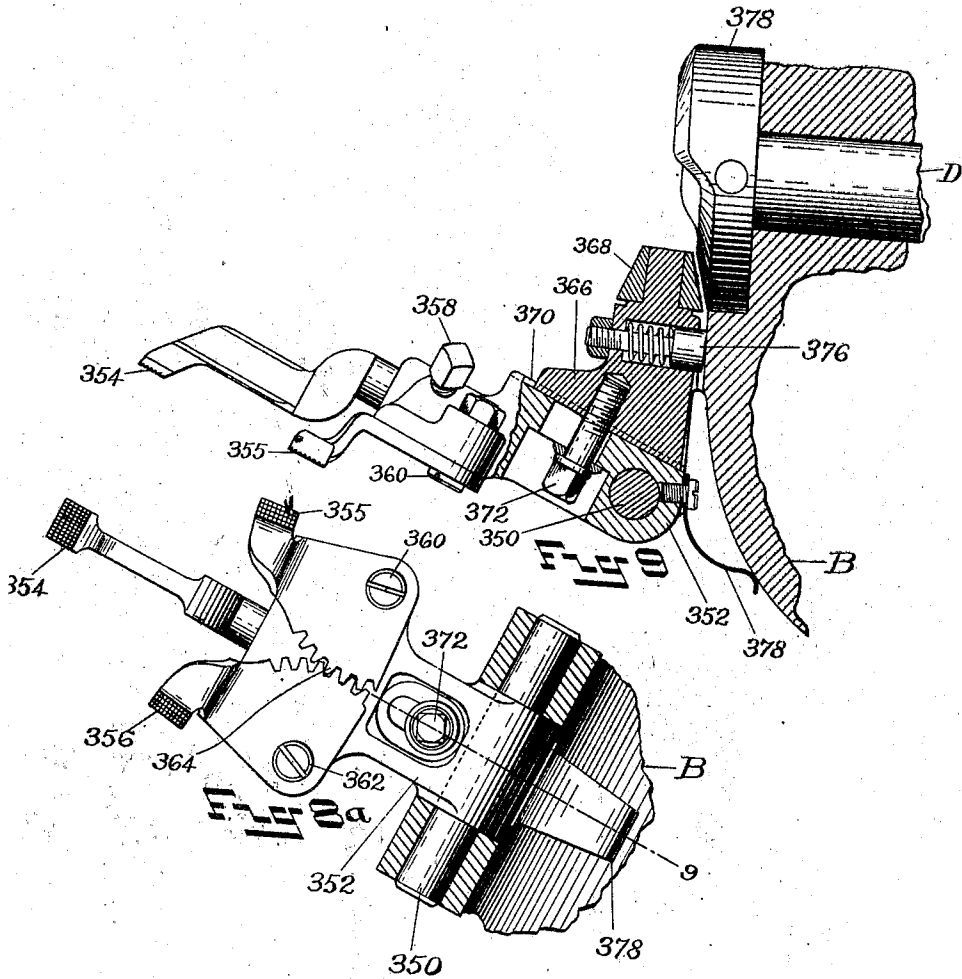
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24 Sheets—Sheet 6.



WITNESSES

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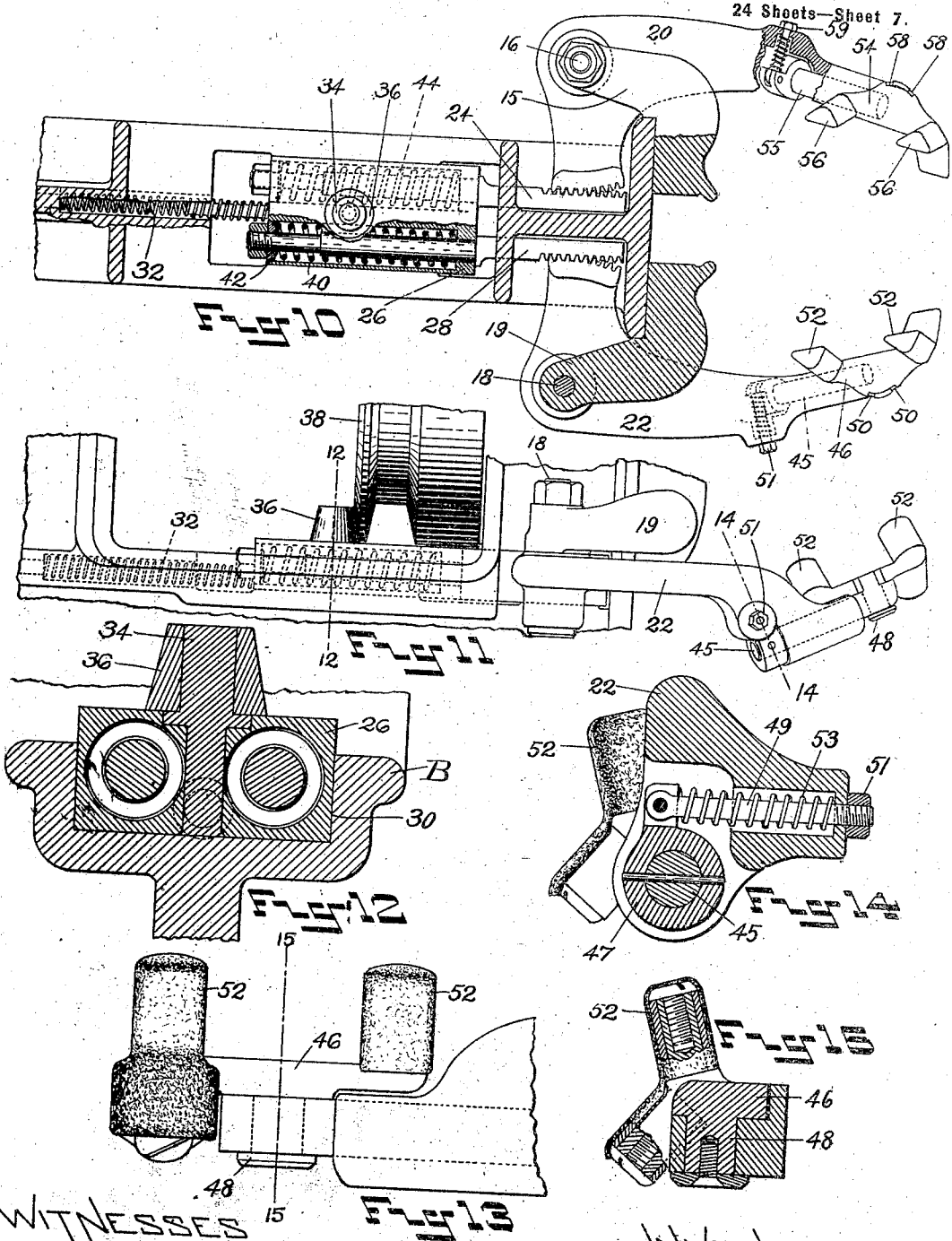
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(No Model.)

24 Sheets—Sheet 7.



WITNESSES
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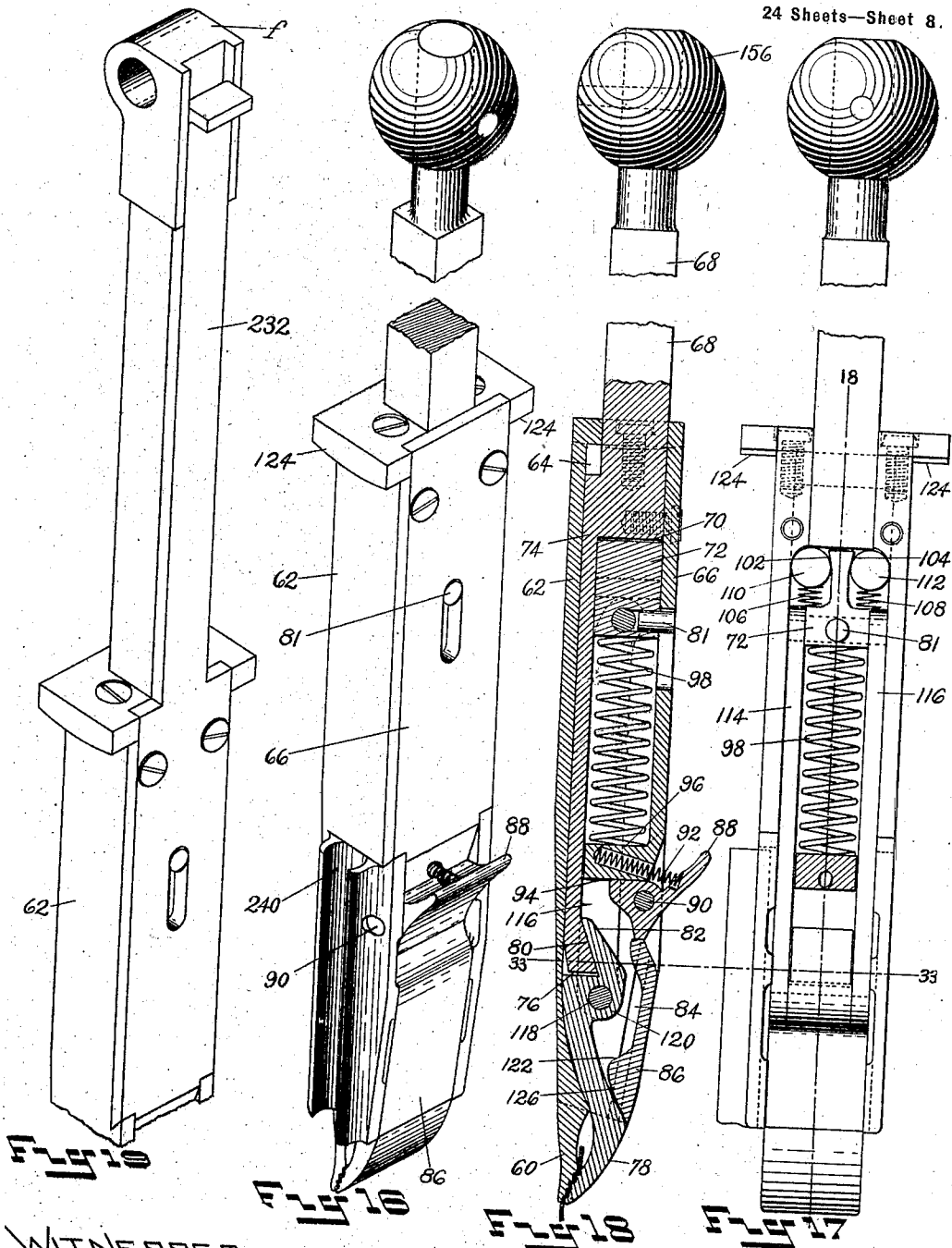
R. F. McFEELY.
PULLING-OVER MACHINE.

Patented Dec. 11, 1900.

(Application filed Sept. 10, 1899.)

(No Model.)

24 Sheets—Sheet 8.



WITNESSES
Charles H. Hoyt
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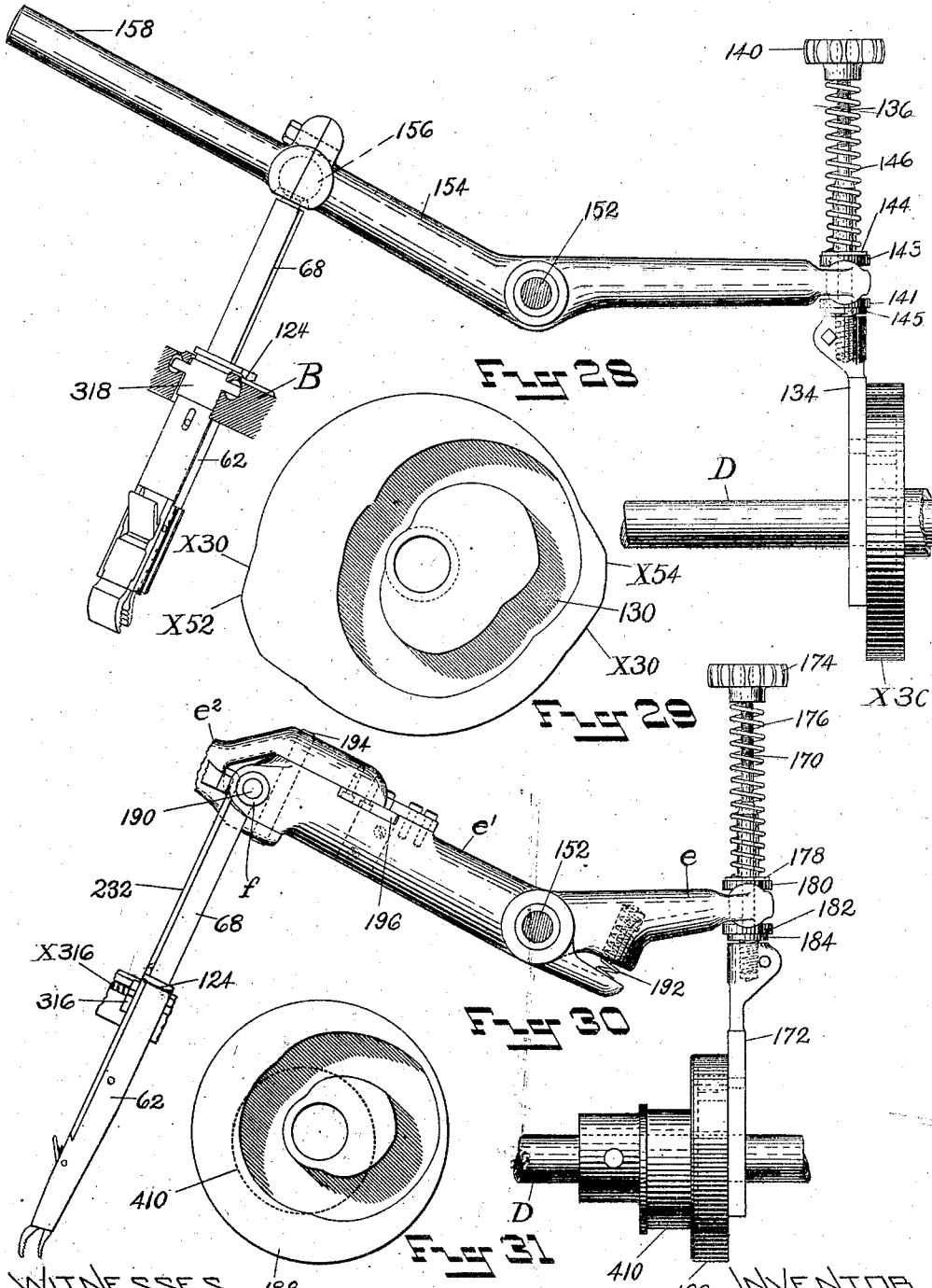
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(No Model.)

24 Sheets—Sheet 10.



WITNESSES
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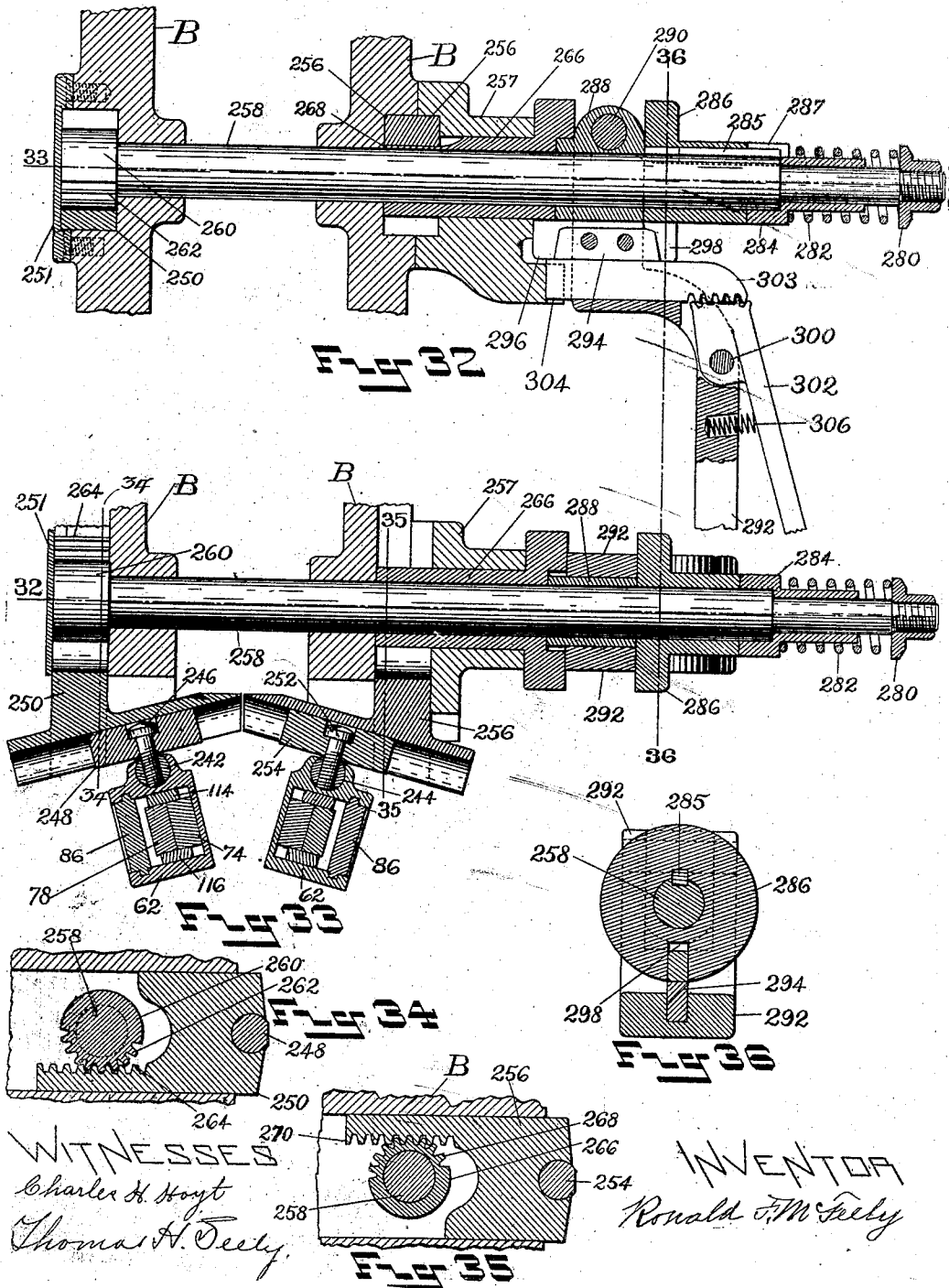
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24 Sheets—Sheet II.



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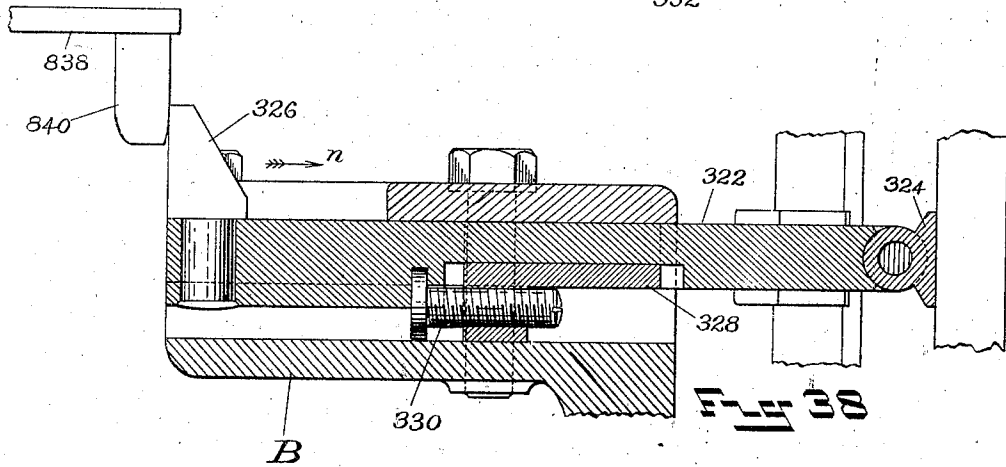
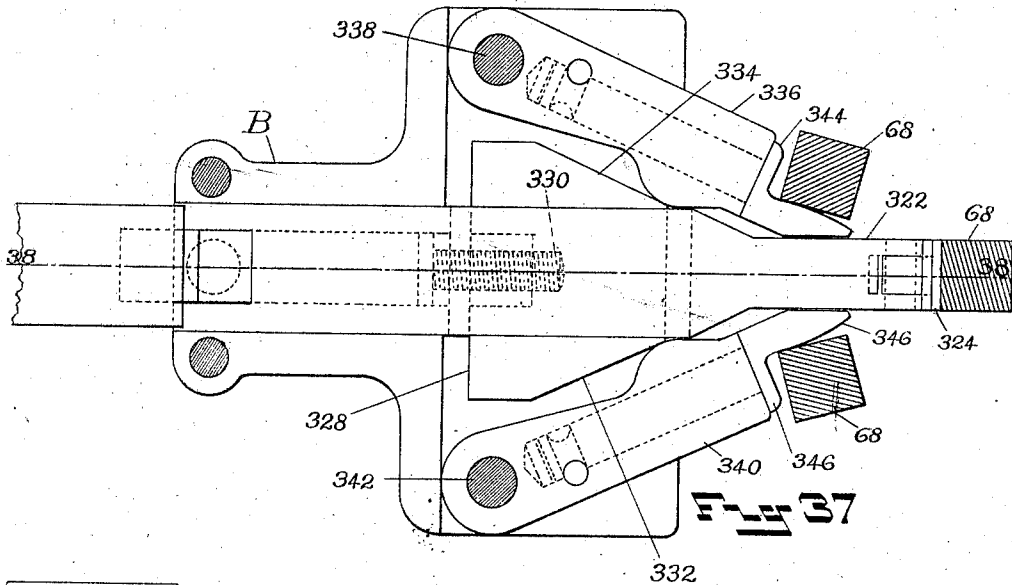
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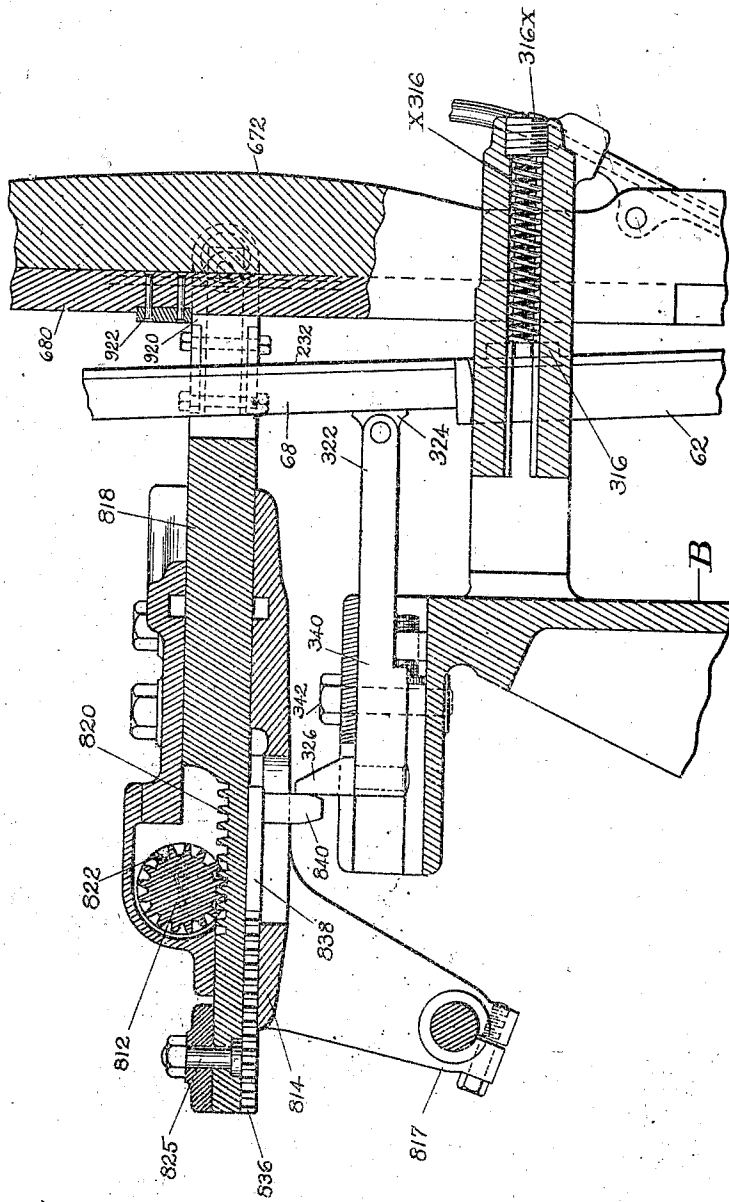
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(No Model.)

24 Sheets—Sheet 14.



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WITNESSES

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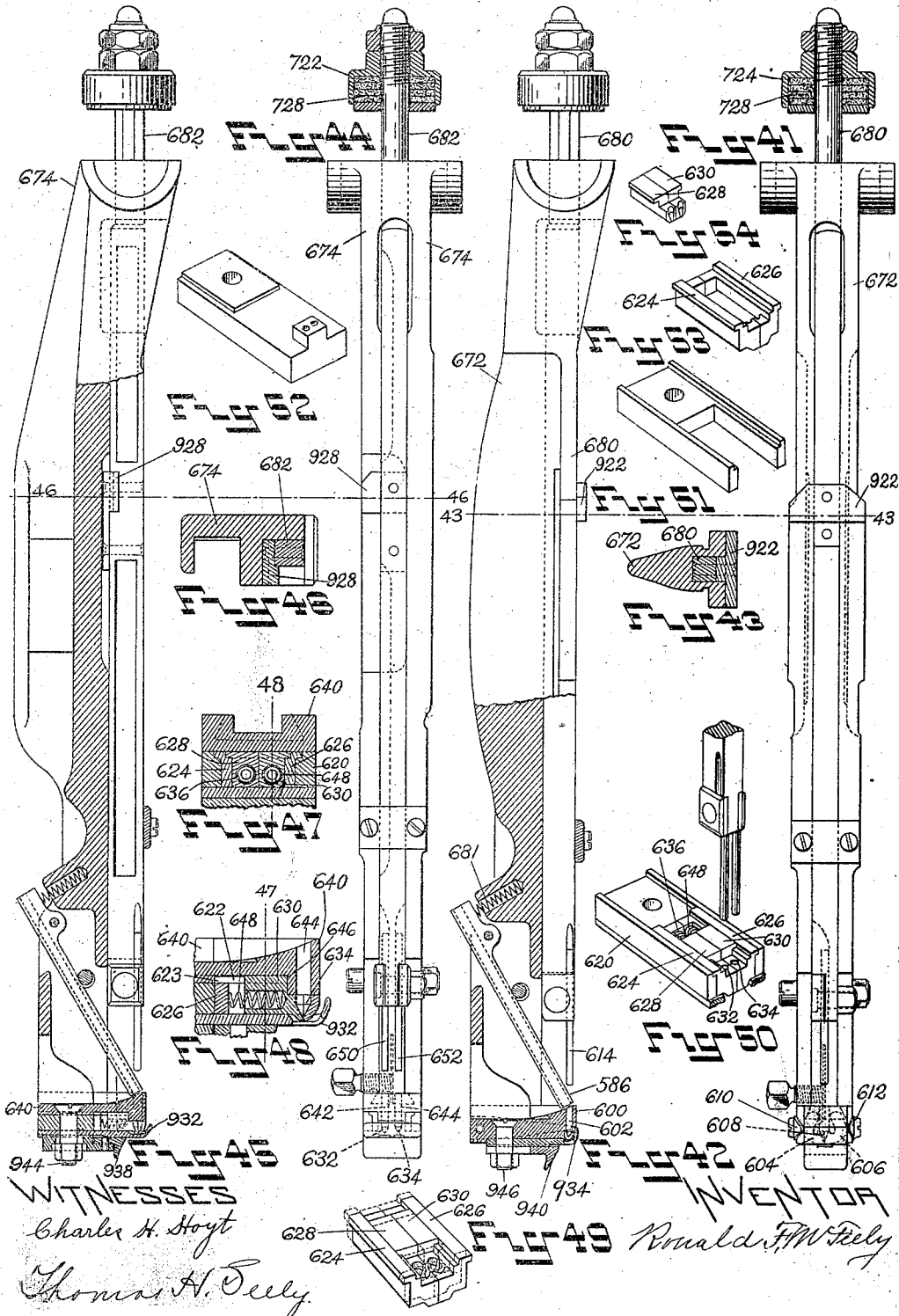
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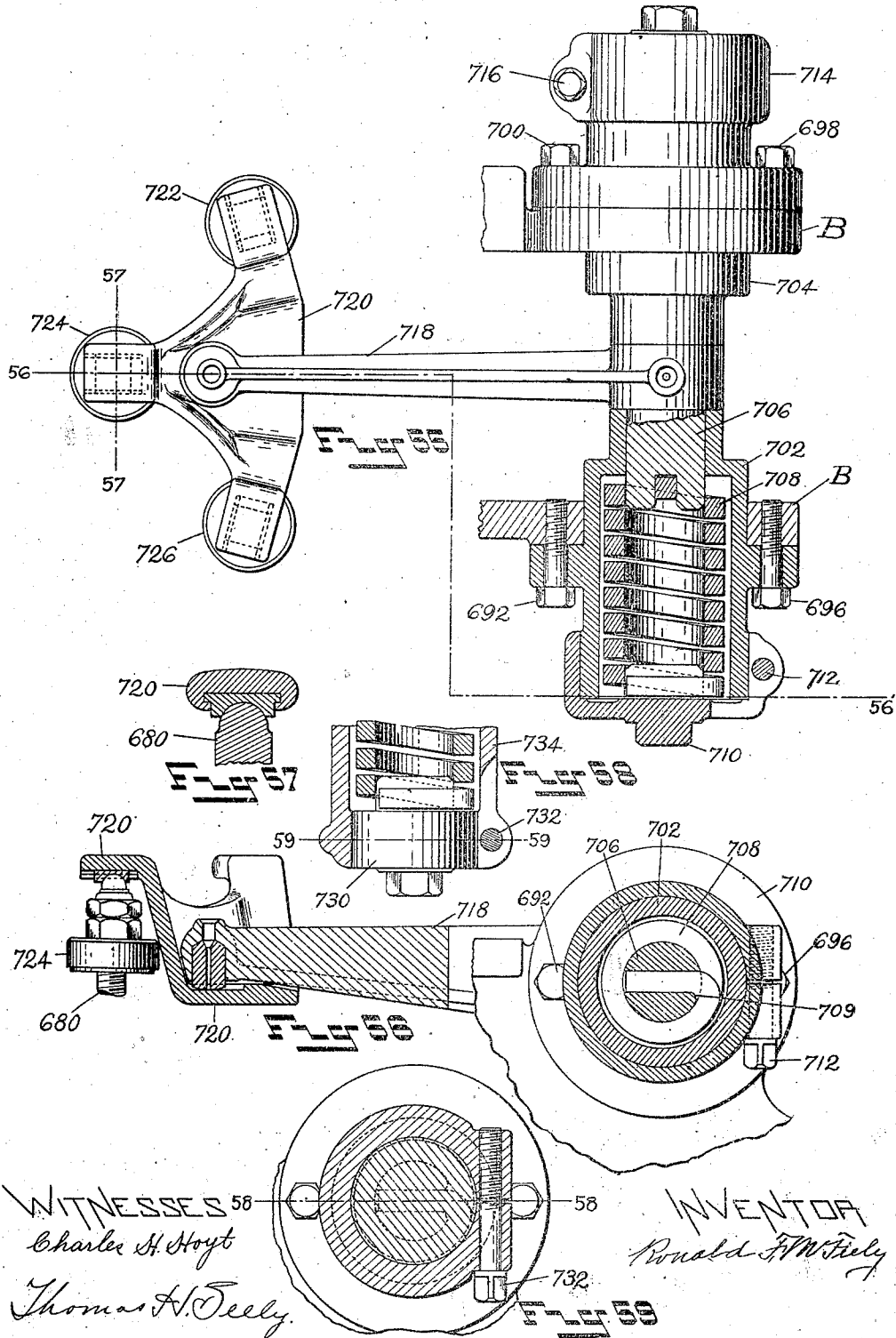
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WITNESSES 58
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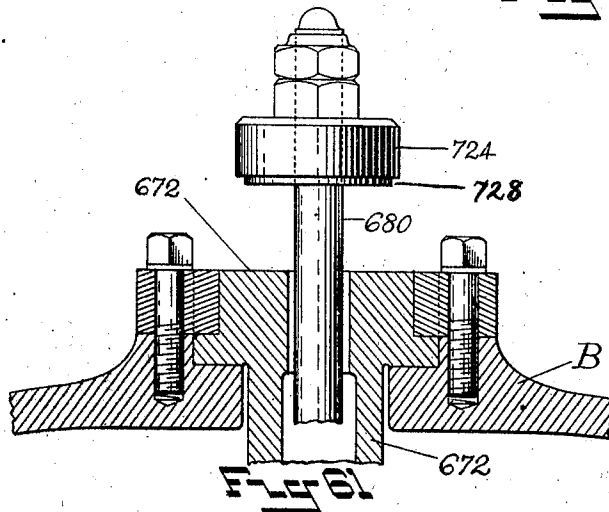
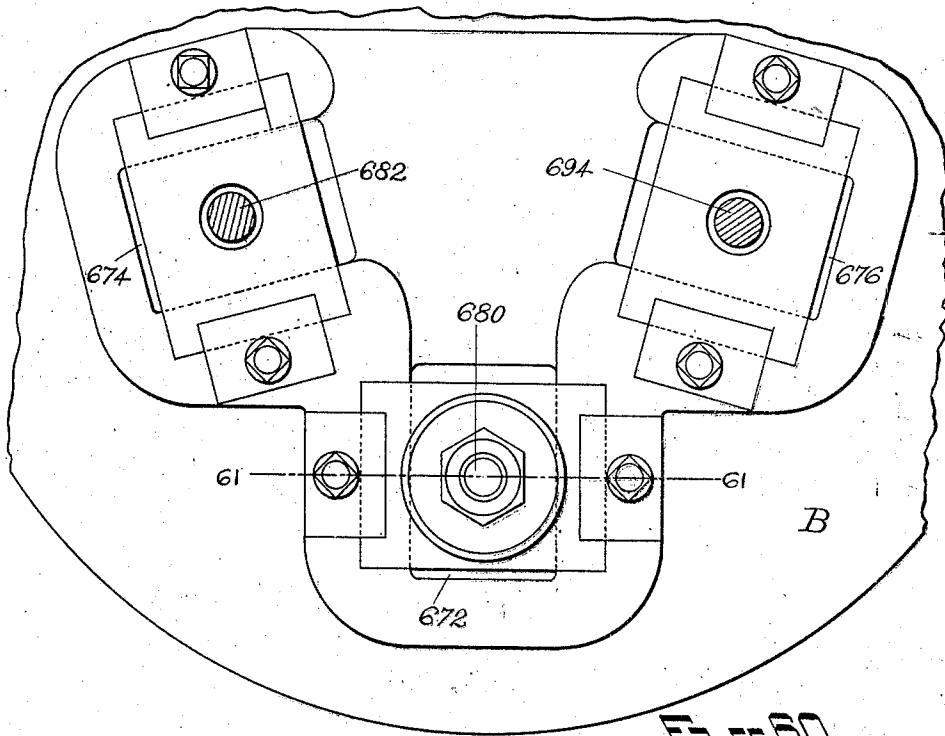
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24 Sheets—Sheet 17.



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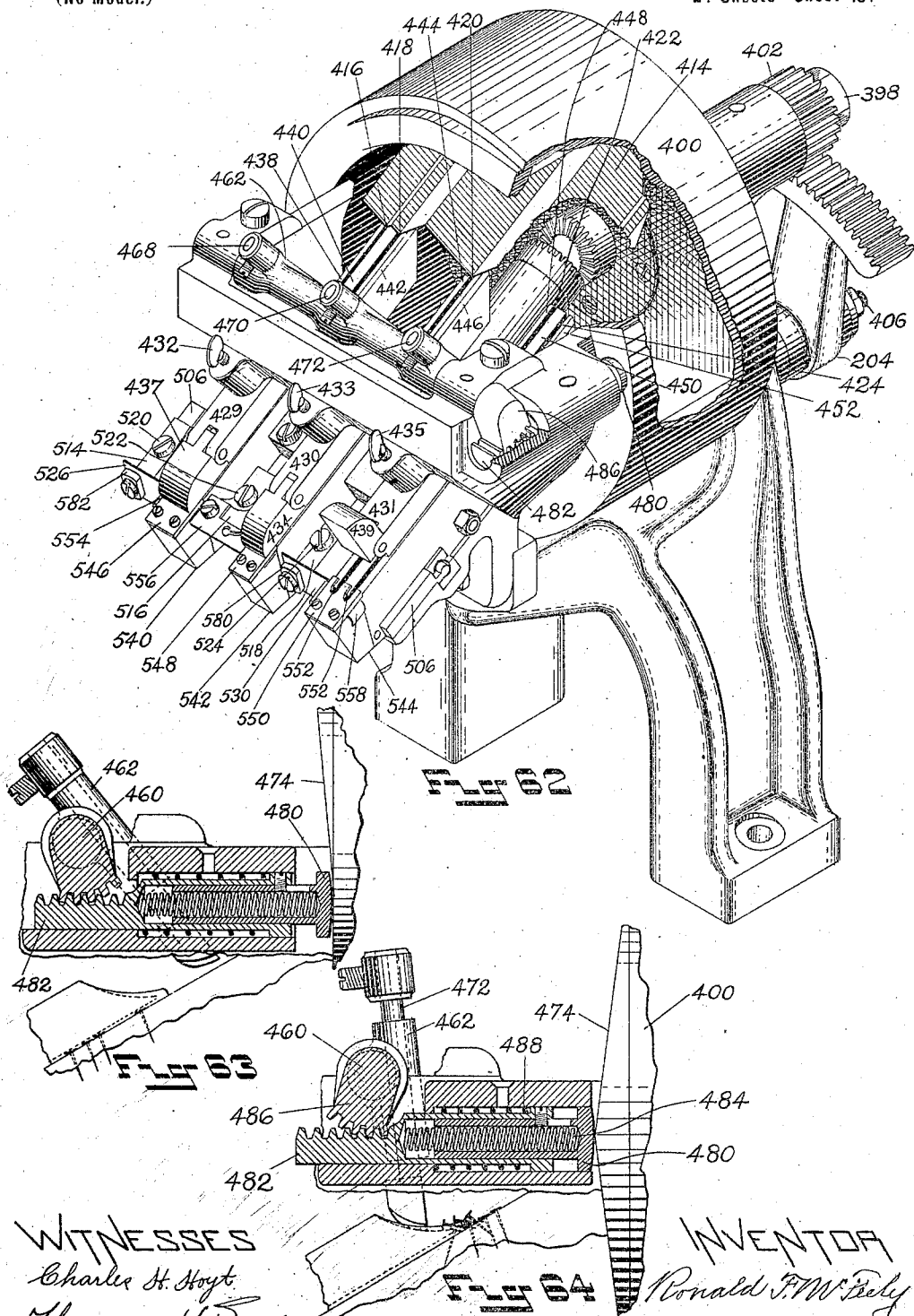
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24 Sheets—Sheet 18.



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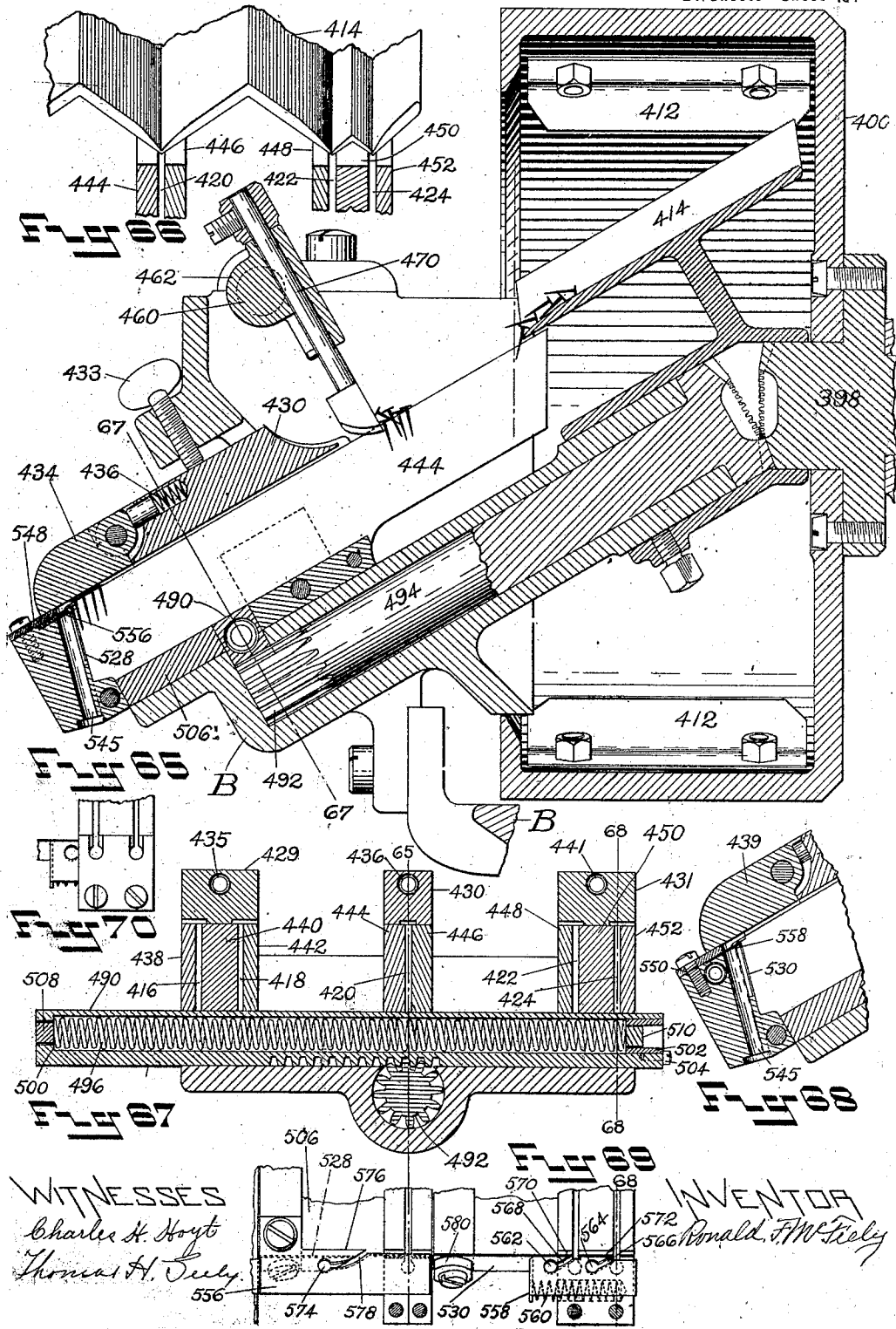
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24 Sheets—Sheet 19.



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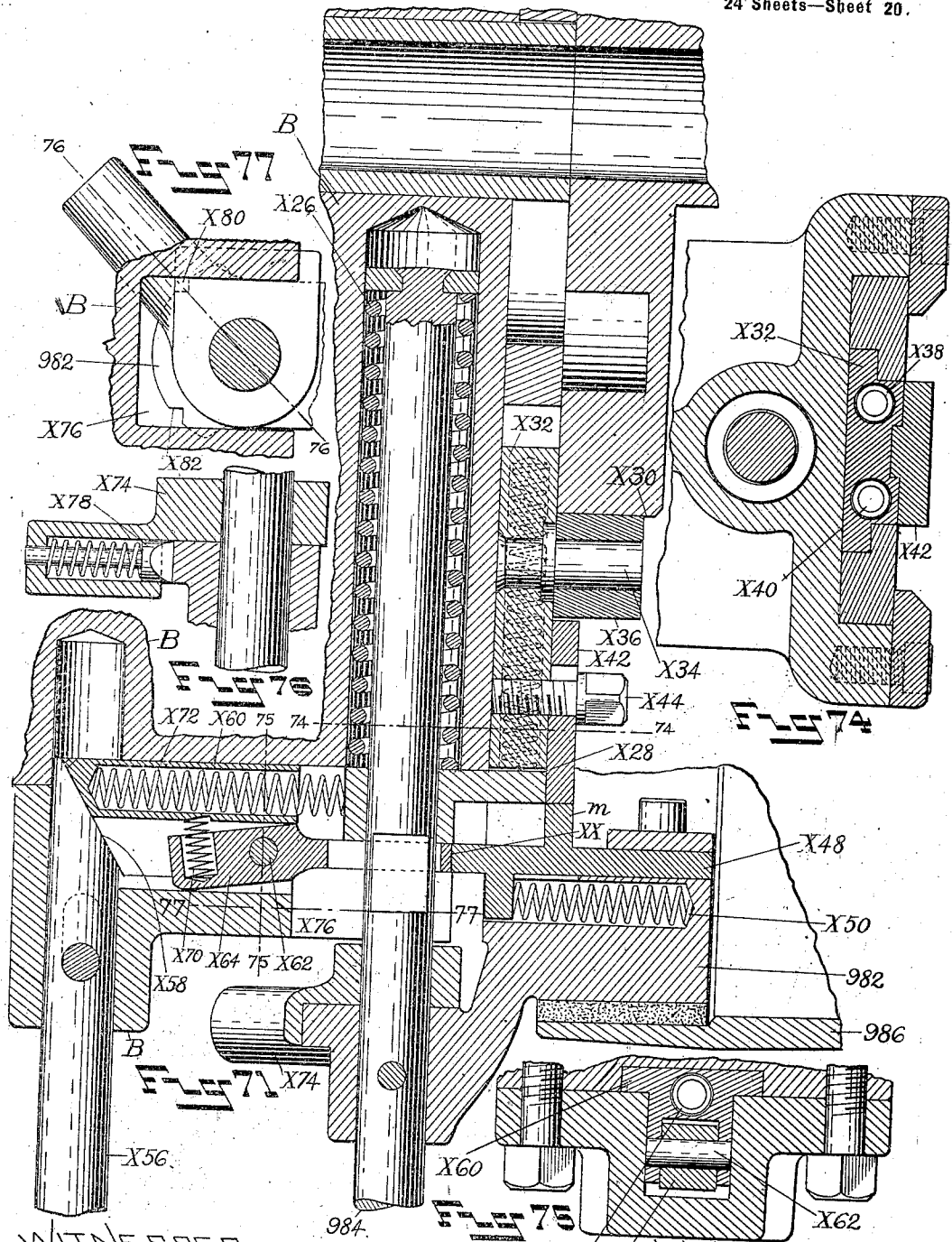
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(No Model.)

24 Sheets—Sheet 20.



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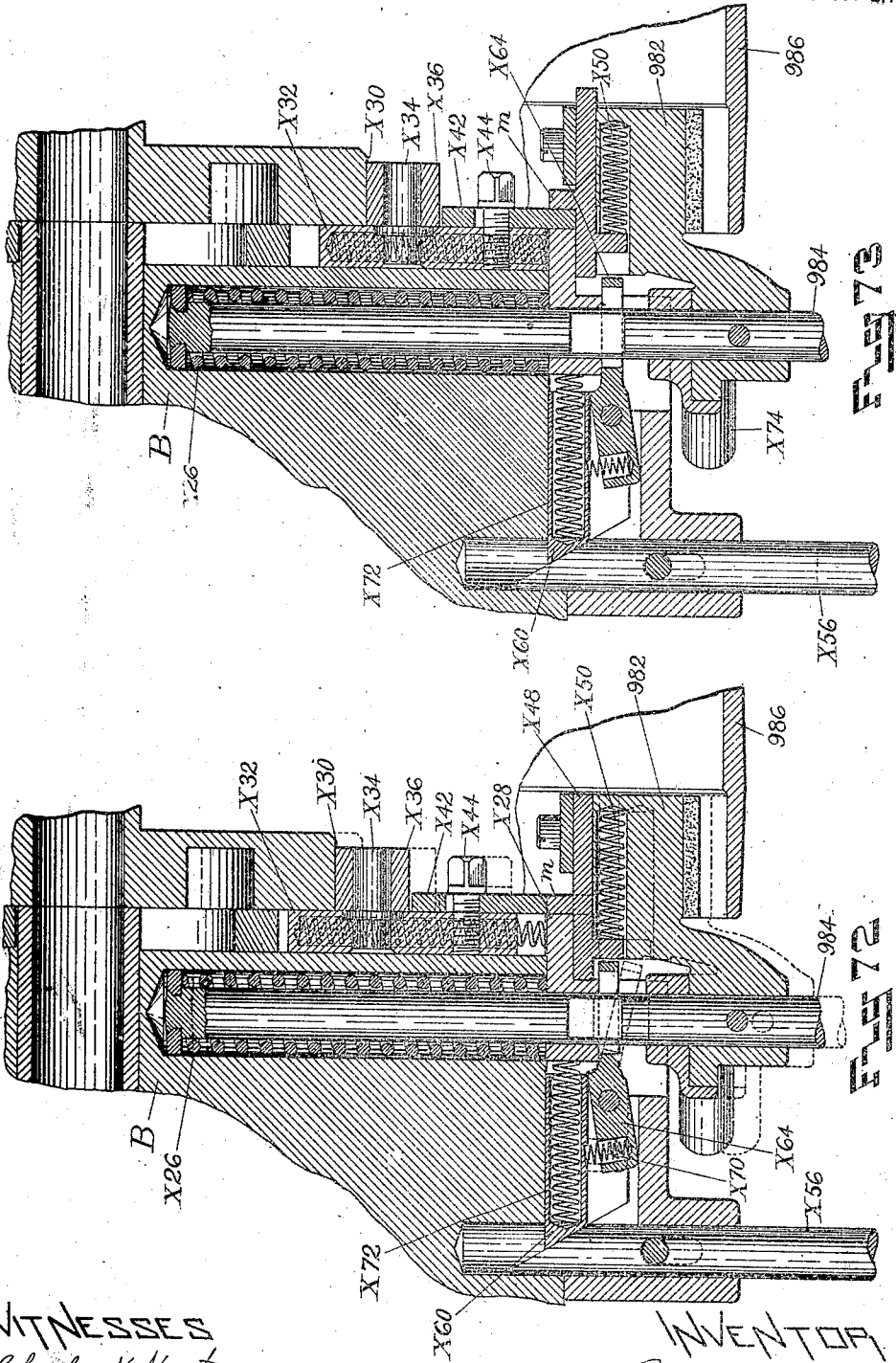


Fig 72

Fig 72

WITNESSES
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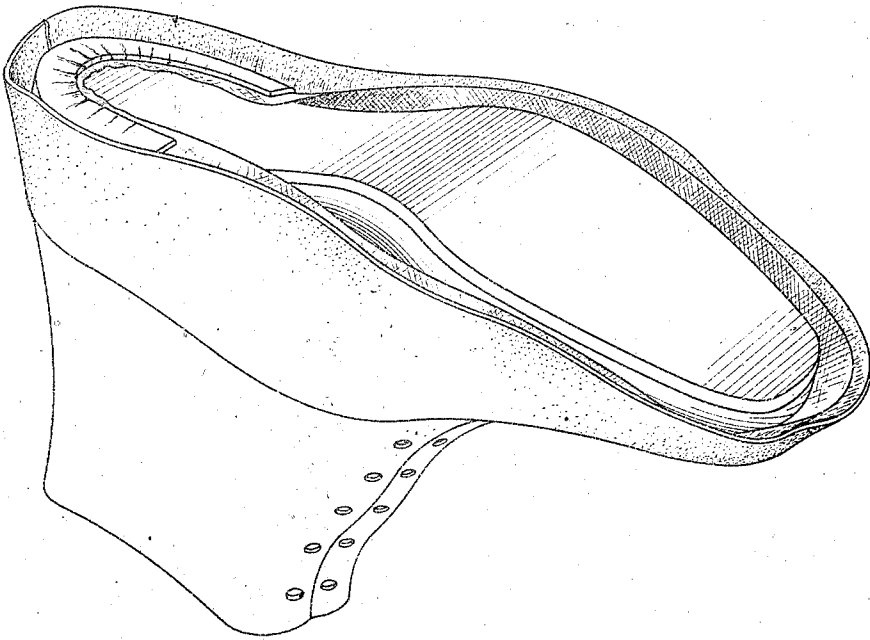


Fig 78

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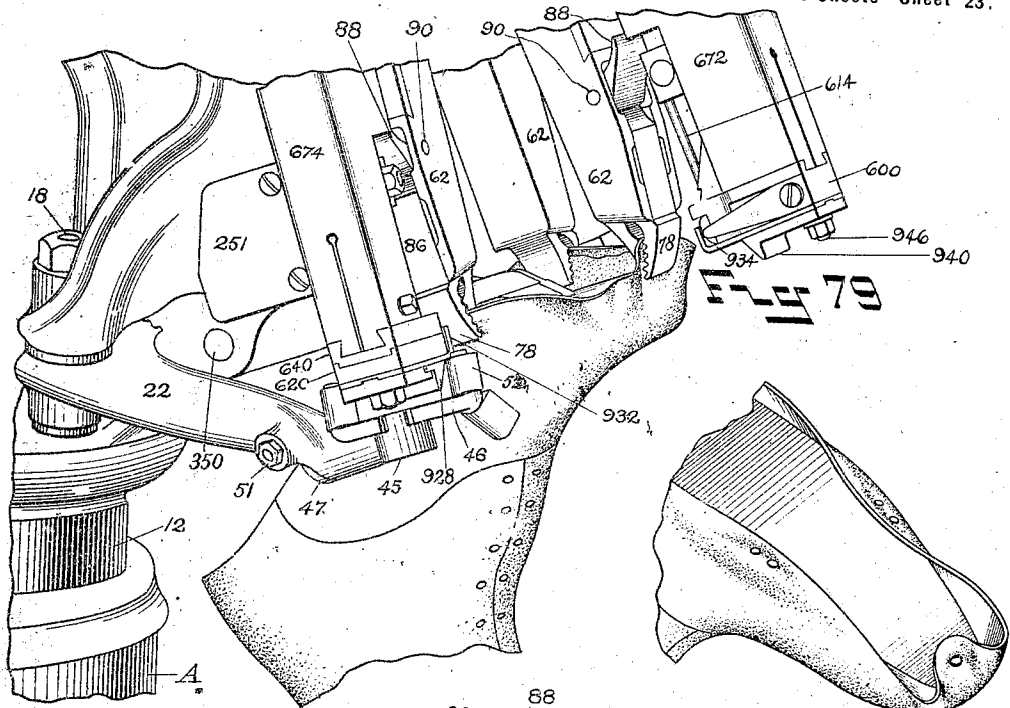


Fig 79

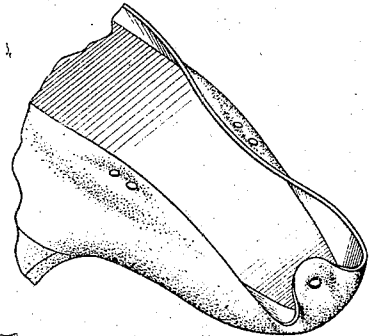


Fig 81

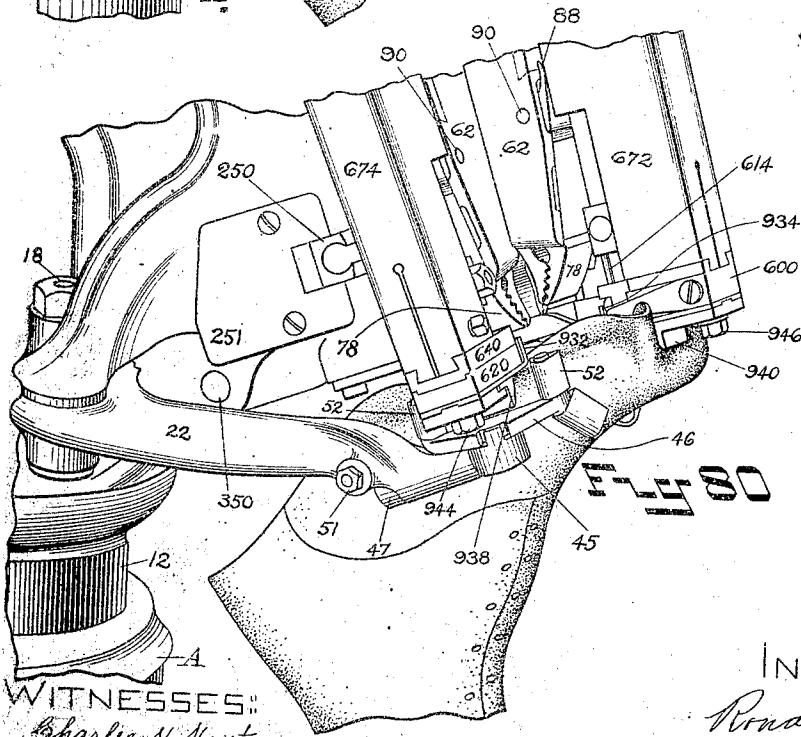


Fig 80

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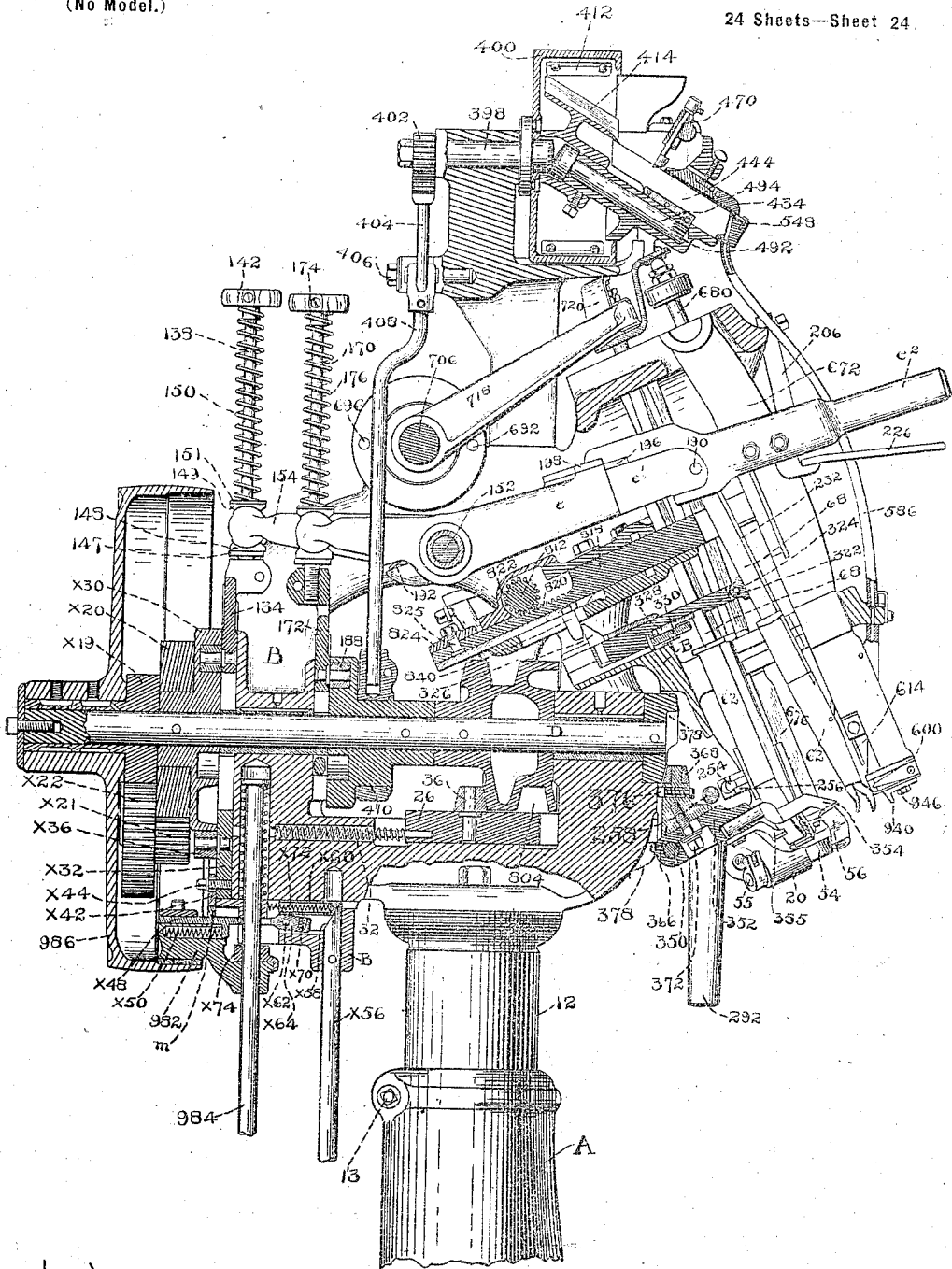
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(Application filed Sept. 19, 1899.)

(No Model.)

24 Sheets—Sheet 24.



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 Thomas H. Deely

BY 82 INVENTOR
 Ronald F. McFeely

UNITED STATES PATENT OFFICE.

RONALD F. McFEELY, OF BEVERLY, MASSACHUSETTS, ASSIGNOR TO THE UNITED SHOE MACHINERY COMPANY, OF BOSTON, MASSACHUSETTS.

PULLING-OVER MACHINE.

SPECIFICATION forming part of Letters Patent No. 663,777, dated December 11, 1900.

Application filed September 19, 1899. Serial No. 730,979. (No model.)

To all whom it may concern:

Be it known that I, RONALD F. McFEELY, of Beverly, county of Essex, Commonwealth of Massachusetts, have invented certain improvements in Pulling-Over Machines, of which the following, read in connection with the accompanying drawings, is a specification.

This invention relates to a machine for pulling boot or shoe uppers over the last preparatory to the lasting operation, and I believe that it is the first practicable machine of this character. It is obvious, however, that many features of this invention may be employed in machines not strictly for such pulling over.

The novel features of the invention are expressed in the claims hereinafter written.

In the drawings, Figure 1 is front elevation, and Figs. 2 and 3 are left and right side elevations, of the machine. Fig. 4 is a side elevation of the machine-column. Fig. 5 is a central vertical section showing clutch-pulley and operating connections. Fig. 6 is a perspective showing a portion of the operative parts assembled, the supporting-frame being omitted. Figs. 7 and 8 are perspective views showing details connected with Fig. 6. Fig. 8^a is a plan, partly in section, showing the bottom of the last-supporter. Fig. 9 is an elevation of Fig. 8^a sectioned on line 9 and shows also the last-supporter-operating connections. Fig. 10 is a plan view showing the auxiliary last-rests and operating connections. Fig. 11 is a side elevation of Fig. 10 and a section-actuating cam. Fig. 12 is an elevation of a section on line 12 of Fig. 11. Fig. 13 is an elevation, on an enlarged scale, showing parts connected with Fig. 10. Fig. 14 is an elevation of a section on line 14 of Fig. 11. Fig. 15 is an elevation of a section on line 15 of Fig. 13, showing also the fingers in section. Fig. 16 is a perspective view showing one of the side-pulling grippers. Fig. 17 is a front elevation, partly in section, of the side-pulling gripper. Fig. 18 is an elevation of a section of the side-pulling grippers on plane indicated by line 18 of Fig. 17. Fig. 19 is a perspective showing a section of the toe-pulling gripper mechanism. Fig. 20 is a plan of a section of parts connected with Fig. 21. Fig. 21 is a plan showing a section of the

gripper-supporting levers and connections. Fig. 22 is a side elevation, partly in section, showing the gripper-supporting levers and connections. Fig. 23 is an elevation of a section of the gripper-supporting levers on plane indicated by line 23 in Figs. 21 and 22. Fig. 24 is an elevation of a section of the toe-gripper-supporting lever on plane indicated by line 24 in Fig. 21. Fig. 25 is an elevation looking endwise at the gripper-supporting levers. Figs. 26 and 27 show details connected with Fig. 25. Fig. 28 is a side elevation, partly in section, showing one of the side-grippers, its supporting-lever, and actuating connections. Fig. 29 is a plan view showing the cam to actuate side-grippers. Fig. 30 is a side elevation, partly in section, showing the toe-gripper-supporting lever and actuating connections. Fig. 31 is a plan view showing the cam to actuate toe-grippers. Fig. 32 is an elevation of a section on vertical plane indicated by line 32 of Fig. 33, showing the shaft and connections for swinging the grippers. Fig. 33 is a plan view of a section on horizontal plane indicated by line 33 of Fig. 32, showing the shaft and connections for swinging the grippers, the grippers being also shown in cross-section, as indicated by the line 33 of Figs. 17 and 18. Fig. 34 is an elevation of a section on plane indicated by line 34 of Fig. 33. Fig. 35 is an elevation of a section on plane indicated by line 35 of Fig. 33. Fig. 36 is an elevation of a section on plane indicated by line 36 of Figs. 32 and 33. Fig. 37 is a plan view, partly in section, showing the gripper-bars and connections for outwardly moving the grippers. Fig. 38 is an elevation of a section on plane indicated by line 38 of Fig. 37. Fig. 39 is a plan view showing sections of the gripper-bars and fastening-inserting members, and particularly the connections for swinging the fastener-inserting mechanisms into and out of the operative positions and minor connections. Fig. 40 is an elevation of a section on plane indicated by line 40 in Fig. 39 and line 38 in Fig. 37. Fig. 41 is a front elevation of the arm and connections carried thereby for securing the toe part of the shoe-upper. Fig. 42 is a side elevation, partly in section, of Fig. 41. Fig. 43 is a cross-section on line 43 of Figs. 41 and 42.

Fig. 44 is a front elevation of the arm and connections carried thereby for securing the shoe-upper on one side. Fig. 45 is a side elevation, partly in section, of Fig. 44. Fig. 46 is a cross-section on line 46 of Figs. 44 and 45. Fig. 47 is an elevation of a cross-section of the twin fastener supporting and delivering mechanism for securing the upper on one side, the section plane being indicated by line 47 of Fig. 48. Fig. 48 is an elevation of a section on plane indicated by line 48 of Fig. 47. Fig. 49 is a perspective view showing detached the casing and pocket forming connections inclosed thereby represented in opened positions. Fig. 50 is the same as Fig. 49, showing the parts in closed positions. Figs. 51, 52, 53, and 54 are perspectives showing details connected with Figs. 47 and 48. Fig. 55 is a plan, partly in section, showing the driver-actuating mechanism. Fig. 56 is an elevation of a section on line 56 of Fig. 55. Fig. 57 is a section on line 57 of Fig. 55. Fig. 58 is a plan of a section on line 58 of Fig. 59, showing modified construction of parts shown in Fig. 55. Fig. 59 is an elevation of a section on plane indicated by line 59 in Fig. 58. Fig. 60 is a plan view showing detail connected with Fig. 55. Fig. 61 is an elevation of section on line 61 of Fig. 60. Fig. 62 is a perspective and partly in section, showing the tack holding and separating mechanisms. Figs. 63 and 64 are sectional elevations showing details connected with Fig. 62. Fig. 65 is an elevation of a section on plane indicated by line 65 in Figs. 67 and 69. Fig. 66 is a sectional view of detail connected with Fig. 62. Fig. 67 is an elevation of a section on line 67 of Fig. 65. Fig. 68 is an elevation of a section on line 68 of Fig. 69. Fig. 69 is a plan view of a detail connected with Fig. 62. Fig. 70 shows a detail connected with Fig. 62. Fig. 71 is an elevation of a section comprising parts pertaining to the mechanism for starting and stopping the machine. Figs. 72 and 73 are duplicates of Fig. 71, showing the parts in different positions. Fig. 74 is a plan of a section on line 74 of Fig. 71. Fig. 75 is an elevation of a section on line 75 of Fig. 71. Fig. 76 is an elevation of a section on line 76 of Fig. 77. Fig. 77 is a plan of a section on line 77 of Fig. 71. Fig. 78 is a perspective view representing the shoe and last assembled preparatory for presentation to the machine. Fig. 79 is a perspective showing a primary stage in the machine's operations. Fig. 80 is a similar view showing an advanced stage in the machine's operations. Fig. 81 illustrates the condition of the shoe after leaving the machine. Fig. 82 is an elevation of a central vertical longitudinal section of the machine.

The machine represented comprises a framework B, which is most conveniently formed in separate parts and securely bolted together, and as such it is hereinafter called the "head," whereupon the working parts of

the machine are principally mounted. The standard A, whereupon the head, and consequently the working members, is supported at a convenient altitude for the workman, has a longitudinal bore adapted for receiving the tang 12 of head B, with its bottom end resting upon screw 10, said screw being in screw-threaded connection with standard A for movement vertically in order to lift and lower the head to different altitudes, according to the requirements of different workmen. The desired altitude or vertical adjustment of the head being determined, it may be clamped firmly to the standard A by operating the screws 13, the jacket end of the standard being for this purpose slotted vertically, thereby permitting the screws 13 to draw it into clamping connection with tang 12 of the head.

The bolts 16 18 respectively operate for holding the lever-arms 20 22 in pivotal connection with extensions 15 19 of the head B. The arm 20 has toothed engagement by its rearmost end with a bar 24, arranged for endwise movement in the slide 26, which slide 26 carries a similarly-arranged bar 28, having toothed engagement with the rearmost end of arm 22. It also carries a stud 34, holding roll 36, for engagement with a cam 38 on shaft D. In the head B (see Fig. 12) is a groove 30, suitably formed for receiving and permitting endwise movement of the slide 26, and rearwardly of the slide 26 is a spring 32, operating to push the slide forwardly in said groove and normally holding the roll 36 in bearing with the cam 38. On the bar 28 is a spring 40, having one end on slide 26, its other end being against the collar 42 on said bar 28, said spring, being normally under tension, operating to hold the bar 28 rearwardly and adapted for contracting to permit yielding movement of the bar forwardly. A duplicate spring 44 on bar 24 has similar end bearings and being under tension operates in like manner for holding the bar 24 rearwardly, and it contracts in like manner for yielding movement of the bar forwardly. The arm 22 carries a rock-shaft 45, on which is mounted the plate 46, having a stud 48 journaled in said shaft and turning to permit oscillation of the plate 46 between stops 50. Said plate 46 carries the fingers 52, intended for bearing upon the shoe, and said fingers are preferably covered with soft leather or a similar non-abrasive material to prevent roughing or breaking the finish of the shoe-upper when applied thereto with pressure.

The plate 54, carrying fingers 56, is a duplicate of the plate 46 and is similarly connected with a rock-shaft 55 in the arm 20 for oscillating between stops 58. In operation of the machine it is the function of these fingers to close in after the upper has been stretched about the last and press upon and wipe over the upper after the manner of a workman's thumb and hold the upper to the last and prevent it from backsliding after the stretching devices let go and to further sup-

port the shoe during the operation of inserting the fasteners which secure the upper to the inner sole. To this end said fingers comprise an upper section designed more particularly for wiping over the upper and a lower section for bearing under, and consequently supporting the last for the driving operations. This action of the fingers is brought about by the cam 38, operating through slide 26, springs 40 44, bars 24 28, and closing together the arms 20 22, by which it will be understood that the inward closing of the arms 20 22 and the consequent pressure of the fingers 52 56 upon the last are effected yieldingly through the medium of said springs 40 44, the arms 20 22 and likewise the plates 46 54 being movable separately in conformity to the variable contours of the shoe-last. The closing-together movement of said arms 20 22 operates a contraction of the spring 32, said spring operating, when permitted by cam 38, to reversely move the slide 26 and intermediate connections, opening and normally holding said arms in the opened position. It may be here remarked that the said arms 20 22 are closed together and opened once only during each complete operation of the machine.

On the shaft 45 (see Fig. 14) is a fixed collar 47, having pivotal connection with the rod 49, which rod, extending through the arm 22, has screw-threaded connection with the nut 51. Said nut, resting on the arm 22, operates for limiting the rotation of shaft 45 in one direction, the amount of such permitted rotation being variable by differently adjusting the said nut. Rotation of said shaft 45 in the opposite direction is allowed to take place against the tension-spring 53. This construction is provided in order that the fingers 52 while moving inwardly shall first come into bearing on the shoe and then by rocking the shaft 45 against spring 53 ride yieldingly over the shoe material, pressing and wiping it upwardly into place while adjusting itself to the position desired thereof for acting as a support. A collar on the shaft 55 in duplicate of the said collar 47, a nut 59 on the arm 20, a rod in duplicate of the rod 49 connecting said collar and nut, and a cooperating spring arranged in duplicate of the spring 53 provide for like yielding and wiping operations in connection with the fingers 56.

The gripper member 60 is made, preferably, in one piece with the bar 62, which bar has an interior chamber 64, extending longitudinally of the bar and opening therethrough on one side, said opening being covered by the plate 66. The bar 68, entering said chamber 64 through an opening in the top thereof, has a shoulder 70 for contact with the sliding block 72, and besides this it has an extension 74 running downwardly for bearing upon the ledge 76 of the gripper member 78. Said extension 74 has also the inclined face 80 for contact with the inclined face 82 on said grip-

per member 78. In the bar 62 are grooves 84, adapted for receiving slide 86, said slide being freely movable endwise. The lever 88 being pivotally connected with a pin 90 in bar 62 is normally actuated by spring 92 into bearing with the under face 94 of plate 66, in which position (see Fig. 18) it sets against the top end of the slide 86, slide being thereby locked against movement upwardly. Spring 98, bearing one end on the ledge 96 of plate 66, presses upwardly the block 72. Said block has an extension upwardly with inclined faces 102 104 and carries springs 106 108, whereon the rolls 110 112 are mounted, said springs operating to lift the rolls 110 112 into position for stopping downward movement of block 72, by reason of the inclined faces 102 104 wedging into gripping touch with the rolls. The links 114 116 have pivotal connection by one end with the block 72 and carry the pin 118, whereon is pivotally supported the gripper member 78.

Movement of the bar 68 downwardly depresses, first, the rolls 110 112, and, secondly, the block 72, thereby contracting spring 98 and simultaneously resting the end of extension 74 upon the ledge 76 of gripper 78. Said bar 68 then continuing downwardly depresses the gripper member 78, which member simultaneously turning on the pin 118 goes downwardly and outwardly, operating to open the gripper-jaws for introduction of the intended material. The slide 86, which normally rests upon the member 78, will ordinarily gravitate downwardly therewith; but to further insure this movement of slide 86 downwardly the member 78 is provided with the shoulder 120 for engagement with boss 122 on slide 86, whereby the slide is positively depressed to the limit required for lever 88 to move into position for bearing upon, and consequently preventing movement of, the slide 86 upwardly. This operation of parts described supposes the bar 62 (see Fig. 2, 3, and 28) to be held against movement downwardly, and to this end the arrangement is such that the shoulder projections 124 on bar 62 will at the proper time and altitude come into bearing with stops suitably prepared therefor on the machine-head B, said bar being adapted thereby for movement upwardly at all times. The reverse or upward movement of bar 68 gives way for the spring 98 to act for closing the grippers. To this end the spring 98, expanding, lifts the block 72, causing it to follow the upwardly-moving bar 68, thereby lifting the links 114 116, and consequently the gripper 78, said gripper being now reversely turned on pivot 118 and guided into the closed or gripping position by cam 126 on slide 86. This movement of block 72 upwardly continues until arrested by the pin 81 coming into bearing with the plate 66 unless sooner stopped by the gripper 78 coming into contact with the material, if any be interposed between the grippers, at which time the rolls 110 112 will have been lifted to the position

where reverse movement of the block 72, and consequently opening of the grippers, is prevented by the inclined faces 102 104 interwedging the rolls 110 112. By this arrangement the material between the grippers is held primarily by the tension of spring 98, during which holding the bar 68, by lifting farther upwardly, operates on the member 78 through cam-face 80, and thereby first moves and locks the grippers into close and fixed engagement with the material therebetween, after which the bar 68, continuing upwardly, becomes a lifter, carrying upwardly the entire gripper-actuating mechanism, including bar 62, and consequently pulling and stretching the gripped material preparatory for the operations for overlaying and securing it to the inner sole.

At any time the grip of the grippers may be relaxed by tripping the locking-lever 88. This allows the material to draw out from between the grippers. The grippers may also be opened and closed by moving the bar 62 upwardly and downwardly on bar 68, and of this operation more will be said hereinafter. The machine, it will be understood, as I have herein chosen to illustrate my invention comprises three pairs of these grippers, which are respectively located for pulling the upper at the toe and on opposite sides along the ball portion of the last. This pulling of the upper is effected with a yielding tension by gripper-lifting mechanism, as follows: On shaft D is set a cam-block having the cam-groove 130, wherein runs a traveler connected with the slide 134, the operation of this combination being to carry the slide 134 downwardly and upwardly once during each complete rotation of the cam. Spindles 136 138, (see Figs. 6 and 28,) carried by the slide 134, have screw-threaded connection with the slide for adjustment vertically and also have screw-threaded connection, respectively, with nuts 140 142. On the spindle 136 is fixed a collar 145 and sliding collars 141 143 144 and a spring 146. Said spring 146, bearing on the nut 140, is normally contracted for pushing downwardly the collar 144, its tension being adjustably variable by suitably operating the nut 140. On the spindle 138 is a fixed collar 147 and sliding collars 148 149 151 and spring 150, which spring being contracted against the nut 142 operates normally for depressing the collar 151.

In the machine-head is a pin 152, (see Figs. 3 and 28,) on which the lever 154, through an intermediate sleeve, has support and rocking movement. Said lever 154 (see Figs. 3, 6, and 28) has its rearmost end between the collars 141 143 and is normally depressed by the spring 146, said end and collars being slotted to give place for the spindle 136 and allow for lifting and lowering movements of the lever end, as are required for rocking the lever 154 on pin 152. Said lever 154 supports one pair of the side-pulling grippers, which are connected therewith at a suitable point forwardly

of the pin 152. The lever is for this purpose provided with a socketed connection for receiving the ball 156 on the end of gripper-bar 68 in order to allow for universal turning and swing movements of the bar, and forwardly of this connection the lever 154 is extended to a position with its foremost or free end 158 in convenient reach for hand manipulation, as referred to hereinafter, by a workman standing in front of the machine. The lever 160 being a duplicate of the lever 154 is similarly supported by a pin in the machine-head, on which it permits like rocking movements. Its foremost end 161 being extended forwardly to the said point for convenient hand manipulation, its rearmost end is interposed between the collars 148 149 on spindle 138 and is normally depressed by spring 150, said collars and end being slotted to give place for the spindle 138 and allow for the lifting and lowering movements required of the lever end in rocking movement of the lever on its said fulcrum-pin. This lever 160, running substantially parallel with lever 154, is provided with a socketed contrivance forwardly of its said fulcrum-pin, wherein is seated the ball end of a bar like 68 in the second pair of side-pulling grippers, this combination giving support for and permitting universal turning and swinging movements of the grippers. It will now be observed that cam-groove 130 by operating an upward movement of slide 134, causing it to lift the rearmost end of levers 154 160, will reversely move the foremost ends of said levers, and thereby the gripper mechanisms attached to these levers will be respectively lowered to the gripping positions, the gripper members being simultaneously opened for grasping hold of the material of the shoe-upper. The altitude to which the grippers are depressed may be varied adjustably by suitably adjusting the spindles 136 138, and consequently shifting the altitude of collars 145 147 in relation to slide 134. A further movement of cam-groove 130 by operating the slide 134 downwardly will actuate the levers 154 160 by force transmitted through the springs 146 150, and thereby a yielding quality is introduced into the line of force through which the levers 154 160 are thus reversely moved for lifting the gripper mechanisms, and consequently pulling and holding the gripped upper to the last. It is deemed of importance here to observe, first, that this yielding quality prevents unduly straining, and consequently injuring or tearing the upper; secondly, the gripper mechanisms are thereby made separately yielding and self-accommodating to the different strains applied therethrough, while cooperating at the different points for drawing the shoe-upper about and into conformity with the lines of the last; thirdly, the levers which lift the gripper mechanisms being movable against the tension of said actuating-springs, respectively, do thereby allow for shifting the relative positions of the gripper mechanisms vertically,

whereby the whole line or belt of upper material suspended between the different gripper mechanisms may be shifted about the last at will by the workman operating said levers from the foremost or handle ends thereof. Opportunity for this hand manipulation is provided for in the cycle of the machine's operations, as referred to hereinafter, in order for the workman to observe the lines of the upper while it is thus suspended about the last and, if necessary, by moving the upper bring them into conformity with the corresponding last-lines preliminary to the overlaying and securing operations, and, fourthly, by this arrangement the upper is held to and about the last during said shifting operations with a substantially uniform tension, any slack in the upper due to a movement downwardly by one gripper mechanism being simultaneously taken up by the automatic action of the other gripper mechanisms upwardly, so that as the suspended upper rides over the last the workman may at a glance see when the lines of the upper are in full conformity with the last-lines. A spindle 170 in slide 172 (see Fig. 30) carries the nut 174, spring 176, the loose collars 178 180 182, and a fixed collar 184. The toe-pulling-gripper-carrying lever has its rearmost end e between the collars 180 182 and is actuated downwardly by the normal tension of spring 176, said end and collars being slotted to give place for spindle 170 and allow the movements required thereof in tilting the lever on pin 152. On shaft D is a cam 188 in connection with slide 172, which operates the slide in suitable time relations for rocking the lever on pin 152, and consequently lowering and lifting the toe-pulling gripper mechanism. As represented in the present instance, this toe-pulling-gripper-carrying lever is composed of three sections or parts $e' e^2$. It is located between the levers 154 160, with the handle end e^2 extending forwardly to a convenient point for hand manipulation by a workman standing before the machine. The part e' has one end pivotally connected by a pin 190 with the head end f (see Figs. 21, 22, and 30) of the toe-pulling-gripper bar, this connection giving support for and permitting swinging movement of the gripper mechanism forwardly and backwardly. Said part e' is supported for rocking movement on pin 152 and by its rearmost end gives bearing for one end of spring 192. Said spring, having its other end in bearing with part e , (see Fig. 22,) is normally contracted and operates to spread these parts. The handle member e^2 is pivotally connected with part e' by a pin 194 and carries in its rearmost end the tongue-piece 196. Under the plate 198 (see Fig. 23) is a recess 202 in part e , and under the plate 200 is a similar recess in part e' , and the tongue-piece 196 when positioned in both of these recesses will operate an interlocking of the parts $e^2 e' e$, whereupon they are all moved as one lever by cam 188. In the regular op-

erations of the machine these parts $e^2 e' e$, acting as one lever, respond to the action of cam 188, which operates in one direction thereupon through slide 172 and collar 182 for lowering the gripper mechanism and simultaneously opening the gripper members for gripping the upper and again in the opposite direction thereupon through slide 172, spindle 170, and spring 176 for lifting the gripper mechanism, and consequently gripping and pulling the gripped upper with a yielding tension, as hereinbefore described.

The plunger 214 (see Fig. 21) is arranged for endwise movement in part e^2 with its foremost end on the part e' , and behind the plunger is a spring 216. This combination operates yieldingly for holding the part e^2 in position for the said tongue-piece to interlock the parts $e^2 e$ and will normally restore this condition of said parts, when permitted, after displacement thereof, as stated hereinafter. By suitably moving the handle part e^2 the tongue-piece 196 may be drawn out of the part e , whereupon the parts $e^2 e'$ are adapted for movement as one lever on pin 152 independently of the part e , and consequently independent of the cam 188—all this to the end that the workman may at will lift this lever, and consequently effect a hand-pulling of the toe part of the upper. This may be of special use where it is considered important for the toe-caps in each pair of finished shoes to be of an even length or distance backwardly from the toe, because in the event of an upper being out of the uniform size or temper for stretching to the uniform point or alinement by the normal action of the machine the workman by suitably moving the hand part e^2 laterally may disconnect it from the cam-actuated part e and lift the lever by hand for stretching the material to the point required.

On the machine-head B (see Fig. 25) is a plate 206, fixed adjustably thereto by screw-threaded bolt 208. This plate has a ledge 210, on one side whereof is a vertical wall 212. A movement of the part e^2 to one side for placing the said tongue-piece in position to allow the said uplifting hand movement will place the finger 220, which is on the part e^2 , in a vertical line to the left side of plate 206, (see Fig. 27,) whereupon the uplifting hand movement taking place will carry the finger 220 upwardly to the altitude required for placing it on ledge 210. On the ledge 210 it is actuated laterally against the wall 212 by spring 216 acting on the part e^2 . When, now, the machine's operations get to the point where the part e has been lifted to its limit of upward throw by cam 188, the grippers are made to release the upper, whereupon the spring 192 operates for lifting the part e^2 to a still higher altitude, in which movement the finger 220 is carried above the wall 212. Thereupon spring 216 operates for moving the part e^2 in the lateral direction firstly to where tongue-piece 196 rides against

the plate 224 of part *e*, and upon said tongue-piece reaching the altitude of recess 202 it further moves the part *e*² laterally, carrying tongue-piece 196 into recess 202, and thereby interlocking the parts *e*² *e* in readiness for movement as one lever in response to the action of cam 188. It is to be noted here that the length of this hand updraw is limited by the altitude of ledge 210, which being on the plate 206 is variably adjustable by means of bolt 208.

It has been found desirable for the workman to have control, whereby independently of the machine's regular operations he may open and close the toe-pulling-gripper jaws at will in order that, if desired, they may be caused to release and grip the upper at times of rest in the cycle of the machine's operations, as more fully pointed out hereinafter. To this end a lever 226, (see Fig. 22,) pivoted on the part *e*², has its foremost end in position for hand operation by the workman, its rearmost end being engaged with lever 228. Said lever 228 has toothed connection with one end of lever 230, the other end of which lever 230 is engaged with a bar 232, having connection with bar 62 of the toe-pulling gripper mechanism. With this arrangement the workman by suitably operating the lever 226 may at will lift and lower the bar 62 for opening and closing the toe-pulling-gripper members.

Besides the hereinbefore-described opening and closing and lifting and lowering movements of the grippers provision is made for moving the side-pulling grippers laterally by mechanisms, as follows: In the gripper-bar members 62 are grooves 240, adapted for receiving the rotative and endwise-movable slides 242 244. (See Fig. 33.) In fixed connection with slide 242 by means of screw 246 is a slide 248, arranged for rotative and endwise movements in the sliding block 250, said block being arranged for endwise movements in the head B and held in place by plate 251. In fixed connection with slide 244 by means of screw 252 is a slide 254, arranged for rotative and endwise movements in the sliding block 256, said block 256 being arranged for endwise movements in the head B and held in place by a sleeved bracket 257, detachably fixed on head B. In the head B is a shaft 258, journaled for permitting movement rotatively. It carries on one end a fixed wheel 260, having toothed formations 262, intermeshing with similarly-formed toothed formations 264 on the slide 250. On the shaft 258 is a rotatively-movable sleeve 266, having toothed formations 268, intermeshing with similarly-formed toothed formations 270 on slide 256. Shaft 258 carries a nut 280, having screw-threaded connection therewith to allow operation for variably adjusting the tension of spring 282. Said spring 282, bearing one end on nut 280 and the other end on sleeved collar 284, is normally under tension operating to yieldingly force endwise movement of the

collar 284 on said shaft 258. Between the sleeved collar 286 and shaft 258 is a key 285 and a groove construction compelling movement of the collar and shaft as one rotatively, but permitting separate endwise movement of the collar 286 on said shaft. By preference, though not essentially so, this key 285 is extended into a recess 287 in collar 284, whereby to hold the collar 284 against movement rotatively on shaft 258. Between the parts 266 286 is a collar 288, which, being loose on the shaft 258, has pivotal connection by a pin 290 with the bifurcated end of lever 292. Said lever 292 carries the plate 294, which normally has one end in a recess 296 of part 266, its other end being in recess 298 of part 286. Movements of the lever 292 swinging in a vertical plane will rock the shaft 258 by power transmitted from the lever 292 through plate 294, collar 286, and key 285, thereby turning the toothed wheel 260 for actuating slide 250, and consequently swinging the side-pulling gripper mechanism along one side of the last. Said lever 292 operating simultaneously through the plate 294 turns the collar 266 for actuating the slide 256, and consequently swinging the other side-pulling gripper mechanism along the other side of the last. Engagement with slide 250 being on the under side of shaft 258 and engagement with slide 256 being on the top side of shaft 258, it follows that a movement of one of the said gripper mechanisms in line from heel to toe is attended by a movement of the other of said gripper mechanisms in line from toe to heel of the last. By this arrangement obviously the shoe-upper may be shifted bodily in either direction around the last longitudinally by suitably swinging the lever 292 in a vertical plane at right angles to the axis of shaft 258; but the arrangement of mechanism described also permits of causing either one of the said side-pulling gripper mechanisms to make the said swinging movements along the side of the lasts, while the other of said side-pulling gripper mechanisms is held stationary, and thereby may be rearranged the lines of a section of the upper material. To accomplish this movement of the grippers on one side of the last, the operator first swings the lever 292 on pin 290 an amount sufficient to withdraw the plate 294 from recess 296 of part 266, whereupon the part 266, and consequently the slide 256 and the gripper mechanism connected therewith, will remain stationary, while the lever 292, if swung as before described, will now turn the shaft 258, moving the slide 250, and consequently swinging the gripper mechanism attached thereto. Swinging of the lever 292 in the opposite direction on pin 290 an amount sufficient to withdraw plate 294 from the recess 298 of collar 286 will allow the collar 286, shaft 258, slide 250, and gripper mechanism actuated thereby to remain stationary, while the lever 292, if swung as before described, will now turn the part 266 for moving the slide 256, and con-

sequently swinging the side-pulling gripper mechanism attached thereto. During these movements of the side-pulling grippers the toe-pulling grippers may be released from the upper, if desired, this being effected by suitably operating the hand-lever 226. The sliding members 242, 248, 244, and 254 are obviously intended to prevent cramping and grinding of the actuating parts. Pivotally supported by a pin 300 on lever 292 (see Fig. 32) is a lever 302, having toothed connection with the slide 303, which has one end in a recess 304 of the part 257 and operates for locking the lever 292 against the described swinging movement in vertical plane at right angles to shaft 258. This lever 302 may be actuated by the workman at will against the tension of spring 306 for moving the slide 303, and consequently releasing the lever 292.

After the gripper mechanisms have gripped and pulled the upper vertically they are moved inwardly over the shoe-bottom for overdrawing the gripped part of the material preliminary to the operations whereby said parts are secured upon the inner sole. To this end are provided three plates, of which only two, 316 and 318, are shown, (see Figs. 28, 30, and 40,) which, being socketed for movement in the head B, have bearing with the bars 62 of the gripper mechanisms, respectively, and are each actuated forwardly by duplicate springs, only one of which (marked X³¹⁶) is shown. This combination operating to move the grippers inwardly over the shoe-bottom with a yielding tension will prevent tearing or unduly straining the gripped material. Said springs are backed up by screw-threaded plugs, only one of which, 316, is shown, whereby the tension of said springs may be adjustably varied. In making these overdrawing movements the gripper mechanisms are limited and after completing the overdrawing operations are reversely moved to the outermost or gripping positions by mechanism, as follows: The slide 322, (see Figs. 37 and 38,) arranged for permitting end-wise movement in a groove of the head-plate B, supports at one end, in pivotal connection therewith, the foot member 324 in touch with the bar 68 of the toe-pulling gripper mechanism, and at the other end it carries the post 326 for engagement with an actuating medium, referred to hereinafter, whereby at times the slide is moved forwardly, as indicated by arrow *n*, Fig. 38. On the slide 322 is a part 328, connecting with the screw 330, whereby it is held, but adapted for adjustment longitudinally of said slide, said part 328 having inclined edge faces 332 334. An arm 336 has contact with the inclined face 334, whereby to be swung outwardly on pin 338 during the movement of part 328 forwardly. A duplicate arm 340 is similarly arranged in touch with the inclined face 332, whereby to be swung outwardly on pin 342. A part 344 has touch with the bar 68 of one side-pulling gripper mechanism and moving outwardly with

the arm 336 pushes the said gripper mechanism outwardly against the tension of its overdrawing-spring, said part 344 being supported in the arm 336 for rocking movement rotatively in order to prevent cramping of the parts. A duplicate part 346, supported in like manner by the arm 340, has touch with the bar 68 of the other side-pulling gripper mechanism and moving outwardly with said arm will in like manner push outwardly the said other side-pulling gripper mechanism. The relative arrangement of these parts is such that during the movement of slide 322 forwardly the gripper mechanisms will be carried outwardly to the gripping positions, where they stand for receiving between the opened grippers the upwardly-projecting edges of the shoe-upper. The required limit of this movement outwardly is variable, depending upon the character of the shoe to be worked upon at different times, and herein lies the object of making the part 328 adjustable in order that its positions on the slide 322 may be shifted as required for giving the necessary limit of outward movement of the side-pulling grippers, the movement of slide 322 forwardly, and consequently the movement outwardly of the toe-pulling grippers, being variable by adjustably shifting the slide-actuating mechanism, as described hereinafter. The speed and time movement of the side-pulling gripper mechanism relatively to the said movement of the toe-pulling grippers will depend upon the shape or contour of the edge faces 332 334 and may obviously be shifted by differently forming such faces.

It may be well to observe at this point that the parts of the shoe to be operated on are "assembled" by placing the upper, with its lining material and heel-stiffening, properly in position over the last, putting in place the toe box or stiffening, if any is used, and placing the inner sole upon the bottom of the last, with the edges of the upper and lining materials projecting outwardly and upwardly in manner substantially as represented by Fig. 78. In this condition it is for convenience called the "shoe" and at times is referred to as such in this specification. The shoe is then taken in hand by the machine operator and presented, bottom upwardly, to the "last-supporter," the movement toward the last-supporter operating to carry the outwardly and upwardly standing edges of the upper and lining materials in between the gripping members, which, it will be understood, are suitably stationed apart and ready for receiving the same.

The last-supporter of this present machine comprises mechanism and operative connections as follows: In the machine-head B is a pin 350, (see Figs. 2, 3, 8^a, and 9,) on which the carrier 352 is supported for swinging vertically. This carrier supports the toe and side rests 354 355 356, which are designed to operate against the bottom of the shoe's inner sole. The toe-rest 354, having its tang end socketed

in the carrier, is held thereto by the screw-
 threaded bolt 358 and may be adjusted lon-
 gitudinally for meeting the requirements of
 use in connection with lasts of different
 5 lengths. The side-rests 355 356 have con-
 nection with the carrier by screws 360 362,
 respectively. Said screws may be operated
 for clamping the rests and carrier tightly to-
 10 gether and further serve as pivots on which
 the rests when loosened may be turned for
 adjustment laterally, according to the re-
 quirements of lasts which differ in width.
 Said rests have toothed engagements 364,
 15 whereby the said adjustment of the rests lat-
 erally may be carried out with uniform re-
 sults. On carrier 352 is a standard 366, hav-
 ing at its top end a roll 368 and in its bottom
 end a recess for the rib 370, whereon the
 standard slides, and it is clamped firmly to
 20 the carrier by an adjustable screw 372. This
 allows of the standard being differently po-
 sitioned on the carrier to compensate for the
 different thicknesses of the material to be
 worked. In the standard 366 is a spring-
 25 actuated plunger 376, and on the carrier 352
 is a spring 378, which spring 378, having one
 end on the head B, operates for uplifting the
 carrier 352, said uplifting movement being
 30 stopped by the plunger 376 coming into bear-
 ing with the head B. The relative arrange-
 ment of the parts involved is such that the
 plunger 376 takes its bearing on head B in
 time for stopping the carrier 352 when the
 rests 354 355 356 are at the proper altitude
 35 for resting the normally-prepared shoes of a
 given class in position with the edges of the
 shoe-upper extending between the grippers,
 ready for the gripping operations; but it
 may sometimes happen that a shoe is met
 40 with which, for reason or by accident, has its
 material cut shorter or more scantily than
 others of its class and which will not, there-
 fore, extend upward sufficiently to be be-
 tween the grippers when said shoe is placed
 45 against the rests 354 355 356, said rests be-
 ing in the normal position of the predeter-
 mined relation of said parts. In such case it
 is that the workman by lifting the shoe up-
 wardly overcomes the spring-actuated plun-
 50 ger 376, carrying the rests, and consequently
 the shoe, to the abnormal height required
 for placing the edges of said abnormally-
 prepared shoe-uppers between the gripper
 members. Instead of the spring-actuated
 55 plunger 376 a screw may obviously be em-
 ployed and adjustably shifted as the occasion
 requires it. On shaft D is a cam 378, which,
 operating through roll 368 and standard 366,
 after the grippers have gripped the upper,
 60 actuates the carrier 352 downwardly, and con-
 sequently depresses the rests 354 355 366,
 first, to an altitude for placing the shoe in
 a plane to allow the hereinafter-described
 nail-carrying wiper mechanisms to pass over
 65 the shoe-bottom in touch with the material
 overturned thereby, and, secondly, to an alti-
 tude for placing the shoe in a plane below the

said wipers, whereby after the overturning and
 nailing operations are completed the secured
 material is out of touch with and conse- 70
 quently uninjurably by the return movements
 of said wiper mechanisms. The different
 thicknesses of materials worked upon by the
 machine at different times are compensated
 for by shifting the position of standard 366 75
 on carrier 352. It will be understood that a
 stationary last-supporter might be employed
 instead of the one having these movements
 to different altitudes without departing from
 the essential spirit of the invention. After 80
 the material has been gripped, pulled, and
 carried inwardly over the shoe-bottom it is
 pressed upon and secured in place by fasten-
 ing it to the inner sole. To this end a secur- 85
 ing mechanism (in the present instance con-
 sisting of mechanism for feeding, delivering,
 and driving loose tacks) is employed in con-
 nection with wipers, which wipers push for-
 wardly, overlying and wiping the material
 closely down upon the inner sole preparatory 90
 for the securing operations. The wipers of
 this present machine are arranged for mov-
 ing into place and holding the material in
 time for the grippers to let go and give place
 for the tack-driving members to come into 95
 position and drive the fastening-tacks.

Supported in the head B for movement ro-
 tatively is a shaft 398, to which is secured the
 basin or hopper 400. Said shaft carries a pin-
 100 ion 402, which has engagement with a rack
 on one end of lever 204. Said lever 204, be-
 ing supported for rocking movement on pin
 406, has pivotal connection by its other end
 with rod 408, which rod has connection with
 an eccentric 410 on shaft D, whereby to be 105
 moved endwise, this combination operating
 to rock the hopper 400 rotatively. The loose
 tacks are deposited in bulk in the hopper 400
 and in the rocking movements of the hopper
 are lifted on the plates 412 to a point above 110
 the chute-pans 414, whereupon they pass from
 the plates 412, and dropping upon the chute-
 pans they slide down the inclined walls
 thereof into the channel-grooves 416 418 420
 422 424. In these channel-grooves the tacks 115
 become suspended by their heads on the plates
 438 440 442 444 446 448 450 452 and gravitate
 downwardly to the discharging ends thereof.
 On said plates are covers 429 430 431, held in
 place above the channel-grooves by screws 120
 432 433 435 and having end sections 434 437
 439 hinged thereto for swinging upwardly
 against springs 435 436 441, (see Figs. 65 and
 67,) whereby they are yieldingly held in place
 above the discharge ends of the channels. 125
 Said covers have their under faces grooved
 to give passage for the heads of the down-
 wardly-moving tacks. The surface walls of
 the said grooves are located at a distance
 above the channel-grooves to stop the tacks 130
 from lifting or riding upwardly, and conse-
 quently becoming cramped or entangled to-
 gether after being once properly in place un-
 der the covers. In order to keep the tacks

from clogging at the hopper ends of the said covers and in the channel-grooves thereabove, mechanisms are employed as follows: A shaft 460 (see Figs. 62, 63, and 64) gives support for the carrier 462, in which are the agitators 468 470 472. Said agitators have support in the carriers to permit sliding movement vertically and gravitate downwardly, keeping their grooved bottom ends over the channel-plates of the tack-raceways. By a movement of the shaft 460 in one direction these agitators are moved upwardly along the raceways to disturb by their bottom ends the tacks, if any, which may have become crowded and lodged together in the channel-grooves above the hopper ends of the covers 429 430 431. A reverse movement of the shaft 460 carries the agitators into position, with their bottom ends resting upon the inclined end faces of the said covers 429 430 431, whereby opportunity is presented for the tacks which are now properly suspended in the channel-grooves to pass under the covers. Said shaft 460 carries a pinion 486, having engagement with the rack-slide 482, (see Figs. 62, 63, and 64,) and the required rocking movements of shaft 460 are effected intermittently by a cam 474 on the hopper 400, which, to avoid breakage of parts, is made to operate through a yielding power-transmitting mechanism comprising the slides 480 482 and springs 484 488. To this end slide 480 allows of endwise movement in the slide 482, its head end being against the cam 474, whereby it is moved inwardly against the spring 484, this movement being imparted yieldingly by spring 484 to slide 482, causing it to move, and consequently turn the shaft 460 in one direction. On the slide 482 is the spring 488, which operates whenever permitted by cam 474 for reversely moving the slide 482, and consequently turning the shaft 460 in the other direction.

At the discharge ends of the raceway-channels are tack separating and feeding mechanisms and actuating connections therefor, as follows: In the head B is a tubular slide 490, (see Figs. 65 and 67,) having toothed engagement with pinion 492 of shaft 494. Said shaft 494, being in toothed engagement with the shaft 398, is rocked thereby rotatively and moves the slide 490 back and forth endwise. In the slide 490 is a spring 496, which is normally held in a condition of partial contraction by one end bearing on a shoulder 500 of the slide and the other end on a collar 502, which is held in adjustable connection with the slide by screw 504. The slide 506 has end projections 508 510, which, extending through slotted openings in the slide 490, have bearing on the spring 496. This combination operates for moving the slide 506 endwise in unison with slide 490, the power being applied yieldingly through spring 496 and allowing stoppage in the movement of slide 506, which, being taken up by the spring 496, obviates any breakage of the parts connecting with and operated by the slide 506.

Gates 526 528 530, composed of thin plate material, are located for bearing against the end faces of the raceway-channel-forming plates 438 440 442 444 446 448 450 452. The gate 526 stands before the channel-grooves 416 418 and is supported by an arm 514, said arm being adjustably fixed on slide 506 by screw 520. The gate 528 stands before the channel-groove 420 and is supported by arm 516, said arm being adjustably fixed on slide 506 by screw 522. The gate 530 stands before the channel-grooves 422 424 and is supported by the arm 518, which arm is adjustably fixed on slide 506 by screw 524. The slide 506, operating through arms 514 516 518, moves the gates 526 528 530 endwise in one direction, which opens the channel-grooves for passage of tacks, and then in the other direction for closing said grooves against the passage of tacks. Connected with the raceways are end blocks 540 542 544, which back up and give support for the gates. In the end blocks are holes 545, (best shown in Figs. 65 and 68,) corresponding one with each of the channel-grooves, through which tacks taken from the channels are discharged. On the end blocks are cap-plates 546 548 550, which overlap the raceway, said cap-plates, respectively, having throat-openings 552 above the said discharge-holes 545 and extending forwardly into the raceway-channels, as shown in Fig. 62. Under the said cap-plates are feeder-plates 554 556 558, which are respectively supported in the end blocks 540 542 544 and permit movement endwise. The feeder-plate 554, being composed of thin plate material, has openings 562 564, (see Fig. 69,) with throatways 566 568 opening therefrom outwardly through the side edge of the plate, and has also the projections 570 572. In connection with the plate 558 is a spring 560, which has bearing with the end block 544 and being contracted by a movement of the feeder-plate in one direction will reversely move the feeder-plate when permitted so to do. A duplicate spring (not shown) similarly arranged in the end block 540 has like connection with the feeder-plate 554, said plate 554 being itself a duplicate of the plate 558, with duplicate openings, throatways, and projections for manipulating tacks from the channel-grooves 416 418. The feeder-plate 556 has one opening 574, with a throatway 578 and projection 576, and is connected directly to the arm 516. The relative arrangement of these mechanisms is such that in operating the machine tacks coming down the raceway-channels stop first by coming against the gates 526 528 530. These gates by a movement of the slide 506 in one direction are drawn endwise sufficiently to open the channels, whereupon the tacks advancing stop by coming against the edges of the feeder-plates 554 556 558, respectively. Reverse movement of the slide 506 now takes place, reversely moving the gates and closing the channel-grooves, the gates having by this operation separated the foremost of said tacks

from the others by passing endwise between it and those above. The slide 506 still moving carries the feeder-plate 556 endwise and engaging the head 580 with the end of feeder-plate 558 it moves the feeder-plate 558 endwise against the reversing-spring 560. Also by engaging the head 582 with feeder-plate 554 it moves the said feeder-plate 554 endwise against its said reversing-spring. During this endwise movement of the feeder-plates the separated tacks are drawn into the throat-openings of the feeder-plates, respectively, and are carried forwardly to where the openings in said plates register with the discharge-openings in the end block of the raceways, whereupon the tacks drop downwardly therefrom through said openings into the conductor-pipes 584, 585, 586, 587, 588, and are conducted thereby into the mechanisms which support the tacks at the driving-point and which cooperate in the driving operations, whereby said tacks are inserted through the overturned shoe-upper and inner sole as follows: At the toe of the shoe one tack only is inserted, and in this connection a block 600 is employed, (see Fig. 42), having a hole 602. Said block gives support for the parts 604 606, which together form the pocket 608. These parts are supported pivotally in the block 600 and are normally closed together by springs 610 612. These parts are in relation so that the pocket 608 stands directly below the hole 602, into which the tack passes from conductor 586 and stands with its point resting in the bottom of said pocket 608. In this condition it may be stationed at the point for driving and is driven by the driver-rod 614 which to that end passes downwardly through the hole 602, causing the tack to force the parts 604 606, which, opening against the springs 610 612, allow passage for the tack and hammer-rod to go through, said tack being thereby forced into the material below, whereupon the driver-bar is lifted and the springs 610 612 operate for again closing together the parts 604 606. The driver-bar 680, moving downwardly, displaces the conductor 586 against a spring 681, which spring operates upon the return of the driver-bar for placing the conductor in position for discharging the next tack into said pocket 608.

In the present machine two tacks are inserted on each side of the shoe, and in order that these two tacks may be inserted in close proximity to one another a different mechanism than the one described above is used in this connection for supporting two tacks as follows: The block 620 has a chamber 622, in which are placed the outer slides 624 626 (see Figs. 47, 48, 49, and 50) for movement endwise. Between said outer slides 624 626 are placed the block-slides 628 630, and these permit endwise movement also. The slides 624 628 comprise a pocket 632, said pocket being formed one-half in each of said slides, and a similar pocket 634 is formed one-half in each of the slides 626 630. Connected with

the block 620 is a block 640, having two holes 642 644 and a shoulder 646. Said shoulder operates to limit the endwise movement of said block-slides 628 630, stopping them in position with their half-pockets alining with the corresponding sections of holes in the block 640. The wall 623 operates in like manner for stopping the slides 624 626 in position with their half-pockets registering with the corresponding sections of the holes in the block 640. The spring 636, seated one end on the slide 624 and the other end on the slide 628, operates normally for endwise moving, and consequently closing together the slides 624 628. A duplicate spring 648 operates normally for endwise moving, and consequently closing together the slides 626 630. The relative arrangement of said parts is such that when the slides 624 628 are closed together the pocket 632, which is formed therebetween, will stand directly beneath the hole 642 in block 640, and in like manner will the pocket 634, formed between the slides 626 630, stand directly below the hole 644 of block 640 whenever the said slides 626 630 are closed together. From these positions the slides permit movement in opposite directions against the springs 636 648 for opening the pockets to permit passage of tacks therethrough.

It will now be understood that a tack passing through the conductor 584 will discharge into the hole 644 and stop with its point resting in the pocket 634, and in like manner a tack passing through conductor 585 will discharge into the hole 642 and stand with its point resting in the pocket 632. In this condition the tacks are ready for the driving operations which are carried out by the drivers 650 652 going downwardly against the tacks and respectively forcing the slides 624 626 628 630 to open by moving in opposite directions endwise against the springs 636 648, whereby openings are made for the tacks and drivers to go through and insert the tacks into the material located below.

A second mechanism in duplicate of the one last described, comprising the outer block 656, is employed for supporting two tacks cooperating with the conductors 587 588 and drivers 668 670 for in like manner inserting two tacks on the other side of the shoe-bottom.

In the general operations of the machine represented it is required for the tack supporting and driving mechanisms to move forwardly into position for the driving operations and then retire backwardly in order to give place for the gripping and pulling operations. In this connection the arms 672 674 676 are employed, said arms having their top ends socketed in the head B (see Figs. 60 and 61) to permit swinging movements, whereby their bottom ends are carried forwardly and backwardly over the shoe-bottom. To the bottom end of said arm 672 is attached the hereinbefore-described mechanism comprising block 600 (see Fig. 42) and connections for supporting a single tack, said arm carry-

ing also the conductor-pipe 586 and the endwise-movable driver-bar 680, which operates the driver-rod 614. To the bottom end of said arm 674 is attached the hereinbefore-described mechanism comprising block 640 and connections for supporting two tacks. This arm also carries the conductors 584 585 and the endwise-movable driver-bar 682 which operates the two driver-rods 650 652. To the bottom end of said arm 676 is attached the block 656 with said duplicate connections for holding two tacks, and this arm carries the conductors 587 588 and the endwise-movable bar 694 which operates the driver-rods 668 670. In fixed connection with the head B, by means of bolts 692 696 698 700, are the tubular parts 702 704. (See Fig. 55.) In said parts a shaft 706 is mounted for rocking movements rotatively. In the part 702 is a spring 708, having one end diametrically disposed in the shaft 706 and the other end similarly disposed in a cap 710. Said cap 710 is supported for movement rotatively on the part 702 and may be operated for twisting and consequently developing and adjustably regulating the tension of spring 708, said tension being maintained by suitably operating the screw-threaded bolt 712 for clamping the cap 710 to the part 702.

In the part 704 is another spring (a duplicate of the spring 708) which is connected in like manner with the end of shaft 706 and a second cap 714, mounted for rotative movement on the end of part 704 and adjustably clampable thereto by screw 716. The shaft 706 has an arm 718 projecting forwardly and resting on the plate 720, which plate 720 rests upon the top ends of the driver-carrying bars 680 682 694, and through said arm, plate, and bars the force is supplied from said springs for driving home the tacks, said driving force being developed in each instance by lifting the arm 718 against the tension of said springs, as referred to hereinafter. The angle formed between the circumferential part of the spring and its diametrically-disposed end projection presents a curved part 709, to accommodate which the wall of the end groove in shaft 706 is cut away, as shown in Fig. 56. The springs being wound right and left present the said angular formations on different sides. The groove in one end of said shaft is formed to admit the right spring, while the groove in the other end of said shaft is formed to receive the left spring. In this way the proper placing of the springs is at all times insured and irregular placement and consequent breakage of the springs is avoided. On the driver-carrying bars are disks 722 724 726, packed with leather 728 or like material to serve as buffers for stopping the movement of the bars against the head B. Fig. 58 is a modified construction, a plug 730 being made to serve the function of cap 710, the part 734, which takes the place of part 702, being clampable thereto by screw-threaded bolt 732.

In the head B is a pin 800, (see Fig. 3,) on which the lever 802 is mounted. The lever

802 has an arm 816 in the cam-groove 804 of a cam-wheel on shaft D, whereby the lever is intermittently rocked on the pin 800. Said lever has adjustably fixed on its topmost end a toothed rack 808 in mesh with pinion 810 of the shaft 812, which shaft is supported for rotative movement in the head B. The part 814 has support on shaft 812 and at its end 817 carries a traveler which runs in the groove 804 of said cam-wheel on shaft D, whereby the part 814 is intermittently rocked on the shaft 812. In the part 814 is a slide 818, which has toothed formations 820 in mesh with toothed pinion 822 on shaft 812, whereby to be moved endwise in unison with the rocking movement of said shaft. On the slide 818 and made fast thereto by the bolt 824 is a part 824, whereon is pivotally supported the lever 826. In the handle end of said lever 826 is the plunger 828, having engagement with toothed formations 830 of part 824, whereon it is yieldingly held by a coiled spring 832. The bar 838 has support on the slide 818 for movement forwardly and backwardly as one therewith, and it carries the stud 840 for engagement with the stud 326 on slide 322; (see Fig. 40,) and this, it will be understood, is the actuating mechanism hereinbefore referred to for forwardly moving the slide 322. Said bar 838 has toothed formations 836 in mesh with toothed formations 834 on lever 826 and permits endwise movement independently of the slide 818, the movement being effected in either direction by suitably operating the lever 826, the parts being normally held against this movement by the spring-actuated plunger 828. This arrangement allows for the stud 840 being differently positioned on the slide 818, whereby to vary the forward position of the slide 322, the amount required being determined by the movement required of the toe-pulling gripper mechanism relatively to the last, and it is variable according to the lasts of different sizes, as more particularly described hereinbefore.

In the part 814 is an endwise-movable slide 844, (see Fig. 39,) having ball-and-socket-joint connection with the block 846, which block is recessed in the arm 674 for movement endwise of the arm. Also in the part 814 is a second endwise-movable slide 848, which is a duplicate of said slide 844, and it has a similar ball-and-socket-joint connection with a block 850, said block 850 being a duplicate of the block 846 and recessed in the arm 676 for movement endwise thereof. The slide 844 has a wedge-face 852 in bearing with a similar face on the plunger 854, which plunger is socketed for endwise movement in the slide 856. It is actuated forwardly by the spring 858, said spring being backed up by a nut 860, having screw-threaded engagement with the slide 856, whereby to be moved for adjustably shifting the tension of said spring. The slide 862, being a duplicate of the slide 856, has screw-threaded engagement with nut 864. In the slide 862 is a plunger 863, a dupli-

cate of the plunger 854, arranged in a similar wedge-faced engagement with slide 848 and actuated forwardly in like manner by a spring 865, arranged in duplicate of spring 858, the tension whereof is adjustably variable by suitably operating the said nut 864. Supported pivotally on the part 814 by means of pins 868 870 are rack-levers 872 874. The said lever 872 has toothed engagement with the slide 818 and similar engagement with the slide 862. The lever 874 has toothed engagement with slide 818 and similar engagement with the slide 856. The parts 880 882, which are duplicates of the slides 856 862, without toothed formations, are fixed to the slide 818 for travel therewith as one part. In the part 880 is a plunger 884, having wedge-face 886 in touch with a similar face on the part 888. The nut 890 has screw-threaded engagement with part 880, whereby to be operated for shifting the tension of spring 892, which spring actuates the plunger 884 forwardly. The part 888 rests between the slide 818 and part 880 and is in sliding touch therewith, its lug end being socketed in the part 904, which has sliding connection with the arm 672. The part 906, which is a duplicate of part 888, is in sliding touch between the part 882 and slide 818 and has its lug end socketed in the part 910, which part 910 also has sliding connection with the arm 672. In the part 882 is a plunger 912, having the wedge-face 914 in touch with the wedge-face of part 906. It is actuated forward by spring 916, which spring is backed up by a nut 918, having screw-threaded engagement with part 882, whereby to be operated for adjustably regulating the tension of said spring. On the slide 818 is a driver-bar 680, and on the parts 856 862 are plates 924 926 for engaging, respectively, under the plates 928 930 (the latter not shown) on the driver-bars 682 694, the functions of these said plates 920 924 926 being to uplift the driver-bars 680 682 694 during the upwardly-tilting movement of the part 814.

It will now be understood that the slide 818 by going forwardly operates through the respective mechanisms described for swinging outwardly the arms 672 674 676, whereby the bottom ends thereof, and consequently the mechanisms carried thereby, are caused to retire over the shoe-bottom to a distance backwardly from the edges thereof. This movement is caused to take place while the part 814 is tilted downwardly to an altitude which, as a result of said movement, places the plates 922 928 930 of the driver-bars, respectively, in vertical alignment with and above the plates 920 of slide 818 and 924 926 of parts 856 862, whereby during the next upward movement of said part 814 the driver-bars will be uplifted, raising the arm 718, whereby is developed the tension of the driving-springs for driving home the tacks, this operation also lifting the driver-rods to an altitude for allowing the tacks to discharge

from the conductors into the tack-holders carried upon the bottom ends of said arms. This uplifting of the part 814 having taken place, the slide 818 moves backwardly, operating to reversely swing the arms 672 674 676, whereby the bottom ends thereof, and consequently the mechanisms carried thereby, are caused to pass inwardly over the shoe-bottom to the positions required thereof in order to drive the fastenings. On the bottom of the blocks 640 600 656 are wipers 932 934 936, consisting of smoothly-polished plates, which during the movement of said arms inwardly ride over the material, wiping and pressing it down upon the inner sole preparatory for the fastening operations. Said blocks 640 600 656 are also made to carry the gages 938 940 942, the end faces whereof come against the edge faces of the shoe operate for stopping the movement of said arms inwardly, and consequently determine the distance of the fasteners from the edge of the shoe, said gages 938 940 942 being held in place by screw-threaded bolts 944 946 948, and thereby admitting of adjustment for differently measuring the distance allowed for the arms to override the shoe-bottom. The slide 818 having reached the point in its said movement backwardly whereat the moving of said arms inwardly is arrested, said slide 818, continuing its movement backwardly, will now cause the plungers 854 863 884 912, by reason of their wedge-faced engagement, respectively, with the members 844 848 888 906, to ride up over said members 844 848 888 906 and move backwardly against the springs 858 865 892 916, respectively. During this latter movement of slide 818 the plates 920 924 926 will have been drawn from under the plates 922 928 930 on the driver-bars 680 682 694, whereupon said bars will be operated for driving home the tacks. The part 814 then moves downwardly, whereupon the slide 818, going forwardly, operates first for again placing the plates 920 924 926 under the plates on the driver-bars preparatory for the next uplifting thereof. This movement of slide 818 is taken up by plungers 854 863 884 912 returning back to normal position, after which the slide 818, continuing forwardly, operates for outwardly swinging the arms 672 674 676, as above described. The rack 808 is made adjustable in order to permit the arms 672 674 676 to be differently positioned at different times relatively to the connecting mechanisms.

The machine also comprises a starting and stopping mechanism as follows: A shaft 960, journaled in the machine-base, carries a fixed pulley 962, to which the primary power is applied from any convenient source. Said pulley has a flange 964, the face whereof constitutes one member of a friction-clutch. The pulley 966 runs loose on the shaft 960 and has a flange 968, constituting the other member of said friction-clutch. In the hub of

said pulley 966 is a groove 970, wherein is one end of a strap 972, extending from the collar 974, which collar is movable endwise of the shaft 960 and has connection with spring 978, which normally operates to hold clutch member 968 out of touch with the member 964. The part 976 has a wedge-face 980 in bearing with the collar 974, which by a vertical movement of said part 976 is operated for causing the collar 974, and consequently the pulley 966, to move for placing the flange 968 in touch with flange 964 and causing the machine to start. Connected with the part 976 is a rod 984, having its top end socketed in the head and resting on the spring X²⁶. (See Fig. 71.) Said spring has its other end on the ledge X²⁸, and when permitted so to do (as described hereinafter) it operates for lifting the rod, and consequently starting the machine. A reverse movement of said part 976 allows the spring 978 to act for separating the flanges and causing the machine to stop. The stopping is made more effective by a brake-shoe 982, which to that end is supported on rod 984 in position for bearing upon the toothed wheel 986. Said wheel, running loose on the end of shaft D, has connection with said shaft through a system of speed-reducing gears X¹⁹ X²⁰ X²¹ X²² and with the pulley 966 by a belt X²⁴. In the slide X³² is a fixed stud X³⁴, whereon turns the roll X³⁶. Springs X³⁸ X⁴⁰, socketed in the slide X³², have end bearing on the ledge X²⁸ and actuate the slide X³² upwardly, thereby keeping the roll X³⁶ in touch with the working face X⁵⁰ of cam on shaft D. Connected with the slide X³² is a plate X⁴², the connection being made by a clamping-bolt X⁴⁴, which, having screw-threaded engagement with slide X³², is movable to allow for differently adjusting the position of said plate X⁴². The plate X⁴² has its bottom end normally resting on the upwardly-projecting limb *m* of the slide X⁴⁸, which, it will be observed, is suitably recessed in the brake-shoe 982 for permitting movement horizontally against the tension of spring X⁵⁰. The cam-face X⁵⁰ comprises two cam features X⁵² X⁵⁴, whereby the roll X³⁶ is forced to move downwardly. This movement operates through the slide X³², plate X⁴², and slide X⁴⁸ for depressing the brake-shoe 982 into bearing with the wheel 986, and consequently depressing the rod 984 and setting the spring X²⁶ for again lifting the rod when permitted. The treadle X⁵⁴ has connection with rod X⁵⁶, the top end whereof is socketed in the head B and has the wedge-face X⁵⁸ in touch with a similar face on the slide X⁶⁰. Supported pivotally by a pin X⁶² on slide X⁶⁰ is a lever X⁶⁴, having its rearmost end normally in touch with the slide X⁴⁸, as indicated at point XX, Fig. 71. In starting the machine the workman depresses lever X⁵⁴, and, reference being now had to Fig. 71, thereby operates an upward movement of the rod X⁵⁶, whereby slide X⁶⁰ is pushed backwardly, carrying with it the lever X⁶⁴, and thereby forcing the slide X⁴⁸

backwardly from under the plate X⁴², whereupon the spring X²⁶ is allowed to operate for lifting the rod 984, and consequently starting the machine. The limb *m* of slide X⁴⁸ will now stand in behind the plate X⁴², as shown in Fig. 73. The cam-face X⁵⁰, which is now traveling, recedes from the roll X³⁶, whereupon the springs X³⁸ X⁴⁰ lift the slide X³², and consequently the plate X⁴², carrying it to an altitude for the slide X⁴⁸ to move forwardly in response to the spring X⁵⁰, whereby the limb *m* is again set directly under the plate X⁴². (See Fig. 72.) The rearmost end of the lever X⁶⁴ will now stand under the slide X⁴⁸, and the cam-face X⁵⁰, continuing its movement, next depresses the roll X³⁶, carrying with it the slide X³², and consequently the plate X⁴², which in turn depresses the slide X⁴⁸, carrying with it the rod 984 against the tension of spring X²⁶ and forcing the brake-shoe 982 into bearing on the wheel 986. The wedge 980 is simultaneously moved to give way for the spring 978 to act for retracting the flange 968, whereupon the machine will stop. It is supposed that all this time the workman has retained the lever X⁵⁴ in the depressed position, so that the rear end of the lever X⁶⁴ has been depressed against the spring X⁷⁰ and still remains under the slide X⁴⁸.

It may now be observed, first, that the machine has stopped even while the starting-lever X⁵⁴ remains depressed, and, secondly, that in order to restart the machine lever X⁵⁴ must be lifted to the normal position, and thereby reversely move the rod X⁵⁶ downwardly and allow the action of spring X⁷² for returning the slide X⁶⁰, and consequently the lever X⁶⁴, to their foremost positions, whereupon the spring X⁷⁰ will reversely lift the rear end of the lever X⁶⁴ and set its rearmost end in line against the slide X⁴⁸ preparatory for the next starting operation, which may then be effected by depressing the lever X⁵⁴, as before stated. By this mechanism the stopping of the machine at a predetermined time or point in the cycle of its general operation is made to take place independently of the starting-lever and accidental restarting of the machine is avoided. It remains to point out the block X⁷⁴, which, being mounted to permit turning on the rod 984, has its top end sized for entering the recess X⁷⁶ in head B, and it also has a handle extension, whereby it may be turned on shaft 984 for bringing its said top end into and out of alignment with said recess X⁷⁶. Obviously when in such alignment it will be lifted into said recess by an upward movement of rod 984 incidental to starting of the machine, as before described; but when not in such alignment it will strike against the head B, thereby preventing the said upward movement of rod 984, and consequently preventing the starting of the machine. In the said handle extension is a spring-actuated plunger X⁷⁸, adapted for entering notches X⁸⁰ X⁸² in the brake-shoe 982, whereby to hold the block against accidental displacement.

This block is intended for use particularly whenever it may be desirable to leave the machine for a time unattended and also whenever it may be desirable to lock the machine against possibly starting while the workman attends to matters of change in and about the machine.

In operating the machine the workman takes in hand the shoe, the materials composing which, it will be understood, have been previously assembled upon the last, as hereinbefore described, and presents it bottom upwardly to the rests 354 355 356 of the last-supporter. This operation simultaneously puts the upwardly and outwardly standing edges of the shoe-upper and lining material into place between the toe and side pulling grippers ready for the gripping operations to take place. By one foot he next depresses the treadle-lever X⁵⁴, and thereby puts the machine into action, whereupon the grippers close together for gripping the upper and then lift for pulling it between said grippers and the last. The relative timing of the machine parts is such as to cause the toe-pulling grippers to act for pulling, and thereby straightening the material on the last from heel to toe in anticipation of the side-pulling operations, which then taking place will more effectively shape the material to the last-lines along and forwardly of the instep part thereof, the said toe-grippers contributing to this result by yielding during the side-pulling operations, and thus permitting the material to bend inwardly along the top curvature of the last. The grippers having gripped for pulling the upper, the last-supporter swings downwardly. In this operation the toe-rest 354 pushes the toe of the last downwardly against the gripped and now tightly-strained upper material, whereby it is made to settle the last downwardly and backwardly against the heel part of the upper for more tightly stretching the lines of the upper from heel to toe, and consequently stretching and shaping the lines of the said heel part of the upper into conformity with the contour of the heel of the last. In the machine represented said movement of the last-supporter downwardly also operates for depressing the shoe to the plane or altitude for the wiping and tacking mechanisms to be moved inwardly over the shoe-bottom, and thereupon the machine-shaft D having completed one-half of a revolution the machine is stopped by the cam-face X³⁰ acting through roll X³⁶ and stopping connections, before described. Opportunity is now presented for the workman to shift the grippers by hand manipulation, so as to bodily move and replace, if necessary, the upper in whatsoever manner is required to insure its being properly positioned to the last, after which the machine is restarted by again depressing the lever X⁵⁴, whereupon the arms 20 22 move forwardly the finger-rests 52 56, and then the arms 672 674 676 are caused to move inwardly, carrying forward the tacks and driving connec-

tions and simultaneously moving the wipers 932 934 936 into bearing with the material, wiping it over and holding it in place upon the inner sole after the grippers let go. This letting go of the grippers is effected by the arms 672 674 676 coming into bearing with, and consequently tripping, the locking-levers 88 of the respective gripper mechanisms, and consequently relaxing the grip of the grippers. By this arrangement it will be observed the letting go of the grippers is in the nature of giving way to the pull of the material, the clinging of the grippers to such material being protracted by the inclined faces of the locker and slide rubbing past each other. In said forward movements the arms 672 674 676 are limited by the edge gages 938 940 942 coming into bearing with the edge of the shoe, after which the tack-driving operations take place. The arms 20 22 then retire, and the last-supporter moves farther downwardly for placing the shoe below the plane of the wipers, and then the arms 672 674 676 are moved backwardly from over the shoe-bottom, followed by the gripper mechanisms. Said gripper mechanisms are then depressed and simultaneously opened apart for again receiving the edges of the material therebetween. The last-supporter and the drivers having been lifted to their positions of normal rest, the machine is again stopped by the cam-face X³⁰ acting upon the roll and stopping connections, as before, whereupon the shaft D will have completed a full revolution.

It is considered desirable for the workman to have full view of the fore part of the last in order to observe the progress of the work and to see at a glance the relative positions of the upper and the last and observe the conformity of the upper with the lines of the last. To this end the last-supporting and upper-manipulating mechanisms of this present machine are relatively disposed, so that the last is supported bottom upwardly in a plane inclined to the perpendicular and at the height or altitude for presenting full view of the fore part of the upper to the operator who is working the machine.

Having thus described my invention, I claim and desire to secure by Letters Patent—

1. A pulling-over machine comprising in combination means for pulling the upper at different points, means for placing said pulled upper over the inner sole, means for securing said overturned upper to the inner sole, the combination being adapted for working on uppers placed loosely over a last, whereby said uppers are pulled over the last and secured at different points in position for lasting.

2. A pulling-over machine comprising automatic means for pulling the upper at different points, means for placing said pulled upper over the inner sole and means for securing the said overlapped upper to the inner sole, the combination being adapted for work-

ing on uppers placed loosely over the last whereby said uppers are automatically pulled, carried over the last and secured to the inner sole at different points.

5 3. A pulling-over machine comprising in combination means for pulling the upper over the last at different points simultaneously, means for placing the pulled upper over the inner sole, and means to secure the overplaced
10 upper to the inner sole, the combination being adapted for working on the upper at different points simultaneously, whereby an upper placed loosely over the last is automatically pulled and secured in position for lasting.

15 4. A pulling-over machine comprising grippers for gripping the sides and toe of the upper, means for pulling said upper between said grippers and the last, means for placing said pulled upper over the inner sole and
20 means for securing said overplaced upper to the inner sole, the combination being adapted for working on uppers placed loosely over a last whereby said uppers are automatically pulled over and secured in position for lasting.

25 5. A last-supporter against which the bottom of the last bears, a plurality of grippers for gripping the upper, means for pulling the upper between said grippers and the last, means for wiping said gripped upper over the
30 inner sole, means for driving fastenings through said overwiped upper and inner sole, and auxiliary means becoming operative after the upper is pulled to support the last during the driving operations.

35 6. A pulling-over machine comprising means for pulling the upper over the last, in combination with means to support said last, with its bottom face upwardly in a plane at an oblique angle to the perpendicular, where-
40 by the fore part of said last is made observable to the workman standing at the machine.

45 7. A pulling-over machine comprising devices to engage the upper, means for pulling the upper between said device and the last, means for shifting the pulled upper on the last and means to support said last with its bot-
50 tom face upwardly in a plane at an oblique angle to the perpendicular, whereby the fore part of said last is made observable to the workman standing at the machine.

55 8. A pulling-over machine comprising means for pulling the upper over the last and securing mechanism adapted for securing the pulled-over upper to the inner sole in combi-
60 nation with means to support said last with its bottom face upwardly in a plane at an oblique angle to the perpendicular, whereby the fore part of said last is made observable to the workman standing at the machine.

60 9. A pulling-over machine comprising means for stretching the upper over the last in combination with means for moving the strained upper around the last.

65 10. In a pulling-over machine, in combination, grippers adapted for gripping the upper on opposite sides of the last combined with

means for changing the relative positions of said grippers and said last, whereby the material between said grippers is adjusted about the last.

70 11. In a pulling-over machine, grippers for gripping the upper on opposite sides of the last, combined with means for simultaneously changing the relative positions of said grippers and said last, whereby the material be-
75 tween said grippers is adjusted about the last.

80 12. In a pulling-over machine, the combination of grippers adapted for gripping the upper on opposite sides of the last and manually-operated connections for changing the relative positions of said grippers and said last whereby the upper between said grippers is
85 adjusted about the last.

85 13. In a pulling-over machine, the combination of grippers for gripping the upper, and means for shifting the relative positions of said grippers and said last whereby the upper is strained between said grippers and said last and means for thereafter changing
90 the relative positions of said grippers and said last whereby the material between said grippers is adjusted about the last.

95 14. In a pulling-over machine, the combination of devices for engaging the upper on opposite sides of the last and means for simultaneously moving a plurality of said devices in the direction of a line surrounding the last.

100 15. In a pulling-over machine, the combination of devices adapted for engaging the upper on opposite sides of the last and means for simultaneously moving said devices in the direction of a line surrounding the last longitudinally and thereby properly position-
105 ing the toe portion of the upper.

110 16. A pulling-over machine comprising grippers for gripping the sides and toe of the upper, and means for stretching the upper between said grippers and the last, in combination with means for adjusting the upper
115 around the last.

120 17. In a pulling-over machine, in combination, grippers adapted for gripping the upper and holding the same in its pulled position over the last, with means for changing the relative positions of the grippers and the last
125 whereby the upper is adjusted longitudinally of the last.

130 18. In a pulling-over machine, in combination, grippers adapted for gripping the upper and holding the same in its pulled position over the last, with means for changing the relative positions of the grippers and the last whereby the upper is adjusted transversely
135 of the last.

140 19. In a pulling-over machine, in combination, grippers adapted for gripping the upper and holding the same in its pulled position over the last, with means for changing the relative positions of the grippers and the last
145 whereby the upper is adjusted longitudinally of the last, and means for changing the rela-

tive positions of the grippers and the last whereby the upper is adjusted transversely of the last.

20. In a pulling-over machine, in combination, a last-supporter, grippers, means for causing said grippers to grip the sides and toe of the upper, means for thereafter shifting the relative positions of said grippers and said last-supporter whereby the upper is strained between said grippers and the last and means for thereafter shifting the relative positions of a plurality of grippers and said last whereby the upper is adjusted around the last.
21. In a pulling-over machine, in combination, a last-supporter, a plurality of grippers, means for causing said grippers to grip the sides and toe of the upper, means for thereafter shifting the relative positions of said grippers and said last-supporter, whereby the upper is strained between said grippers and the last, means for causing said toe-grippers to release the upper, and means for shifting the relative positions of said side-grippers and said last, whereby the upper is adjusted around the last.
22. In a pulling-over machine, side and toe grippers for gripping the sides and toe of the upper, means for moving said grippers to strain the upper between said grippers and the last, means for causing said toe-grippers to release the upper and means for thereafter moving the side-grippers in the direction of a line surrounding the last.
23. In a pulling-over machine, the combination of a last-supporter, a plurality of grippers, means for causing said grippers to grip the sides and toe of the upper, means for shifting the relative positions of said grippers and said last-supporter whereby the upper is strained between said grippers and the last and means for thereafter releasing the toe of the upper independently of the side grippers.
24. In a pulling-over machine, the combination of a last-supporter, a plurality of grippers, means for causing said grippers to grip the sides and toe of the upper, means for shifting the relative positions of said grippers and said last-supporter, whereby the upper is strained between said grippers and the last, and means controllable by the workman for causing said grippers to release the toe of the upper whenever desired.
25. In a pulling-over machine, the combination of a last-supporter, a plurality of grippers, means for causing said grippers to grip the sides and toe of the upper, means for shifting the relative positions of said grippers and said last-supporter, whereby the upper is strained between said grippers and the last, said toe-grippers being adapted for operation to thereafter release and take hold of the toe of the upper.
26. Mechanism to engage the upper, means for moving said mechanism to shift the upper around the last, in combination with grippers for pulling the toe of the upper and means

for causing said toe-grippers to release said upper for the said operations of shifting the upper around the last.

27. The combination of a plurality of grippers adapted for gripping the sides and toe of the upper, means for pulling the upper between said grippers and the last, means for shifting the pulled upper around the last, and means for causing the toe-pulling grippers to release the upper for said operations of shifting the upper around the last.

28. A pulling-over machine comprising means for automatically pulling the upper first longitudinally of the last and then transversely of the last.

29. In a pulling-over machine, the combination of a last-supporter, a plurality of grippers, means for causing said grippers to grip the sides and toe of the upper, means for shifting the relative positions of the said last-supporter and a gripper whereby the toe of the upper is strained between said gripper and the last, and means to thereafter shift the relative positions of the last-supporter and the side-pulling grippers whereby the sides of the upper are strained between the said grippers and the last.

30. In a pulling-over machine, the combination of a last-supporter, a plurality of gripper mechanisms adapted for gripping the sides and toe of the upper, means for moving a gripper to strain the toe of the upper between said gripper and the last, and means to thereafter move the grippers for straining the sides of the upper.

31. A pulling-over machine comprising mechanism for pulling the toe of the upper whereby said upper is straightened longitudinally of the last, combined with means for thereafter pulling the sides of the upper whereby said upper is shaped to the last transversely, said toe-pulling mechanism being adapted to yield for the said shaping of the upper transversely.

32. A pulling-over machine comprising a gripper adapted for gripping the toe of the upper, actuating mechanism for moving said gripper to pull said toe of the upper, means for thereafter pulling the sides of the upper, said toe-gripper-actuating mechanism having provision to yieldingly actuate said toe-pulling gripper during the said side-pulling operations.

33. In a pulling-over machine, the combination of a last-supporter, a plurality of grippers adapted for gripping the sides and toe of the upper, actuating mechanism for causing a gripper to move for straining the toe of the upper between said gripper and the last, means to thereafter shift the relative positions of the last-supporter and the side-holding grippers for straining the sides of the upper between the grippers and the last, said toe-gripper-actuating mechanism being adapted for yielding to the action of the side-pulling grippers whereby the upper is accommodated to the longitudinal curvature of the last.

34. The combination of grippers for gripping the upper on opposite sides of the last, actuating mechanism for moving said grippers to pull the upper, means for moving a gripper toward the last-bottom and means for simultaneously moving another gripper away from the last-bottom, whereby the belt of upper between said grippers is shifted around the last.
35. The combination of grippers for gripping the upper on opposite sides of the last, means for moving said grippers to pull the upper, said means adapted for yielding to permit movement of a gripper toward the last-bottom and means for automatically moving another gripper away from the last-bottom whereby the belt of upper between said grippers is shifted around the last.
36. The combination of grippers for gripping the upper on opposite sides of the last, means for moving said grippers to pull the upper, said means adapted for yielding to permit movement of a gripper toward the last-bottom and a spring-controlled means for automatically moving another gripper away from the last-bottom whereby the belt of upper between said grippers is shifted around the last.
37. The combination of a plurality of grippers for gripping the upper, a slide, actuating means for moving said slide in opposite directions, and levers, connecting with said slide and said grippers, to be actuated by said slide for moving said grippers to pull the upper.
38. The combination of a gripper adapted for gripping the upper, means for moving said gripper to pull the upper and means controllable by the workman during said pulling operation for reversely moving said gripper toward the last.
39. The combination of a gripper for gripping the upper, a lever and connections for moving said lever, said lever connecting with said gripper whereby to move it for pulling said upper and a manually-operated connection for reversely moving the gripper.
40. A plurality of grippers for gripping the upper, means for moving said grippers to pull the upper, said means adapted to permit a retractive movement of a gripper during the pulling operations, and means controlled by the retractive movement of a gripper for causing an increased movement of another gripper.
41. A pulling-over machine comprising a plurality of grippers, means for moving said grippers into position to grip the upper and yielding actuating mechanism for reversely moving said grippers to pull the upper.
42. In a pulling-over machine the combination of a plurality of devices for engaging the upper at different points, a movable part and connections between said part and said devices wherethrough a movement of said part causes a movement of said devices for adjusting the upper about the last.
43. The combination of a plurality of devices for engaging the upper at different points, a movable part and connections between said part and said devices wherethrough a movement of said part causes a movement of said devices for adjusting the upper about the last, and means for rendering said part inoperative as to one or more of said devices.
44. A plurality of devices for engaging the upper at different points, mechanism for moving said devices around the last and means controlling the operation of said mechanism whereby it is caused to move said devices separately or collectively.
45. The combination of a plurality of devices for engaging the upper at different points, mechanism to move said devices for shifting the upper around the last, said mechanism adapted for operation for moving said devices separately or simultaneously at the will of the workman.
46. The combination of a plurality of devices for engaging the upper at different points, mechanism to move said devices for shifting the upper around the last and means for locking said mechanism in inoperative position.
47. The combination, with a plurality of devices for engaging the upper at different points, of means for shifting the relative positions of said devices whereby a section of said upper is moved around the last.
48. The combination of a plurality of devices for engaging the upper at different points and means for moving a device whereby the section of upper gripped by said device is shifted longitudinally around the last.
49. Grippers for automatically gripping the upper on opposite sides of the last, said grippers being supported to swing longitudinally of said last and means for swinging the grippers.
50. The combination of grippers for gripping the upper at different points, a shaft, connections between said shaft and a gripper, a sleeve on said shaft, connections between said sleeve and a gripper, means for interlocking said sleeve and said shaft at times and means for moving said shaft to actuate the grippers.
51. The combination of a plurality of grippers, a shaft, connections between said shaft and a gripper, a sleeve on said shaft, and connections between said sleeve and a gripper, connections for interlocking said sleeve and said shaft and a lever to be operated for moving said shaft to actuate said grippers.
52. The combination of a plurality of grippers, a shaft, connections between said shaft and a gripper, a sleeve on said shaft and connections between said sleeve and a gripper, a lever and connections to be operated by said lever for interlocking said sleeve and said shaft, said lever adapted for moving said shaft to actuate the grippers.
53. The combination of a plurality of grippers, means for causing said grippers to grip

the upper on opposite sides of the last, means for automatically pulling the upper between said grippers and the last, said grippers being mounted to permit movement over the last bottom and also turn, whereby the gripping-plane is shifted with relation to the edge of the last.

54. A pulling-over machine comprising a plurality of grippers standing normally open, a last-supporter normally in position for resting the last with the edges of the shoe upper interposed between the grippers, means for causing said grippers to grip the upper and means for thereafter shifting the relative positions of the grippers and the last-supporter for pulling the upper over the last.

55. A pulling-over machine comprising grippers to grip the upper and a supporter for resting the shoe in position to be gripped by said grippers, said grippers and said supporter maintaining normally positions relatively fixed preparatory to the gripping of the upper, means for causing said grippers to grip the upper, means for thereafter shifting the relative positions of said grippers and said supporter for pulling said upper, and means for thereafter reestablishing the said normal relative positions.

56. A pulling-over machine comprising grippers to grip the upper and a supporter for resting the shoe in position to be gripped by said grippers, said grippers and said supporter maintaining normally positions relatively fixed preparatory to the gripping of the upper, means for causing said grippers to grip the upper, means for thereafter shifting the relative positions of said grippers and said supporter for pulling said upper, means for thereafter reestablishing the said normal relative positions and means for thereafter causing a rest in the machine's operations.

57. A pulling-over machine comprising grippers to grip the upper and a supporter for resting the shoe in position to be gripped by said grippers, said grippers standing normally open and said grippers and said supporter being normally at rest in positions relatively fixed preparatory to the gripping of the upper, means for causing said grippers to grip the upper, means for thereafter shifting the relative positions of said grippers and said supporter for pulling said upper, and means for thereafter reestablishing the said normal relative positions.

58. A pulling-over machine comprising grippers to grip the upper and a supporter for resting the shoe in position to be gripped by said grippers, said grippers standing normally open and said grippers and said supporter being normally at rest in positions relatively fixed preparatory to the gripping of the upper, means for causing said grippers to grip the upper, means for thereafter shifting the relative positions of said grippers and said supporter for pulling said upper, and means for thereafter reestablishing the said normal relative positions, and means for

thereafter causing a rest in the machine's operations.

59. A pulling-over machine, comprising grippers to grip the upper and a supporter for resting the shoe in position to be gripped by said grippers, said grippers and said supporter maintaining normally positions relatively fixed preparatory to the gripping of the upper, and means to vary said relative positions to accommodate undersized or abnormally-prepared uppers.

60. A pulling-over machine, comprising a last-supporter, a plurality of grippers standing normally open, said grippers and said last-supporter being normally at rest in positions relatively for resting the last with the edges of the upper standing in between said grippers, combined with means under control of the workman for shifting the said relative positions of said grippers and said last-supporter whereby the introduction at times of undersized or abnormally-prepared uppers is provided for.

61. A pulling-over machine comprising a last-supporter, a plurality of grippers standing normally apart, said grippers and said last-supporter being normally at rest in positions relatively for supporting the last with the edges of the upper standing in between said grippers, and said last-supporter adapted for yielding, whereby the introduction at times of undersized or abnormally-prepared uppers is provided for.

62. In a pulling-over machine, grippers to grip the upper and a supporter for resting the shoe in position to be gripped by said grippers, said grippers and said supporter maintaining normally positions relatively fixed preparatory to the gripping of the upper, and said last-supporter adapted for yielding, whereby the introduction at times of undersized or abnormally-prepared uppers is provided for.

63. A pulling-over machine comprising a mechanism for pulling the upper longitudinally of the last, in combination with means for settling the last downwardly and backwardly into the pulled upper.

64. In a pulling-over machine, the combination of a last-supporter, a plurality of grippers, means for causing said grippers to grip the sides and toe of the upper, means for shifting the relative positions of the last-supporter and the grippers for pulling the upper over the last, and means to actuate the last-supporter for settling the last into the pulled upper.

65. The combination of a last-supporter, a plurality of grippers, means for causing said grippers to grip the upper automatically, means for moving said grippers to pull the upper over the last, and means for moving said last-supporter to settle the last into the pulled upper.

66. The combination, with means for gripping the upper, of a last-supporter adapted for bearing on the bottom of the last approxi-

mately near the toe thereof and actuating means for moving said last-supporter in the direction of a curved line running downwardly and backwardly toward the heel of the last.

5 67. The combination, with means for pulling the upper, of a pivoted last-supporter having a rest located forwardly of said pivot for bearing on the last approximately near the toe thereof and means for swinging said last-supporter on said pivot whereby the last is settled into the pulled upper.

10 68. The combination of a last-supporter, means for pulling the upper and wipers for wiping the upper over the inner sole, said last-supporter and said wipers maintaining positions relatively fixed preparatory for the wiping operations and means for shifting the relative positions of said last-supporter and said wipers whereby they are adapted for working on uppers of different thicknesses.

20 69. The combination of the pivotally supported part 352, carrying last-rests, substantially as described, the part 366 adjustably mounted on said part 352 and the actuating-cam 378.

25 70. A last-supporter, a plurality of wipers, means for moving said wipers over the last and means for thereafter shifting the relative positions of said wipers and said last-supporter whereby the shoe is separated from the wipers preparatory for a movement of said wipers reversely.

30 71. The combination of grippers for gripping the upper, a last-supporter, reciprocating wipers, means for shifting the relative positions of said last-supporter and said grippers for pulling the upper between said grippers and the last, means for thereafter advancing the wipers to wipe the upper over the inner sole and means to thereafter move the last-supporter whereby the shoe is removed from the plane of the wipers.

35 72. The combination of grippers for gripping the upper, a last-supporter and reciprocating wipers, means for shifting the relative positions of said grippers and said last-supporter for pulling the upper between said grippers and the last, means for shifting the relative positions of said wipers and said last-supporter for wiping the upper over the inner sole and means for thereafter shifting the relative positions of said wipers and said last-supporter whereby the upper is carried away from the plane of the wipers.

40 73. The combination of grippers for gripping the upper, a last-supporter, reciprocating wipers, means to move the last-supporter for pulling the upper between said grippers and the last, means to thereafter advance the wipers for wiping the upper over the inner sole and means to thereafter again move the last-supporter for taking the shoe out of the plane of the wipers.

45 74. A pulling-over machine comprising a plurality of grippers for pulling the upper over the last, and auxiliary means for hold-

ing said upper over the last after the pulling operations.

75. A pulling-over machine comprising means for pulling the upper over the last and auxiliary means for holding said upper over the last after the pulling operations, said means operating also to support the last during the securing operations.

76. A last-supporter adapted for resting on the bottom of a last, in combination with means for pulling the upper over the last, and independent means, becoming operative after the upper is pulled, to support the last against the operations of securing the upper to the inner sole.

77. Means for pulling the upper over the last, a plurality of securing mechanisms for securing the upper to the inner sole at different points and auxiliary last-supporting mechanism, becoming operative after the upper is pulled, for supporting the last during the operations of said securing mechanisms.

78. A pulling-over machine comprising upper-pulling devices and actuating means for causing said devices to pull the upper over the last combined with rests and mechanism for moving said rests into juxtaposition with said pulled upper on opposite sides of the last, said rests operating to support the last during the securing of the upper to the inner sole.

79. A pulling-over machine comprising a plurality of grippers for pulling the upper over the last, and auxiliary means for holding said upper over the last after the pulling operations; said means having provision to ride yieldingly over the upper preliminary to taking positions of rest thereon.

80. A pulling-over machine comprising means for straining the upper over the last, combined with rests for holding the pulled upper on opposite sides of the last.

81. A pulling-over machine comprising upper-pulling devices and actuating means for causing said devices to pull the upper over the last, combined with rests and mechanism for moving said rests into juxtaposition with said pulled upper on opposite sides of the last.

82. A pulling-over machine comprising upper-pulling devices and actuating means for causing said devices to pull the upper over the last, combined with rests and mechanism for moving said rests into juxtaposition with said pulled upper on opposite sides of the last, said rests adapted to ride yieldingly over the upper preliminary to taking positions of rest thereon.

83. A pulling-over machine comprising a plurality of fingers adapted for riding over the last, means to actuate said fingers over the upper and separate means for pulling the upper over the inner sole.

84. A pulling-over machine comprising a plurality of fingers, yieldingly-movable supporting connections and means to move said connections whereby said fingers are pressed yieldingly on the last.

85. A pulling-over machine comprising mechanism supporting a plurality of fingers on opposite sides of the last and means to actuate said mechanism for placing said fingers in juxtaposition with the last.
86. A pulling-over machine comprising a plurality of fingers, movable connections supporting said fingers on opposite sides of the last, and means for moving said connections whereby said fingers are shifted from juxtaposition with the last, to positions remote therefrom.
87. A pulling-over machine comprising a plurality of fingers, rocking connections supporting said fingers and means to move said connections whereby said fingers are brought into bearing with the last.
88. A pulling-over machine comprising a plurality of fingers, connections to support said fingers on opposite sides of the last and a yielding actuating mechanism for moving said connections whereby said fingers are pressed yieldingly against the last.
89. A pulling-over machine comprising a plurality of fingers, arms to support said fingers on opposite sides of the last, an actuator, separate yielding connections between said arms and said actuator where through said actuator causes a movement of said arms for pressing said fingers on the last.
90. A pulling-over machine comprising a plurality of fingers, arms to support said fingers on opposite sides of the last, a slide, and connections between said slide and said arms, a cam to move said slide for actuating the arms in one direction and a spring to move said slide for actuating said arms in the opposite direction.
91. A pulling-over machine comprising a plurality of fingers, means to move said fingers into bearing with the shoe, said means adapted to vary the forward positions of the fingers according to variations in the positions, sizes or shapes of different shoes.
92. A pulling-over machine comprising a plurality of fingers, means to move said fingers into bearing with the upper, said means adapted for yielding to a resistance of said fingers separately.
93. A pulling-over machine comprising the combination of fingers, means to move said fingers into bearing with the upper on opposite sides of the last and separate means for pulling the upper over the last.
94. A pulling-over machine comprising the combination of fingers, and means to move said fingers into bearing with the upper on opposite sides of the last, said means adapted to vary the forward positions of the fingers according to the varying positions of different shoes.
95. A pulling-over machine comprising a plurality of arms, fingers supported on said arms, and means to move said arms whereby the fingers are brought into bearing with the shoe, said means adapted for yielding to resistance of said arms separately.
96. A pulling-over machine comprising a plurality of finger sections, supporting means from which said sections are projected at different angles and means for moving said finger sections into bearing with the upper, said means adapted for presenting the finger sections to the upper at different angles.
97. A pulling-over machine comprising a carrier, a plurality of finger sections projected at different angles from said carrier and means to support and move the carrier whereby the finger sections are brought into bearing with the upper.
98. A pulling-over machine comprising the combination of a support, finger sections connected pivotally with said support and projected therefrom at different angles, and means to move the support whereby the finger sections are brought into bearing with the shoe upper at different angles.
99. The combination of a plurality of grippers for gripping the upper, means for pulling the upper over the last, means, becoming operative after the upper is pulled, for supporting the last, and wipers on opposite sides of the last for wiping said pulled upper over the inner sole.
100. The combination of a plurality of grippers for gripping the upper, means for pulling the upper between said grippers and the last, auxiliary means for holding said upper over the last after the pulling operations and means for wiping said upper over the inner sole.
101. The combination of a plurality of grippers for gripping the upper, means for pulling the upper between said grippers and the last, rests for holding the pulled upper on opposite sides of the last and wipers for wiping said pulled upper over the inner sole.
102. The combination of means for pulling the upper over the last, a plurality of movable fastener-carrying wipers on opposite sides of the last for wiping the upper over the inner sole, and means controlled by the shoe for limiting the movement of said wipers.
103. The combination of a last supporter to which the last is held by the workman, a plurality of movable wipers and means to move said wipers into operative positions, said means being adapted to vary the operative positions of said wipers according to the variance in the positions of different shoes.
104. A pulling-over machine comprising a wiper to slide over the upper and actuating means for moving the wiper, said actuating means comprising a yielding member arranged to be under uniform tension during the movement of said wiper to a point of resistance and thereafter yielding to the resistance of said wiper.
105. Means to pull the upper over the last, means, becoming operative after the upper is pulled, for supporting the last, fastener-inserting mechanism, means to move said fastener-inserting mechanism into operative position and means to limit the movement of

said mechanism according to the size of the shoe.

106. Means to pull an upper over a last, fastener-inserting mechanism, automatic means to move said mechanism forward into operative position and backward into inoperative position before and after each operation of said mechanism, respectively, and means to limit the forward movement of said mechanism according to the size or position of the last.

107. Means for pulling an upper over a last, means for adjusting the pulled upper about the last, fastener-inserting mechanism, means to move said fastener-inserting mechanism into operative position, and means controlled by the shoe for limiting the movement of said fastener-inserting mechanism.

108. A pulling-over machine comprising means for pulling the upper over the last, a plurality of movable fastener-inserting mechanisms for securing the upper on opposite sides of the last and stops to engage with the edge of the shoe for limiting the movement of said fastener-inserting mechanisms.

109. Means to pull the upper over a hand-supported last, fastener-inserting mechanism, means to move said fastener-inserting mechanism into operative position and a stop to engage the edge of the shoe and thereby limit the movement of the fastener-inserting mechanism.

110. Means for pulling an upper over a last, means for adjusting the pulled upper about the last, means, becoming operative after the upper is pulled, for supporting the last, means for placing the pulled upper over the inner sole, movable fastener-inserting mechanism, and means controlled by the shoe for limiting the movement of said fastener-inserting mechanism.

111. A pulling-over machine comprising the combination of a plurality of movable fastener-inserting mechanisms and means to move said mechanisms into operative positions, said means being adapted to vary the operative positions of said mechanisms according to the variance in the positions of different shoes.

112. A plurality of movable fastener-inserting mechanisms, means to be operated for moving said mechanisms into operative positions and automatically causing the fastener-inserting operations to take place.

113. The combination of a plurality of grippers for gripping the upper, means for pulling the upper between said grippers and the last and fastener-carrying wiping mechanisms on opposite sides of the last for wiping the pulled upper over the inner sole.

114. The combination of a plurality of grippers for gripping the upper, means for pulling the upper between said grippers and the last and fastener-carrying wiping mechanisms on opposite sides of the last for wiping the pulled upper over the inner sole and means for si-

multaneously discharging said fasteners into the upper and inner sole.

115. Movable fastener-inserting mechanisms, means to gage the positions of said fastener-inserting mechanisms relatively to the edge of the shoe and means to actuate said fastener-inserting mechanisms into positions determined by said gaging means, said actuating means being thereafter movable to cause the operations for inserting the fastenings.

116. Movable fastener-inserting mechanisms, means to gage the positions of said fastener-inserting mechanisms relatively to the edge of the shoe and spring-controlled means to actuate said fastener-inserting mechanisms into positions determined by said gaging means, said actuating means being thereafter movable to cause the operations for inserting the fastenings.

117. The combination of a plurality of grippers for gripping the upper, means for pulling the upper between said grippers and the last, means, becoming operative after the upper is pulled, for supporting the last, and fastener-carrying wiper mechanisms on opposite sides of the last for wiping the pulled upper over the inner sole.

118. A plurality of movable fastener-inserting mechanisms, a rocking part, connections between said part and the fastener-inserting mechanisms whereby movement of said part is made to lift the fastener-inserting mechanisms and means for rocking said part, a separate mechanism carried by said part and connecting with said fastener-inserting mechanisms and means to actuate said mechanism for moving the fastener-inserting mechanisms into operative positions.

119. A plurality of fastener-inserting mechanisms supported to swing over the last-bottom, actuating mechanism over the last-bottom connecting with said fastener-inserting mechanisms, and adapted to be operated for swinging the fastener-inserting mechanisms into operative position.

120. A plurality of fastener-inserting mechanisms, means to move said mechanisms, said means including a movable part, combined with means to adjustably vary the relative position of said part, whereby to vary the paths of movement of the fastener-inserting mechanisms.

121. A plurality of fastener-inserting mechanisms, an actuator and adjustable connections operated by the actuator for moving said mechanisms into operative positions.

122. The combination of a plurality of grippers occupying positions relatively distanced for gripping the sides and toe of an upper and mechanism to be actuated for simultaneously shifting said grippers whereby they are differently positioned for working on uppers of a different size.

123. The combination of a plurality of grippers occupying positions relatively distanced for gripping the sides and toe of an upper

and means for shifting said grippers whereby they are differently positioned for working on uppers of a different size, said positions remaining approximately the same relatively.

5 124. A plurality of grippers for gripping the upper on opposite sides of the last, said grippers being relatively distanced apart for gripping an upper and movable transversely of the last to different positions for gripping up-
10 pers of a different size, combined with means wherethrough said movement of said grippers is made uniform.

125. The combination of a plurality of grippers occupying positions relatively distanced
15 for gripping sides and toe of an upper and manually operated connections for simultaneously shifting said grippers whereby said grippers are differently positioned for working on uppers of a different size.

20 126. The combination of a plurality of grippers adapted for gripping the upper at different points, a movable part and connections between said part and said grippers where-
25 through a movement of said part operates a simultaneous movement of said grippers outwardly to the gripping positions, and means for automatically moving said part.

127. The combination of a plurality of grippers for gripping the upper at different points,
30 mechanism engaging said grippers on their sides nearest the center of the last for moving said grippers outwardly to the gripping positions and separate means for reversely moving said grippers.

35 128. A plurality of grippers for gripping the upper at different points, actuating mechanism located over the last-bottom for moving
40 said grippers outwardly to the gripping positions and separate means for reversely moving said grippers.

129. The combination of a plurality of grippers, yielding actuating mechanism for moving
45 said grippers inwardly over the last-bottom and mechanism over the last-bottom for positively actuating the grippers outwardly to the gripping positions.

130. The combination of a plurality of grippers for gripping the upper adapted for movement
50 forwardly and backwardly over the last-bottom, combined with yielding actuating mechanisms for moving said grippers inwardly over the last-bottom and separate mechanisms for positively actuating the grippers reversely.

55 131. A plurality of grippers for gripping the upper at different points, means for pulling the upper between said grippers and the last and mechanism whereby the grippers are
60 yieldingly actuated inwardly over the last.

132. In a pulling-over machine, grippers arranged for automatically gripping the toe of
65 the upper and manually-operated connections for causing said grippers to pull said toe of the upper over the last.

133. In a pulling-over machine, grippers for
gripping the upper, mechanism for pulling the upper between said grippers and the last,

and means for rendering said mechanism inoperative, said grippers then permitting
70 movement independently for manipulating the upper.

134. In a pulling-over machine, grippers for
gripping the upper, mechanism for pulling the upper between said grippers and the last,
75 means for rendering said mechanism inoperative, said grippers then permitting movement independently, and means for thereafter automatically reestablishing the operative character of said mechanism.

135. In a pulling-over machine, grippers for
80 gripping the upper, actuating mechanism for moving said grippers to pull the upper over the last and means for disconnecting said grippers and said actuating mechanism, said grippers then permitting independent movement.
85

136. In a pulling-over machine, in combination,
grippers, actuating mechanism for causing said grippers to grip the upper and there-
90 after move said grippers for straining the upper between the grippers and the last, and connections to be operated for disconnecting the said grippers from said actuating mechanism, said grippers then permitting operation according to the will of the workman.
95

137. In a pulling-over machine, in combination,
a plurality of grippers, means for causing said grippers to grip the upper, means for thereafter pulling the upper between said
100 grippers and the last, and means for thereafter causing a rest in the machine's operations, said grippers still holding the upper under tension.

138. In a pulling-over machine, in combination,
105 a plurality of grippers, means for causing said grippers to grip the upper, means for thereafter pulling the upper between said grippers and the last, and means for thereafter causing a rest in the machine's operations, said grippers still holding the upper under tension and being movable for shifting the upper around the last.
110

139. In a pulling-over machine, in combination,
115 a plurality of grippers, means for causing said grippers to grip the upper, means for thereafter pulling the upper between said grippers and the last and means for thereafter causing a rest in the machine's operations, said grippers still holding the upper under tension, and means to move the upper around the last.
120

140. In a pulling-over machine, a last-supporter,
125 a plurality of grippers, means for causing said grippers to grip the upper, means for shifting the relative positions of said last-supporter and said grippers, whereby the upper is pulled between said grippers and the last, and means for thereafter causing a rest in the machine's operations, said grippers still holding the upper under tension.
130

141. In a pulling-over machine, in combination,
a plurality of grippers, means for causing said grippers to grip the sides and toe of
the upper, means for thereafter pulling the

upper between said grippers and the last, and means for thereafter causing a rest in the machine's operations, said grippers still holding the upper under tension.

5 142. A machine comprising upper pulling and securing mechanisms, means to be actuated for starting the machine into operation, and mechanism to stop the machine automatically between the operations of said pulling and securing mechanisms.

10 143. A machine comprising upper pulling and securing mechanisms, means to be actuated for starting the machine into operation, mechanism adapted for operation independently of said means for stopping the machine, said mechanism arranged for operation to stop the machine between the operations of said pulling and securing mechanisms.

15 144. The combination of a bar, grippers supported by said bar, a second bar, connecting mechanism between said second bar and the grippers, means to move said second bar for closing the grippers together, and thereafter actuating said second bar to lift the grippers.

20 145. The combination of a bar, a gripper in fixed connection with said bar, a cooperating gripper supported loosely by said bar, a second bar, means to move said second bar for closing the grippers together and thereafter actuating said second bar to lift the grippers.

25 146. The combination of a bar, a gripper, a cooperating gripper, means to be actuated by movement of said bar for opening the grippers, means to be actuated by movement of said bar for closing the grippers and means to actuate said bar to lift the grippers.

30 147. The combination of a bar, a gripper, a cooperating gripper supported for movement longitudinally of said bar, a second bar, means to move said second bar for closing the grippers together and thereafter actuating said second bar to lift the grippers.

35 148. The combination of a bar, a gripper, a cooperating gripper mounted loosely on said bar, mechanism for lifting and lowering said bar, means for closing said grippers together and thereafter causing said grippers to be lifted by said bar.

40 149. The combination of a gripper, a bar, a movably-supported cooperating gripper, mechanism between said bar and said movably-supported gripper to be actuated for closing the grippers together and mechanism for thereafter causing said grippers to be lifted by said bar.

45 150. The combination of a bar, a gripper, a cooperating gripper, mechanism for lifting and lowering said bar, means to be actuated by a movement of said bar for closing said grippers together, and thereafter causing said grippers to be lifted by said bar.

50 151. The combination of a bar, a gripper, a cooperating gripper, means to be actuated by a movement of said bar for closing said grippers together, and means to actuate said bar to lift the grippers.

152. The combination of a bar, a gripper actuated by said bar, a second gripper, a second bar, mechanism put into operation by movement of said second bar for closing together the grippers and thereafter causing said grippers to be lifted as one with said bar, said first bar remaining freely movable to open and close the grippers.

70 153. The combination of a bar, a gripper actuated by said bar, a second gripper, a second bar and mechanism actuated by said second bar for closing the grippers together, and thereafter causing said grippers to be lifted as one with said bar, said first bar remaining freely movable to open and close the grippers, and manually-operated connections for moving said bar.

75 154. A pulling-over machine comprising the combination of a gripper, a cooperating gripper, means for closing said grippers together and a part adapted for movement separately whereby the hold of said grippers is relaxed.

80 155. The combination of a gripper, a cooperating movably-supported gripper, actuating means for closing the grippers together, a movable part in fulcrum relation with said movable gripper, a locking connection for holding said movable part, said connection permitting movement to relax the hold of the grippers.

85 156. The combination of a gripper, a cooperating gripper, means for closing the grippers together, and a part in juxta-relation with one of said grippers, said part being stationary during the closing of the grippers but permitting movement for relaxing the hold of the grippers.

90 157. A gripper mechanism comprising a bar, a gripper connected with said bar, a second bar, a second movably-supported gripper, mechanism connected with said second gripper and in juxta-relation with said second bar, and put into operation by a movement of said second bar for closing the grippers together and means actuated by said second bar for thereafter locking said movable gripper.

95 158. A gripper mechanism comprising a bar and a gripper connected therewith, a cooperating gripper, a second bar, and connections actuated by a movement of said second bar for closing the grippers together with yielding pressure and thereafter crowding the grippers together with a positive force.

100 159. A gripper mechanism comprising a movably-supported gripper, a part normally held stationary to act as a fulcrum for said gripper, and means to be operated for releasing said part to relax the hold of said grippers.

105 160. Means for pulling an upper over a last and fastener-inserting mechanism comprising a tack supporting and delivering device having sliding parts each suitably recessed to form a portion of a tack-receiving pocket, means for moving said parts whereby they are brought into position for collectively forming such pocket, said means adapted to yield for reverse movement of said parts whereby

said pocket is opened for passage of tacks therethrough.

161. Means for pulling an upper over a last and fastener-inserting mechanism comprising a tack supporting and delivering device having movable parts each suitably recessed to form a portion of a tack-receiving pocket, means for relatively placing said parts whereby a plurality of pockets are formed, said parts being movable to permit the passage of tacks through said pockets.

162. Means for pulling an upper over a last and fastener-inserting mechanism comprising a tack supporting and delivering device having movable parts each suitably recessed to form a portion of a tack-receiving pocket, means for relatively placing said parts whereby a plurality of pockets are formed, said means adapted for yielding to movement of said parts for passage of tacks through said pockets.

163. Means for pulling an upper over a last and fastener-inserting mechanism comprising a tack supporting and delivering device having an outer casing, a plurality of movable parts associated in juxtaposition, each suitably recessed to form a portion of a tack-receiving pocket, means for relatively placing said parts whereby a plurality of pockets are formed, said parts being movable to permit the passage of tacks through said pockets.

164. Means for pulling an upper over a last and fastener-inserting mechanism comprising a tack supporting and delivering device having sliding parts, each suitably recessed to form a portion of a tack-receiving pocket, stops for limiting the movement of said parts, and means for moving the parts into engagement with said stops, the combination operating to position said parts for forming said pocket, and the parts adapted for movement to allow the passage of tacks through said pocket.

165. Means for pulling an upper over a last and fastener-inserting mechanism comprising a tack supporting and delivering device having movable parts, each suitably recessed to form a portion of a tack-receiving pocket, said device comprising an opening where-through tacks are delivered to said pocket, means for moving said parts whereby they are relatively placed for forming said pocket and means controlling the movement of said parts whereby they are positioned with said pocket in alignment with said tack-delivering opening.

166. In a tack-separating mechanism the combination of tack-separating devices and actuating mechanism for moving said devices forwardly and backwardly, said actuating mechanism including a single means adapted for yielding in both of said directions to resistance abnormally interposed to the movement of said devices.

167. The combination of a shaft and means to actuate said shaft, a slide, connections between said slide and said shaft for endwise

moving the slide, a spring actuated by said slide, a second slide, arms connecting with said second slide and bearing on said spring whereby movement is transferred from said first slide through said spring and arms to yieldingly endwise move said second slide in opposite directions, and tack-separating devices actuated by said second slide.

168. A sleeve, a shaft journaled in said sleeve, right and left coiled spring devices located in said sleeve at the ends of said shaft, said springs having diametrically-disposed right and left terminal sections socketed in said shaft and a driver-arm mounted on said shaft to be actuated by said springs.

169. A sleeve, a shaft journaled in said sleeve, coiled spring devices located in said sleeve at the ends of said shaft, said shaft having diametrically-disposed right and left end grooves in which are projected one end of said springs respectively, collars supported by said sleeve for movement rotatively, said collars supporting the other ends of said springs respectively, means for interlocking said collars and said sleeve and a driver-arm mounted on said shaft to be actuated by said springs.

170. Means for pulling an upper over a last, combined with means for moving said pulled upper around said last longitudinally.

171. Means for pulling an upper over a last, combined with means for moving said pulled upper around said last transversely.

172. Means for pulling an upper over a last, combined with means for moving said pulled upper around said last longitudinally and transversely.

173. A pulling-over machine comprising means for stretching the upper over and holding it upon the last, with means for adjusting the pulled-over upper on the last.

174. A pulling-over machine comprising a support against which the last is held, means for pulling over the upper, means for fitting and adjusting the upper and means for fastening the upper.

175. A support to which the last is held by the workman, means to pull the upper over the last, means to then hold said last on said support, means for placing said upper over the inner sole, and means for securing said upper to the inner sole.

176. Means for pulling an upper over a last, means for causing a rest in the machine's operations after the upper is pulled; means for adjusting the upper on the last while the machine is at rest, and means for thereafter securing the upper to the inner sole.

177. A pulling-over machine comprising the combination of means for pulling the upper over the last, a plurality of movable wipers on opposite sides of the last for sliding over the upper and wiping the upper over the inner sole, and means controlled by the shoe for limiting the movement of said wipers.

178. Means for pulling an upper over a last, a plurality of movable fastener-inserting

mechanisms for securing the upper at the sides and toe, and means controlled by the last for limiting the movement of said fastener-inserting mechanisms.

5 179. A pulling-over machine comprising means for pulling an upper over a last, means for adjusting the pulled upper about the last and means to secure the upper to the inner sole.

10 180. Means for pulling an upper over a last, means for adjusting the pulled upper about the last and means to wipe the upper over the inner sole.

15 181. Means for automatically pulling an upper over a last, means for adjusting the pulled upper about the last and automatic means to secure the upper to the inner sole.

20 182. Means for automatically pulling an upper over a last, means for adjusting the pulled upper about the last and automatic means to wipe the upper over the inner sole.

183. A pulling-over machine comprising means for pulling an upper over a last, means

for adjusting the pulled upper about the last longitudinally and means to secure the upper to the inner sole. 25

184. Means for pulling an upper over a last, means for adjusting the pulled upper about the last longitudinally and means to wipe the upper over the inner sole. 30

185. Means for automatically pulling an upper over a last, means for adjusting the pulled upper about the last longitudinally and automatic means to secure the upper to the inner sole. 35

186. Means for automatically pulling an upper over a last, means for adjusting the pulled upper about the last longitudinally and automatic means to wipe the upper over the inner sole. 40

Signed by me at Lynn, Massachusetts, this 14th day of September, A. D. 1899.

RONALD F. McFEELY.

Witnesses:

A. M. TUTTLE,
C. B. TUTTLE.