

July 3, 1945.

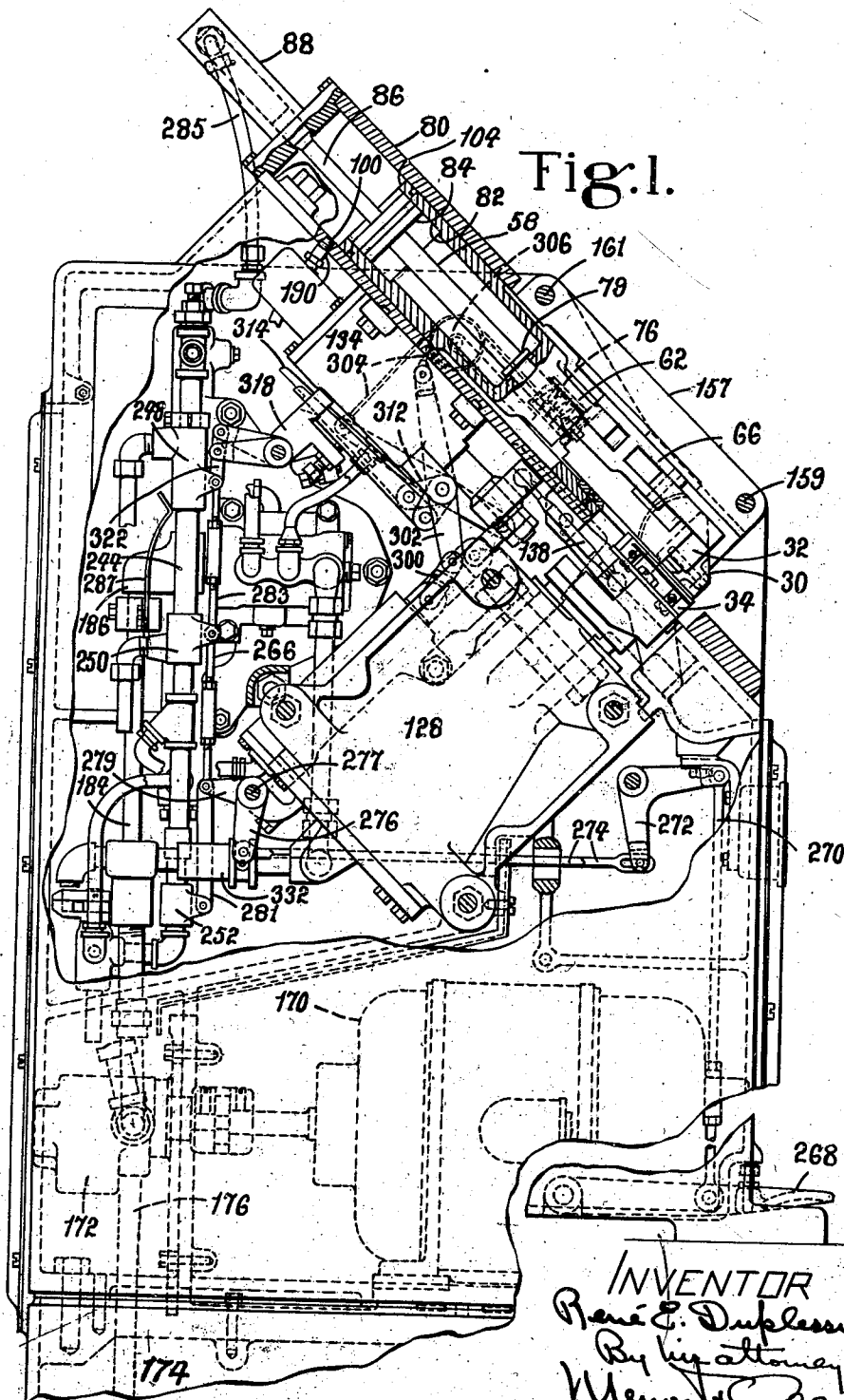
R. E. DUPLESSIS

2,379,425

MACHINE FOR SHAPING SHOE UPPERS

Filed June 20, 1942

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R. E. DUPLESSIS

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MACHINE FOR SHAPING SHOE UPPERS

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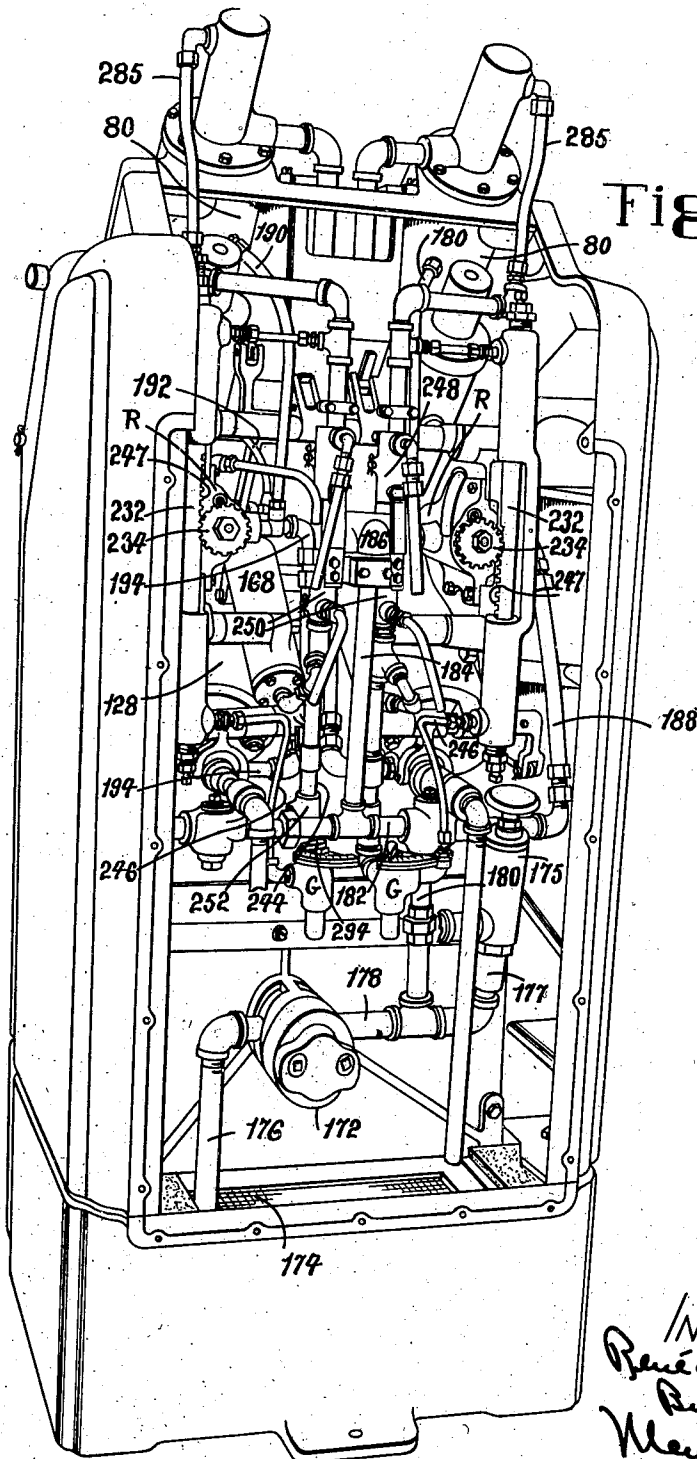


Fig. 2.

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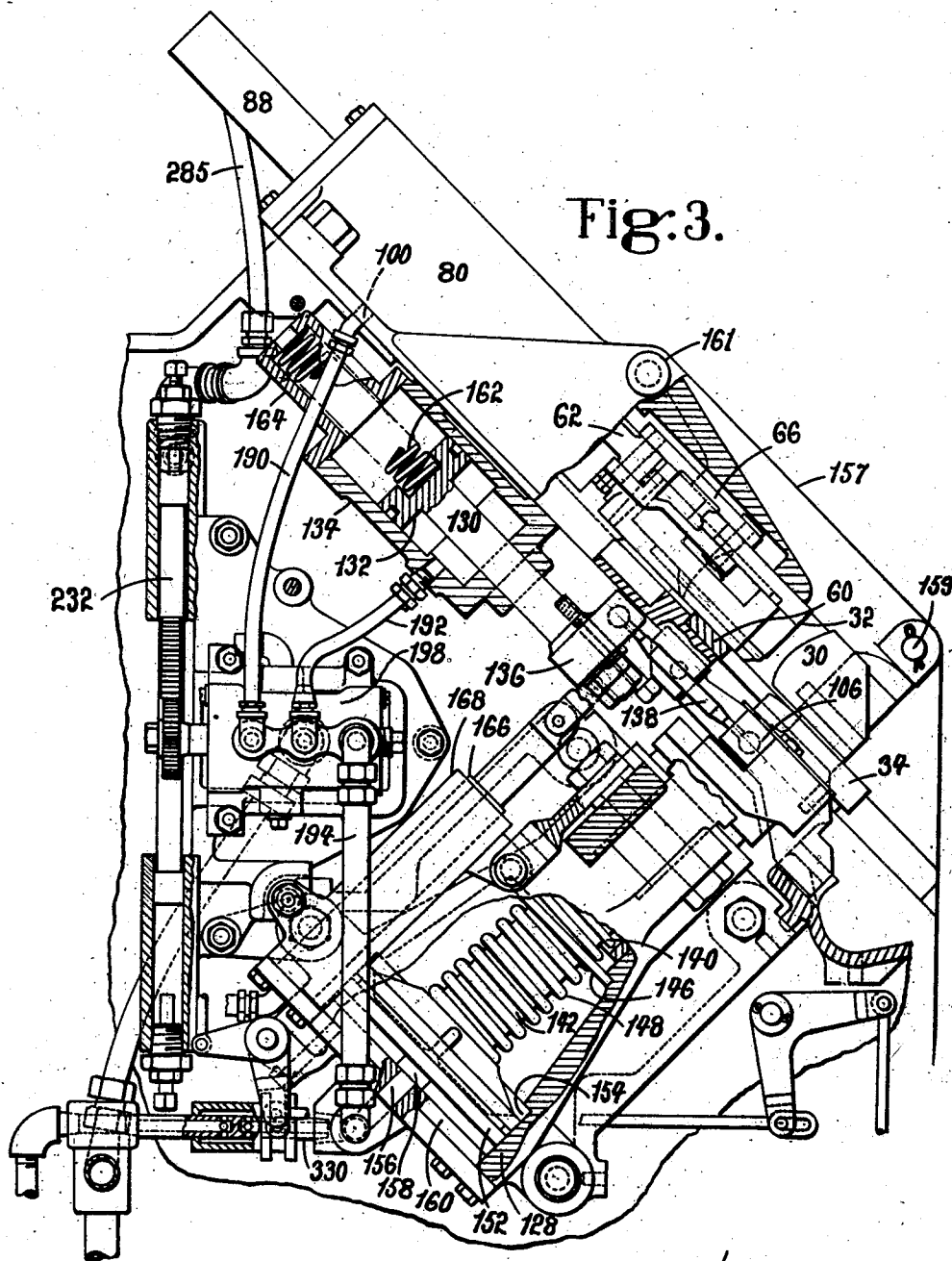
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MACHINE FOR SHAPING SHOE UPPERS

Filed June 20, 1942

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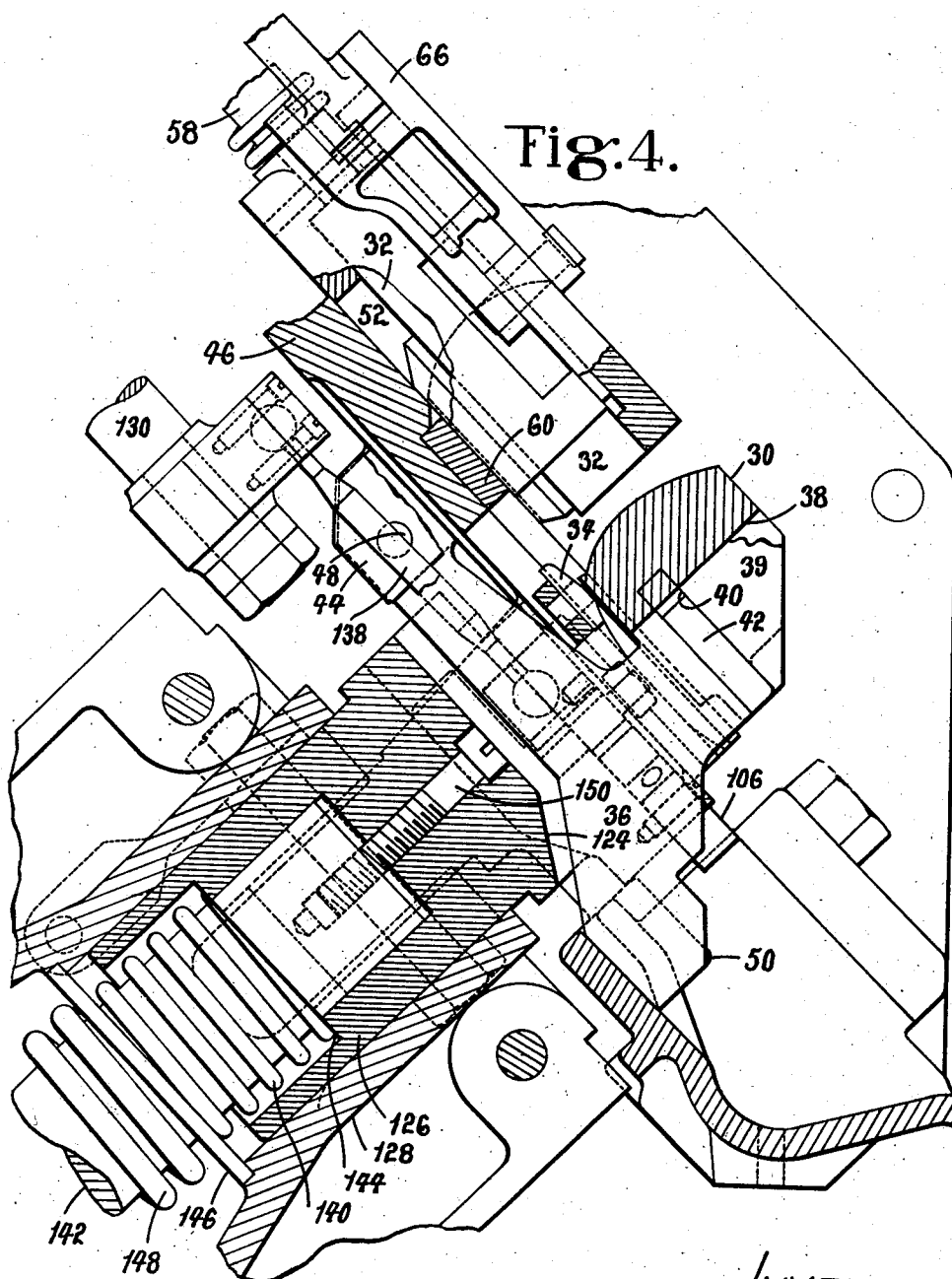
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MACHINE FOR SHAPING SHOE UPPERS

Filed June 20, 1942

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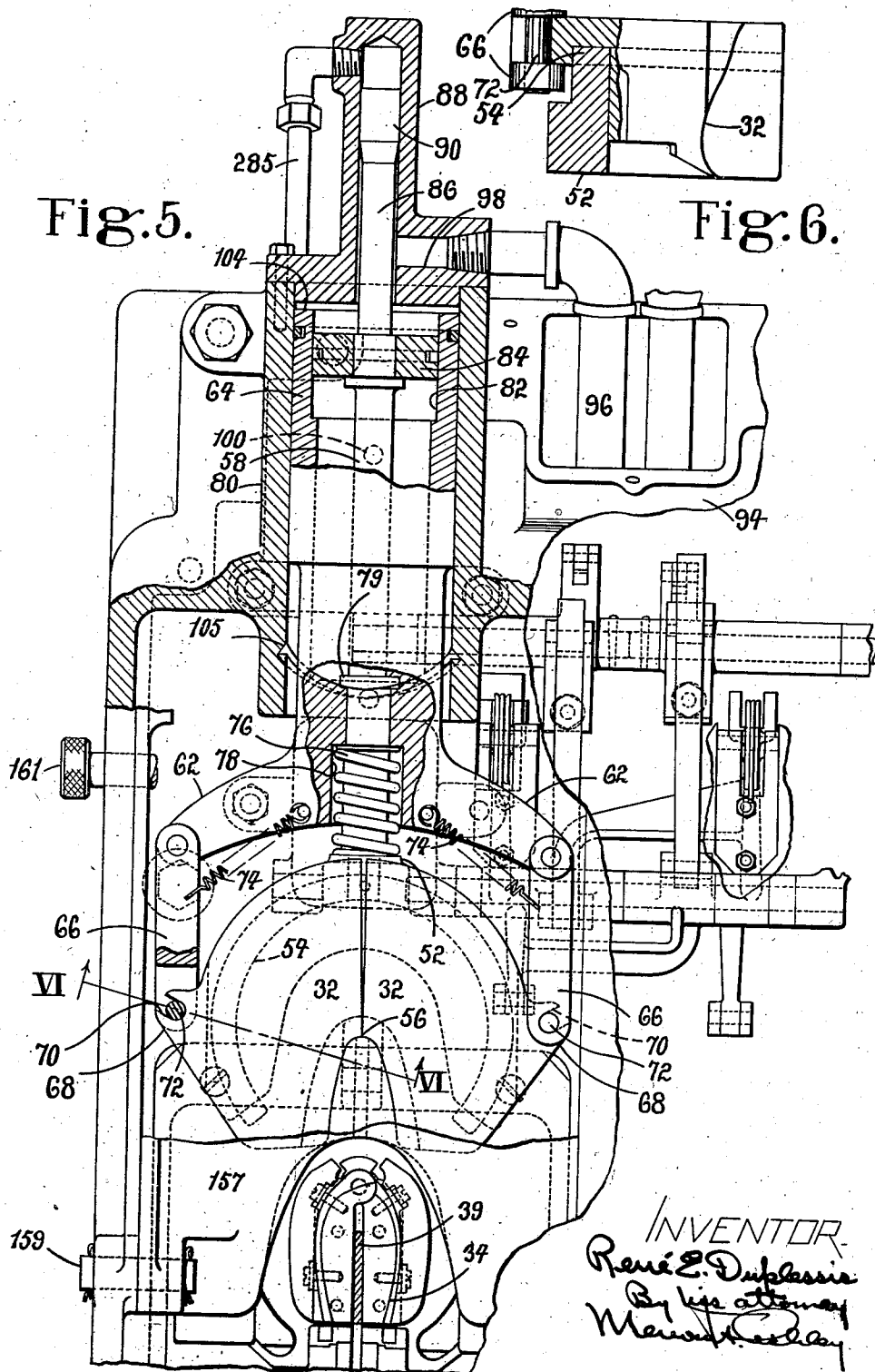
MACHINE FOR SHAPING SHOE UPPERS

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Fig. 5.

Fig. 6.



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MACHINE FOR SHAPING SHOE UPPERS

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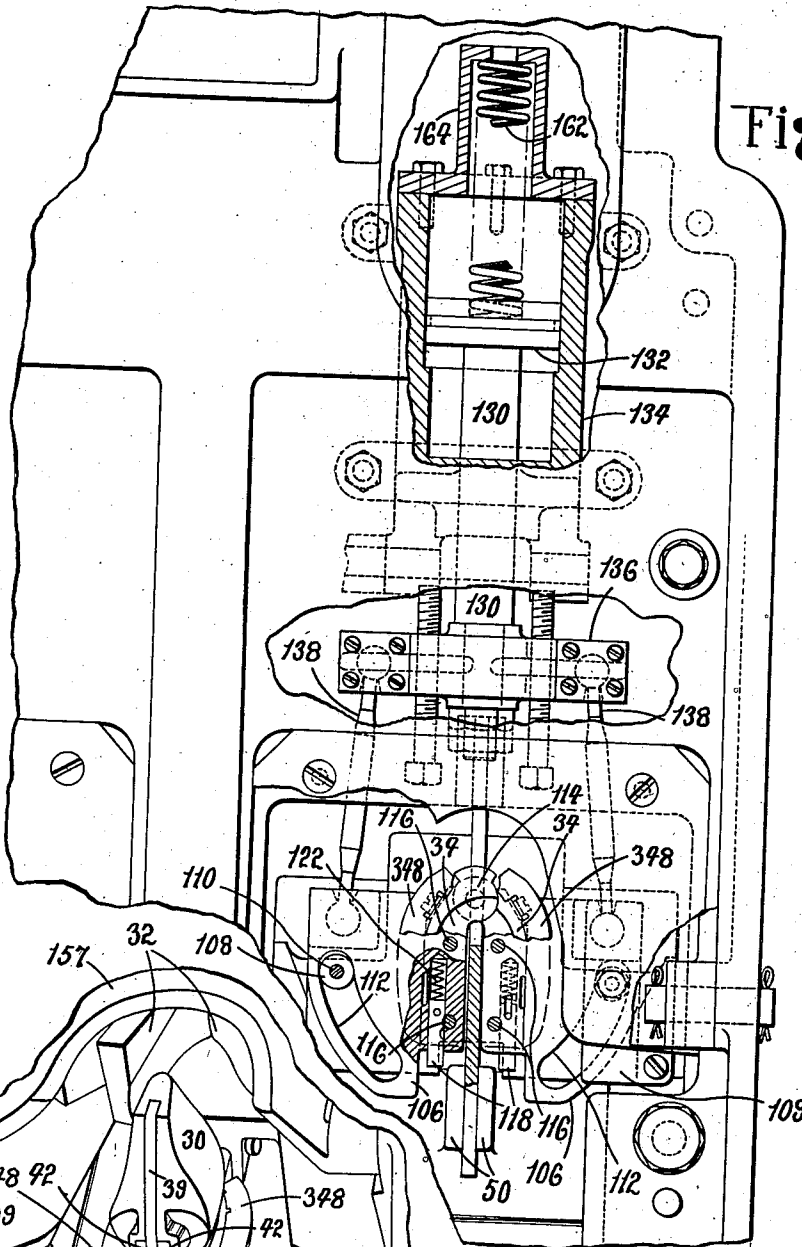


Fig. 7.

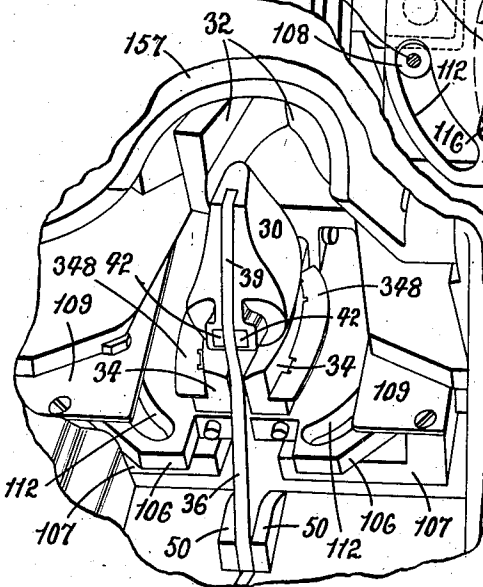


Fig. 8.

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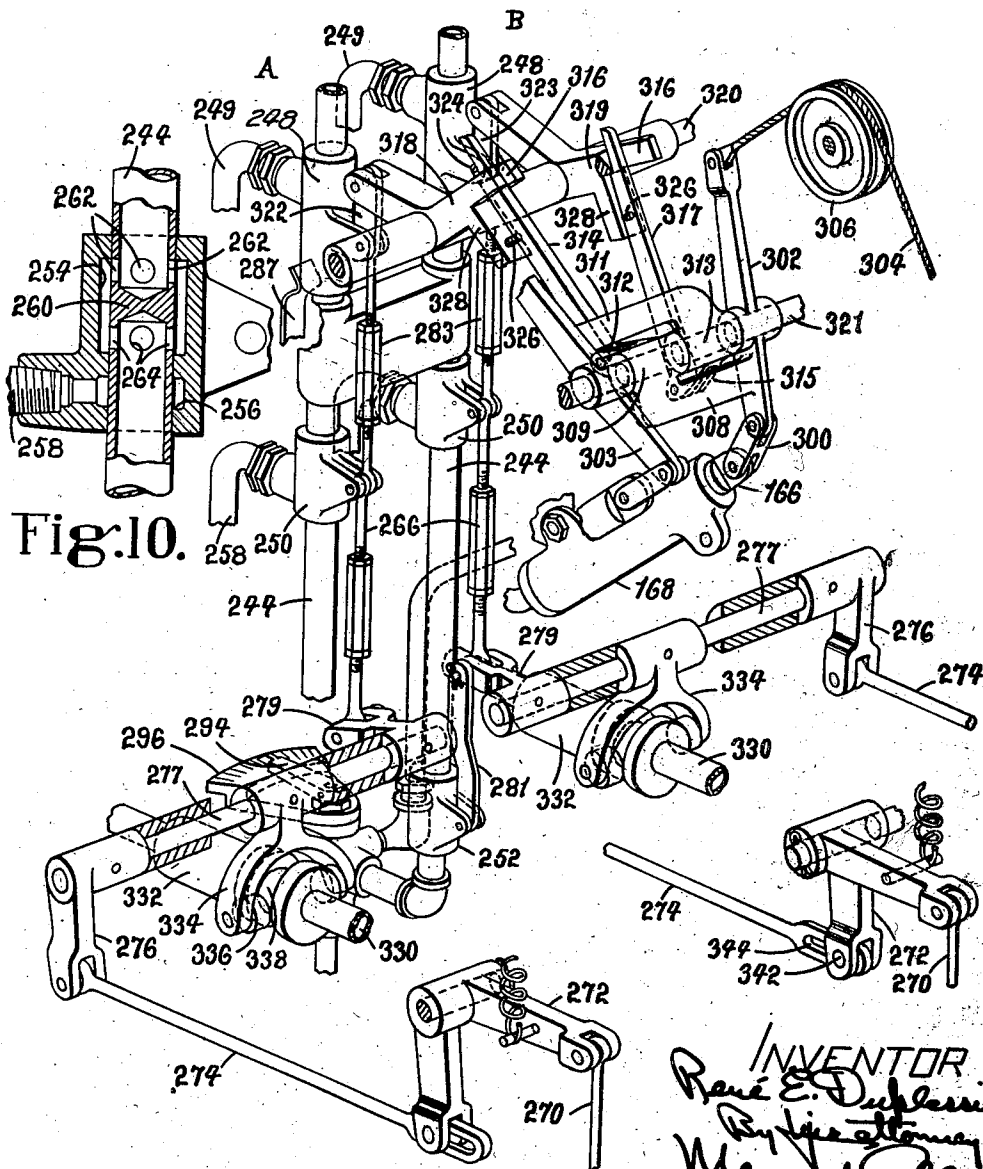
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Fig. 9.



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Fig. 11.

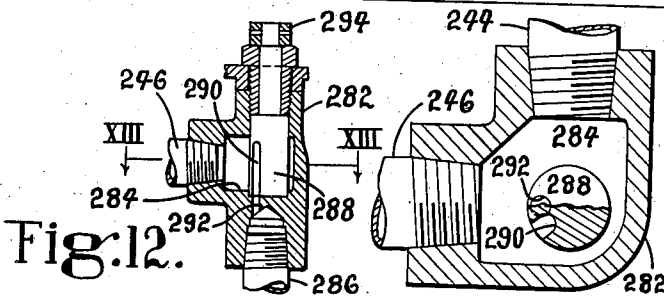
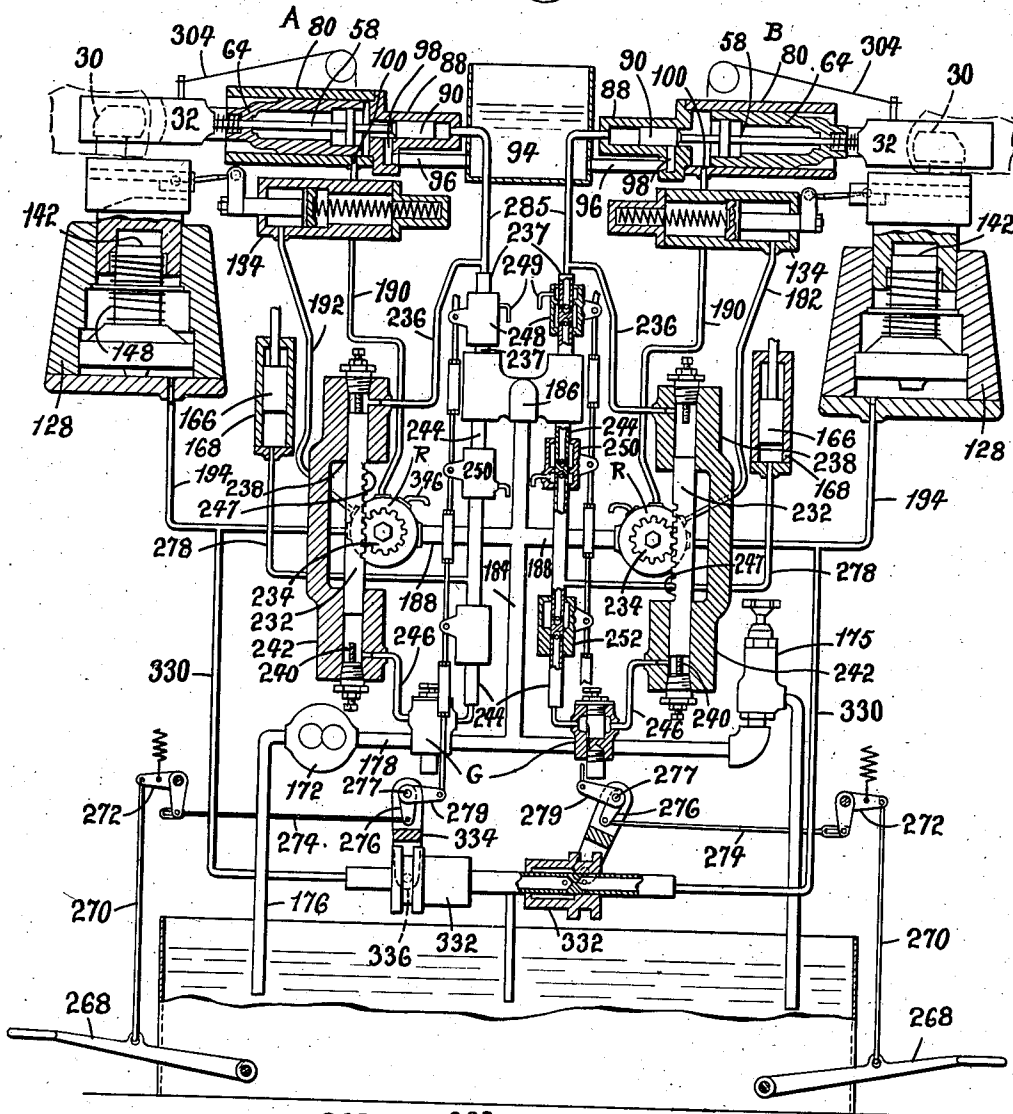


Fig. 13.

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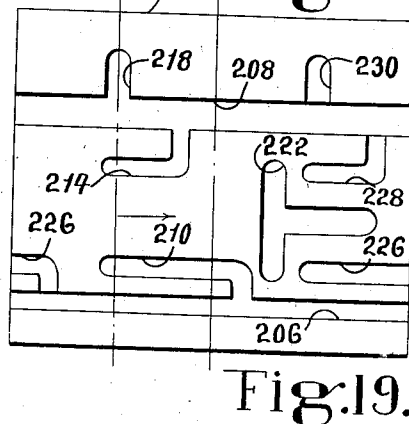
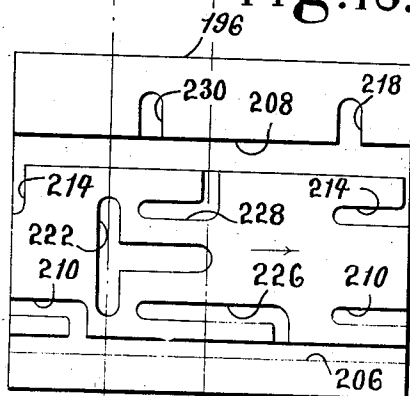
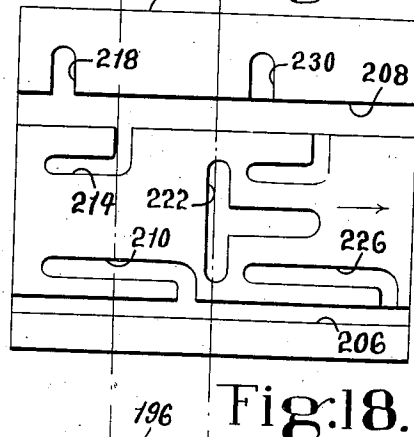
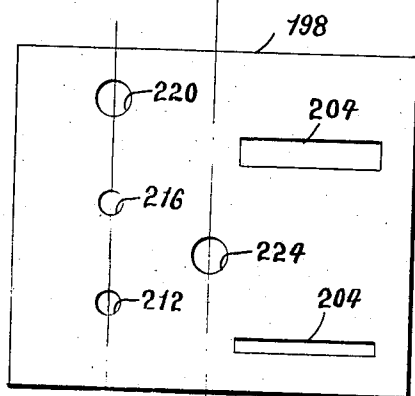
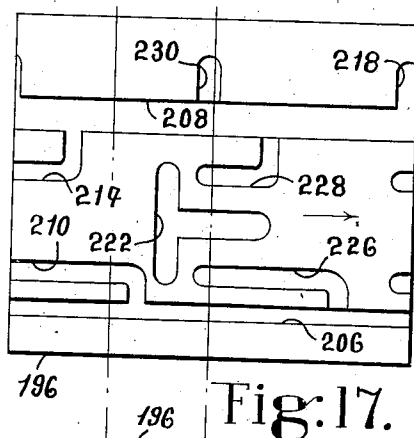
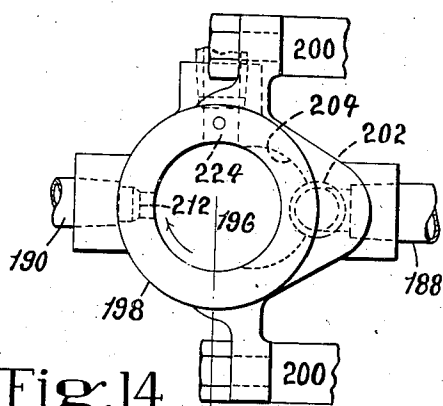
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MACHINE FOR SHAPING SHOE UPPERS

Filed June 20, 1942

10 Sheets-Sheet 9



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MACHINE FOR SHAPING SHOE UPPERS

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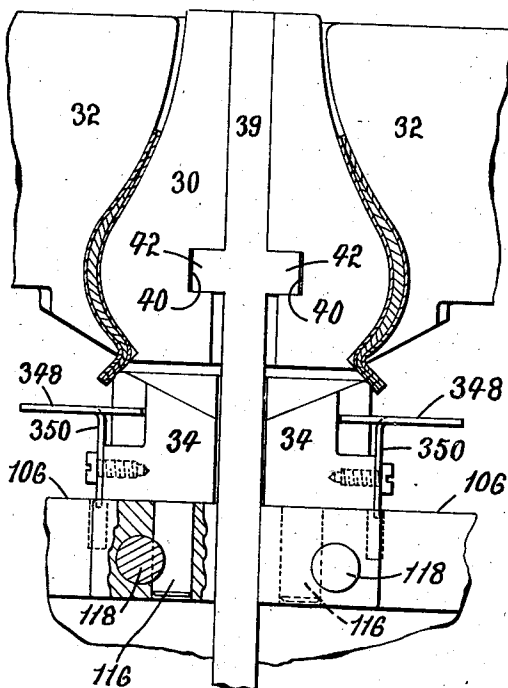
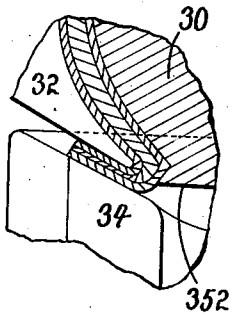
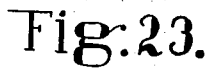


Fig. 21.

Fig:20.

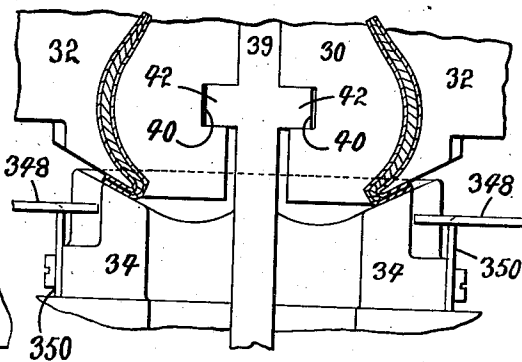
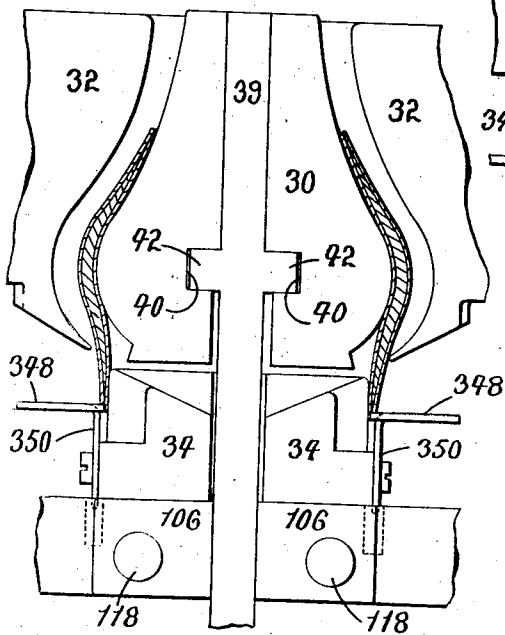


Fig. 22.

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UNITED STATES PATENT OFFICE

2,379,425

MACHINE FOR SHAPING SHOE UPPERS

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Application June 20, 1942, Serial No. 447,791

45 Claims. (Cl. 12—97)

This invention relates to machines for shaping shoe uppers or shoe parts such, for example, as separately molded back parts, and is herein illustrated as embodied in a machine for shaping the rear parts of stitchdown uppers having outturned flanges. In certain respects, however, the invention is not limited to machines for shaping uppers having outturned flanges but is applicable also to machines for forming inturned flanges in shoe uppers or upper parts. In certain aspects thereof, the invention relates to combinations and mechanisms applicable to machines other than shoe machines.

In the manufacture of stitchdown shoes in which the rear portion including a heel stiffener is flanged outwardly, it is desirable that the rear part of the upper including the heel stiffener and the lining be molded before the upper is mounted on the last in order to provide a permanently formed flange and a sharply defined crease between the flange and the body portion of the upper. In machines heretofore provided for this purpose such, for example, as the machine disclosed in United States Letters Patent No. 1,891,259, granted December 20, 1932, on my application, it has not been possible under all conditions to apply sufficient pressure to the upper to form the outturned flange as desired or to provide a crease between the outturned flange and the body portion of the upper sufficiently well defined to provide the best condition for subsequent shoe-making operations.

It is an object of this invention to provide a machine which, while retaining the advantages of prior machines, including that disclosed in the patent above referred to, will be capable of applying sufficient pressure to the shoe upper to attain the desired results.

With the above object in view, the present invention in one aspect thereof consists in the combination with inner and outer upper-shaping molds or forms of flange forming means movable heightwise of the upper and pressure fluid actuated means for imparting such heightwise movement to the flange forming means. Further features are to be recognized in the provision of a pressure fluid actuated piston constructed and arranged for movement heightwise of the upper to impart such heightwise movement to a pair of flange formers; in the combination with said piston of a pressure fluid actuated member for moving said flange formers longitudinally of the upper; in the provision of a carrier on which said flange forming members are mounted, said carrier being arranged for movement heightwise of the

upper by the actuation of said pressure fluid operated piston; and, in the construction and arrangement of said parts wherein said piston is positioned in heightwise alinement with the upper in order to apply direct pressure to said flange formers. In order to provide for suitable pressure of the flange formers against the bottom margin of the upper during their outward or flange turning movement, the illustrated machine, in accordance with a further feature of the invention, is provided with yielding means for exerting a light pressure heightwise of the upper on the flange former carrier, said yielding means, as herein illustrated, comprising a relatively light spring interposed between the carrier and said piston.

In the illustrated machine, as in the machine of the prior patent above referred to, the flange formers mold the outturned margin of the upper against the bottom surfaces of the outer heel forms. It will be understood that it is important that the flange formers move downwardly away from the outwardly flanged margin of the upper before the flange formers or the outer heel forms commence their retracting movement. In order to achieve this result, the illustrated flange forming mechanism, in accordance with a further feature of the invention, consists in the combination with the relatively light spring for pressing the flange formers against the bottom margin of the upper during the flange turning operation and the pressure fluid actuated piston for applying flange molding pressure to said flange formers of a relatively heavy spring for effecting a quick retraction of said piston before the retraction of the flange formers or the outer heel forms commences.

In accordance with a further feature of the invention, both the outer heel forms and the flange forming members are operated by pressure fluid actuated means and a separate pressure fluid actuated means is provided for retracting said outer heel form.

In another aspect thereof, the invention provides means for actuating the upper-shaping molds comprising a piston having connections to the opposite side portions of said molds and yielding means for holding the molds open while they advance into work-engaging position. In order to facilitate the interchange of molds for operating on uppers of different sizes, readily detachable connections are provided between the piston and the molds and the molds are mounted on a carrier from which they are conveniently removable. In accordance with a further feature of the invention, pressure fluid actuated means is provided for advancing the molds in their open

position and a second pressure fluid actuated means is provided for closing the molds on the upper. In the illustrated machine, said second pressure fluid actuated means is rendered operative by the resistance of the work to further bodily advancement of the molds in their open position. Another feature of the invention consists in the provision of a pressure fluid actuated member for advancing the molds, a second pressure fluid actuated member for closing the molds and a cylinder in which said members are concentrically mounted. In order that the molds may be advanced rapidly into upper-engaging position and then brought to bear against the upper with relatively heavy molding pressure, the illustrated machine, in accordance with a still further feature of the invention, is provided with pressure fluid actuated means for advancing the molds under relatively light pressure to bring them into proximity to the work, pressure fluid actuated means for thereafter advancing the molds under relatively heavy pressure, and pressure fluid actuated means for closing the molds on the work. To achieve this result, the illustrated machine is provided with a member having a relatively small pressure fluid area for advancing the molds into proximity to the work, a second member having a relatively large pressure fluid area for further advancing the molds and pressing them against the work, and a third pressure fluid actuated member for closing said molds on the work.

In forming an outturned flange in a stitchdown upper, it is desirable that a well-defined crease be formed at the bend line of said flange. To that end, the illustrated inner form is provided with a recess so constructed as to assist in the formation of a crease line in the upper at the root of the outturned flange, said recess providing a space into which the upper materials are forced by the application of pressure to said outturned flange by upward movement of the flange formers. The illustrated inner form is provided with an angular recess or groove extending about its work engaging surface along a line adjacent to the bend line of the outturned flange of the upper and having a contour complementary to the shape desired in the creased portion of the upper.

In order to reduce to a minimum the extent of operating movement of the flange formers, they are so constructed and arranged that in their closed or retracted position they occupy a space somewhat wider than the base of the inner form, thus providing abutments against which the upper-engaging molds turn the bottom margin of the upper outwardly to initiate the flange forming operation.

In certain important respects, the present invention is not limited to a machine for shaping shoe uppers but is applicable to power operated machines generally. In one aspect thereof, the invention contemplates the provision in each station of a two-station machine of a pressure fluid actuated piston, a second pressure fluid actuated piston, novel means actuated by said second pressure fluid actuated piston for retracting said first-mentioned piston, and means in each station for controlling the actuation of said second piston in the other station. In the illustrated machine, the first piston above referred to advances the upper-shaping molds while the second piston actuates mechanism for retracting said molds, said second piston acting in the cycle next succeeding the application of

pressure by the operation of the first piston, and providing a time interval during which pressure is maintained to insure an effective molding operation on the upper.

In an important aspect thereof the invention consists in the combination with the upper shaping molds, the flange formers and the pressure fluid actuated pistons for operating the molds and the flange formers of a selector valve for determining the sequence of operation of said pistons, a pressure fluid actuated motor for operating said selector valve, and another valve for determining the speed of operative movement of said motor. The illustrated selector valve is so constructed and arranged as to cause the heel end shaping operations to occur in the following sequence, namely, first the closing of the molds on the heel end of the upper, then the movement of the flange formers to bend the bottom margin of the upper outwardly and, finally, the movement of the flange formers heightwise of the upper to mold the outturned flange.

Another aspect of the invention relates to combinations applicable to pressure fluid actuated machines generally, and not limited to machines for operating on shoes. In this aspect the invention provides a combination including the piston rod which, in the illustrated machine, actuates the outer heel molds, said piston rod having a small piston head and a relatively large piston head and operating in a cylinder having a small bore for said small piston head and a large bore for a sleeve which slides on the large piston head. The piston is initially actuated by pressure fluid admitted through a port in the small bore of the cylinder and acting against the small piston head and is finally actuated by pressure fluid admitted through a port in the large bore of the cylinder and acting against the large piston head, the latter bore being initially covered by the sleeve. In the operation of the machine after the initial advancement of the piston rod the sleeve is advanced to actuate work engaging means and in the course of such advancement uncovers the port in the large bore of the cylinder, admitting pressure fluid which operates against the large piston head to further advance the piston rod together with a carrier for said work engaging means actuated by movement of said piston rod.

Other features of the invention relate to the provision in a two-station machine of novel mechanism, including a treadle common to both stations, for operating the valves in each station to initiate the operation of said station, and automatic means in each station for operating the valves in the opposite station to effect the release of the work.

These and other features of the invention will now be described with reference to the accompanying drawings and pointed out in the appended claims.

In the drawings,

Fig. 1 is a side elevation of a machine embodying the features of the present invention, the base and side wall being broken away and certain parts shown in section;

Fig. 2 is a perspective view of the rear portion of the machine with the back cover plate removed;

Fig. 3 is a side elevation illustrating parts in the head of the machine, the hydraulic cylinders being shown in central longitudinal section;

Fig. 4 is an enlarged view in side elevation il-

illustrating operating instrumentalities in the head of the machine, certain parts being shown in section;

Fig. 5 is a plan view illustrating a portion of the machine head, certain parts being broken away and other parts shown in section;

Fig. 6 is a section on the line VI—VI of Fig. 5;

Fig. 7 is a plan view illustrating the flange former operating mechanism and certain other operating parts;

Fig. 8 is a perspective view illustrating particularly the heel form and the flange formers;

Fig. 9 is a perspective view illustrating parts of the hydraulic system and other operating mechanism;

Fig. 10 is an enlarged detail view of a hydraulic valve in central longitudinal section;

Fig. 11 is a diagrammatic view of the hydraulic system with the hydraulic cylinders shown in central longitudinal section and the valve operating treadle, for convenience of illustration, separately shown in each station;

Fig. 12 is an enlarged detail view of the governor valve in central longitudinal section;

Fig. 13 is a section on the line XIII—XIII of Fig. 12, greatly enlarged;

Fig. 14 is an enlarged detail view of the rotary valve and its casing;

Fig. 15 is a development of the inner surface of the casing illustrated in Fig. 14;

Figs. 16 to 19 inclusive are developments of the outer surface of the rotary valve body showing the position of the valve body in its casing at successive stages in the operation of the machine;

Figs. 20, 21 and 22 are enlarged detail views illustrating successive positions of the operating parts on the work; and

Fig. 23 is an enlarged detail view, partly in section, illustrating the work engaging portions of the flange forming mechanism.

Referring to Fig. 1, the illustrated machine is a two-station fluid pressure operated machine having operating parts similar in their construction and mode of operation to the operating parts in the machine illustrated in my patent hereinbefore referred to. In common with the machine illustrated in said patent, each station of the present machine is provided with an inner heel form 30, a pair of outer heel forms 32, and a pair of flange formers or wipers 34 constructed and arranged to move outwardly and rearwardly to flange the bottom margin of the upper against the outer heel forms 32 and to move heightwise of the upper to shape or mold said outturned flange against said outer heel forms. As best illustrated in Fig. 4, the inner heel form 30 is mounted on a supporting plate 36, said form having a central vertical slot 38 which receives an upward extension 39 of said plate and having a key way 40 extending transversely thereof and arranged to receive keys 42 (Fig. 8) in said plate. A shoe upper mounted on the inner heel form 30 lies at an angle of 45° to the horizontal with its heel portion uppermost. Thus, it will be understood the inner heel form is so positioned on the plate 36 that it is held in position on said plate by gravity. The plate 36 is secured between downward extensions 44 (Fig. 4) of an inclined portion 46 of the top of the machine by a cross-pin 48, the forward portion of the plate 36 resting on the recessed portion of the frame between upward extensions 50 (Fig. 8). Referring to Figs. 5 and 6, each outer heel form 32 is mounted on a

carrier 52 provided with an upwardly extending arcuate tongue 54 which fits into a corresponding groove in the outer heel forms 32. The center of curvature 56 of said arcuate tongue is located substantially at the meeting point of the work engaging surfaces of the forms 32 and thus there is no appreciable separation of the work engaging surfaces of the molds when the molds are opened slightly to free them from the work.

The carrier 52 is secured to the reduced forward portion of a piston rod 58 and the weight of the carrier and the forms 32 is supported by a crosshead 60 (Fig. 4) on which the carrier is slidably mounted. For closing the forms 32 on the heel portion of an upper mounted on the inner form 30 a crosshead 62 (Fig. 5) at the forward extremity of a hollow piston or sleeve 64 is connected by links 66 to outwardly extending ears 68 on the forms 32. To facilitate the removal of the forms 32 from the machine, the ears 68 are provided with open-ended slots 70 which receive the pivot pins 72 on the links 66, thus permitting said links to be readily disconnected from the forms. During the operation of the machine, the pins 72 are retained in position within the slots 70 by springs 74. The forms 32 are normally held in their open position by the expansion of a spring 76 surrounding the piston rod 58 and confined between the rear portion of the carrier 52 and the base of a spring receiving recess 78 in the central portion of the crosshead 62, the expanded position of the spring being determined by the engagement of a flange 79 on the rod 58 within a counter-bore in the central portion of the crosshead 62. The sleeve 64 is slidably mounted in a fixed cylinder 80 and its rear portion is counterbored at 82 to receive a piston 84 on the piston rod 58. A rearward extension 86 of the piston rod 58 is mounted in a small cylinder 88 and its end portion is enlarged to provide a piston 90 which slides in said cylinder. The initial advancement of the outer heel forms 32 from their position illustrated in Fig. 5 is effected by fluid under pressure introduced into the rear portion of the small cylinder 88 through a pipe 285. It will be understood that during such initial advancement the entire outer heel form assembly comprising the forms 32, the carrier 52, the piston rod 58, the sleeve 64, and its connections to the heel forms advance as a unit with the forms 32 in their open position, as shown in Fig. 5. During such initial advancement of the heel form assembly, fluid is drawn from a surge tank 94 through a pipe 96 into the chamber at the rearward extremity of the cylinder 80, the flow of fluid from said surge tank continuing until the port 98 through which such fluid flows into the small cylinder 88 is closed by the piston 90. This occurs as the forms 32 come into engagement with the back-line portion of an upper on the inner form 30. As the advancement of the piston 90 closes the port 98 corresponding advancement of the sleeve 64 opens a port 100 (Fig. 1) in the cylinder 80 admitting fluid under pressure from a pipe 190. Pressure fluid from said pipe 190 acts against the piston 84 and the rear edge face 104 (Fig. 5) of the sleeve 64, thus forcing the molds 32 under relatively heavy pressure against the back-line portion of the upper and simultaneously closing said forms on opposite sides of the heel portion of the upper to shape the upper against the inner heel form 30. Some pressure fluid will inevitably leak through the cylinder 80 and, unless provision is made for

draining off this leakage, it will flow downwardly along the sleeve 64 and there is danger that some of this leakage will work downwardly onto the outer heel forms and soil the exposed surfaces of shoe uppers. In order to provide for the proper draining of such oil leakage, the forward portion of the cylinder bore is provided with a drain groove 105 (Fig. 5), said groove forming an ellipse extending downwardly and forwardly from the top of the cylinder bore. The forward wall of this groove extends outwardly at a right angle to the cylinder bore in order to wipe the leaking oil from the sleeve 64 during its forward movement and cause it to drain downwardly through the bottom of the cylinder 80 and through suitable drainage ports in the top of the machine frame. It will be understood that the upper-shaping mechanism above described is substantially identical in the two stations of the illustrated machine.

The flange formers 34 are removably secured to carrier plates 106 (Figs. 7 and 8) which are mounted on bed plates 107 and held against upward movement by hold-down plates 109 secured to said bed plates. The flange formers are connected together by a halved joint 114 and their operative movements are controlled by rolls 108 mounted on studs 110 and arranged to operate in arcuate slots 112 in the plates 106. For mounting the flange formers on their carrier plates 106, each flange former is provided with two downwardly extending pins 116 (Figs. 7 and 21) the foremost of which is provided with a groove which receives a locking pin 118 mounted in a longitudinal bore in the carrier plate 106. In order to admit the foremost pin 116 into its hole in the carrier plate, the locking pin 118 is provided with a groove which registers with said hole when the locking pin is pressed rearwardly against the pressure of a spring 122 which returns the locking pin to its forward or locking position after the flange former is seated on its carrier. The flange forming assembly is mounted on the head 124 (Fig. 4) of a sleeve 126 slidably mounted in the upper portion of a cylinder 128 secured to the machine frame and moves upwardly with said sleeve during the flange forming operation. For moving the flange formers rearwardly and outwardly to flange the bottom margin of the upper outwardly against the outer heel forms 32, the illustrated machine is provided with a pressure fluid actuated means comprising a piston rod 130 (Fig. 7) which carries at its rear end a piston 132 slidably mounted in a cylinder 134 and has fixed to its forward end a crosshead 136, the opposite ends of which are connected by ball-ended links 138 to the flange former carriers 106. The flange forming assembly is supported for the flange forming operation above described a spring 140 (Fig. 4) surrounding a piston rod 142, and is confined between a shoulder 144 in the sleeve 126 and an annular plate 146 surrounding said piston rod and supported by a relatively heavy spring 148 surrounding said rod and holding said annular plate against a shoulder formed in the cylinder 128. The initial or rest position of the flange forming assembly heightwise of the upper is determined by the adjustment of a headed screw 150 extending freely through a bore in the head 124 and threaded into a tapped hole in the upper end portion of the piston rod 142, the head of said screw being seated in a counterbore in the head 124. It will be understood that the screw 150 holds the flange forming assembly against upward movement while permitting said assembly

to move downwardly slightly against the pressure of the spring 140 as may be required during the rearward and outward movement of the flange formers. Preferably, the flange formers would exert only a light upward pressure against the bottom margin of the upper during such rearward and outward movement, the upward movement of the flange formers to mold the flange against the outer heel forms 32 occurring after the rearward and outward movement of the flange formers has been completed. For moving the flange forming assembly heightwise of the upper for the flange molding operation, the piston rod 142 carries a large piston 152 (Fig. 3) which operates in a counterbore 154 in the expanded lower portion of the cylinder 128. The piston is actuated by fluid under pressure introduced into the chamber in the lower portion of the cylinder 128 through a port 156. The pressure thus produced is taken by a cover plate 157 (Figs. 1 and 5) mounted to swing on pins 159 to permit the removal of the operating parts. The rear portion of the plate is held against upward movement by a removable pin 161. In order to prevent the piston from returning to a position where it will contact the bottom of the cylinder and eliminate said chamber, a spacer or boss 158 extends downwardly from the piston 152 for engagement with the head 160 of the cylinder. In order to obviate any rubbing of the flange formers against the molded flange as they return to their rest position, the spring 148 is made sufficiently heavy to insure a quick return of the piston together with the flange forming assembly to its lowermost position. For moving the flange formers forwardly and inwardly to their rest position a spring 162 (Figs. 3 and 7) is mounted in a reduced extension 164 of the cylinder 134 and its forward end is seated in a bore in the piston 132. The outer heel forms 32 are withdrawn to their rest position by the pressure fluid actuation of a piston 166 (Fig. 9) in a cylinder 168 through a train of mechanism hereinafter described.

For actuating the illustrated machine, an electric motor 170 (Fig. 1) operates a constant delivery pressure fluid pump 172 (Figs. 1 and 2) which may be a gear pump of any known type and said pump draws pressure fluid from a sump 174 in the base of the machine and delivers it to both stations of the illustrated machine. For controlling the fluid pressure, a pressure control valve 175 is secured to a pipe 177 communicating directly with the pump 172. While this valve may be of any known type, I prefer to employ for this purpose a valve such as that illustrated in Fig. 33 of United States Letters Patent 2,047,185, granted July 14, 1936, on an application filed in the name of Milton H. Ballard et al.

Referring to Figs. 2 and 11, the pump 172 draws fluid, preferably oil, from the sump 174 through a supply pipe 176 and forces it through feed pipes 178, 180, 182 and 184 to a manifold 186 and through two feed pipes 188 to two rotary selector valves R (Fig. 11) one in each station of the machine. Upon actuation of the rotary valve in one station, as hereinafter described, pressure fluid from one of the pipes 188 is fed in predetermined sequence first to a pipe 190 which communicates with the cylinder 80 to operate the outer heel forms 32; secondly, through a pipe 192 which communicates with the cylinder 134 in which operates the piston which imparts outward or wiping movement to the flange formers; and finally, through a pipe 194 which communicates with the

cylinder 128 in which operates the piston for applying molding pressure to the flange formers.

Referring now to Figs. 14 to 19 inclusive, the illustrated rotary valve comprises a valve body 196 mounted for oscillatory movement in a casing 198 secured to inward extensions 200 of the side wall of the machine frame. The feed pipe 188 communicates with a chamber 202 in the casing 198 said chamber having two outlets in the form of slots 204 (Fig. 15) which extend peripherally of the bore in the casing and communicate with annular passages or grooves 206, 208 (Fig. 16) in said valve body. The groove 206 communicates with a groove 210 which extends first longitudinally of the valve body and then peripherally of the valve body in a direction opposite to the direction of rotation of the valve body to a predetermined point. The groove 210 communicates with a port 212 in the valve casing, said port communicating with the pipe 190. In the course of the rotation of the valve body in a clockwise direction, as seen in Fig. 14, or in the direction of the arrow in Figs. 16 to 19 inclusive, the groove 210 comes into alignment with said port 212 thus opening a pressure fluid line from the pipe 188 (Fig. 11) to the pipe 190. The groove 208 communicates with a groove 214 which extends longitudinally of the valve body then peripherally of the valve body to a point in alignment longitudinally of the valve body with the end of the groove 210. The groove 214 communicates with a port 216 which, in turn, communicates with the pipe 192. The groove 208 also communicates with a groove 218 which extends longitudinally only of the valve body in alignment with the ends of the grooves 210 and 214. The end of the groove 218 communicates with a port 220 in the casing 198, said port communicating with the pipe 194. It will be seen that the construction and arrangement of the valve body and its casing are such that upon rotation of the valve body in the direction of the arrow, the grooves 210, 214, and 218 communicate with their ports in the order named at predetermined intervals, the groove 218 coming into communication with its port as the valve body comes to the limit of its rotation, said position being illustrated in Fig. 19. It will be seen that in this position of the valve body, all three of the grooves 210, 214 and 218 are in communication with their ports and, consequently, the flange formers are at the limit of their advancement and the upper is under the mold pressure of the outer heel forms and the flange formers. This pressure is maintained while an upper which has been operated upon is removed from the second station of the machine and an upper to be molded is positioned in said station and the operation of said station is initiated by means hereinafter described. At a predetermined point in the operation of said second station, mechanism hereinafter described causes the valve body 196 in the first station to be rotated in a counterclockwise direction, as seen in Fig. 14, to return it to its position indicated by Fig. 16. In this position, a T-shaped groove 222 in the valve body connects the ports 212 and 216 to an exhaust port 224 in the casing 198. The port 220 does not communicate with an exhaust port in the casing since the cylinder 128 is provided with a separate exhaust line hereinafter described. For balancing the valve body in its casing, said valve body is provided with three grooves 226, 228, and 230 which correspond to the grooves 210, 214, and 218, respectively, and are located diametrically opposite said last-mentioned grooves.

It will be understood that the pressure fluid in these grooves maintains a pressure on the rotary valve body equivalent to the pressure applied to the opposite side of said valve body by the pressure fluid in the grooves 210, 214, and 218 and prevents any binding or cramping of the valve body in its casing.

For oscillating the valve body 196, there is provided in each station of the machine, a pressure fluid actuated motor 232 (Figs. 2 and 11) having rack teeth which mesh with a pinion 234 connected to the valve body. For rotating the valve body in a direction to connect the pressure fluid pipe 188 to the service ports in predetermined sequence as above described, a pipe 236 extends from a pipe 237 into the upper portion of a cylinder 238 in which the upper portion of the motor 232 is slidably mounted. The motor turns the valve body approximately half a revolution into a position accurately predetermined by a stop screw 240 arranged to engage the lower end of the motor. For turning the valve body in the opposite direction to return it to its rest position and open the exhaust line as above described, pressure fluid is directed to a cylinder 242 in which the lower portion of the motor 232 is slidably mounted through a pipe 244 extending from the manifold 186 through valves hereinafter described and through a pipe 246 to the cylinder 242. The motor 232 turns or oscillates the valve body 196 by the engagement of rack teeth 247 with the pinion 234 fixed to the valve body. The operation of the motor 232 is controlled by three sleeve valves 248, 250, and 252, valve 248 being slidably mounted on the pipe 237, and the valves 250 and 252 being slidably mounted on the pipe 244. The construction of the sleeve valve 250 is illustrated in Fig. 10. Said valve has an upper chamber 254 surrounding the pipe 244 and a smaller, lower chamber 256 also surrounding said pipe and communicating with an exhaust passage 258. The pipe 244 is closed at 260 and at opposite sides of this closure the pipe has ports 262 and 264. In the position of the sleeve valve 250, illustrated in Fig. 10, both the upper ports and the lower ports are in communication with the upper chamber 254 and pressure fluid passes downwardly through the valve into the lower portion of the pipe 244. When it is desired to open the exhaust line, the valve is moved upwardly until the lower ports 264 are in communication with the lower chamber 256, thus permitting exhaust fluid to move upwardly through the lower section of the pipe 244 and through the exhaust passage 258. The upper sleeve valve 248 differs from the valve 250 only in that its exhaust outlet 249 is in the upper part of the valve. The lower sleeve valve 252 is substantially the same as the valve 250, except that it has no exhaust chamber. See Fig. 11. The valves 248, 250 and 252 are moved upwardly by the depression of a treadle 268 (Fig. 1) which operates through a train of mechanism comprising a link 270 (Figs. 1 and 9), a bell crank lever 272, a horizontal link 274, and a vertical arm 276 fixed to a rockshaft 277 to which there is also fixed a horizontal arm 279 which is connected to the valve 252 by a link 281 and to the valve 250 by a link 266, the valve 250 being connected to the valve 248 by a link 283. The vertical arm of the bell crank lever 272 has a pin-and-slot connection to the horizontal link 274 to provide a predetermined lost motion, the purpose of which is hereinafter explained. The valve assembly is yieldingly held in its uppermost position by a spring 287 (Fig. 1) arranged

to engage the bottom of the valve 248. Referring to Fig. 11, the valves 248, 250 and 252 in the right-hand station of the machine are shown in their elevated position with the operating parts shown in their pressure-applying positions. In this position of the sleeve valves, the upper valve 248 is arranged to open a pressure line from the manifold 186 through a pipe 285 to the small end 88 of the cylinder 80, and also to open a pressure line through the pipe 236 to the cylinder 238. The middle valve 250 in its upper position is arranged to close the pressure line extending downwardly from the manifold and to open the exhaust port in said valve for the passage of exhaust fluid from the cylinder 168 through a pipe 278 connected to the pipe 244. The lower valve 252 in its upper position prevents the passage of pressure fluid into the lower portion of the pipe 244 and also prevents the discharge of exhaust fluid from the cylinder 242 upwardly through the pipe 244 and through the exhaust passage in the middle valve 250 and forces the exhaust fluid from said cylinder to pass outwardly through a governor valve G. Said governor valve, now to be described, restricts the flow of exhaust fluid from the cylinder 242 and times the downward movement of the motor 232 and therefore the rotation of the rotary valve R. Referring now to Figs. 12 and 13 illustrating the construction of the governor valve, said valve comprises a casing 282 to which the pipes 244 and 246 are connected, said pipes communicating with a fluid chamber 284 which provides a permanently open passage between the two pipes. Said casing is also provided with an exhaust outlet 286 through which oil passes from the chamber 284 through an orifice the size of which may be varied by turning a valve body 288 extending vertically through said chamber and into a bore at the bottom of said chamber. The cylindrical surface of the valve body is provided with a longitudinal groove 290 which is open to the chamber 284 and which communicates with an eccentric passage 292 extending from the chamber 284 to the exhaust outlet 286. The valve body 288 may be turned by means of a hand lever 294 (Fig. 9) to adjust the position of the groove 290 relatively to the eccentric passage 292 and thereby to vary the size of the orifice through which fluid passes from the chamber 284 into the exhaust outlet 286, the adjustment of said valve body being indicated by the position of a pointer, on the hand lever on a scale 296 on the upper portion of the casing 282.

Referring again to Fig. 11, the sleeve valves 248, 250 and 252 at the left side of the diagram are illustrated in their lower positions, the operating parts being shown in their inoperative positions. The upper valve 248 is now so positioned that exhaust fluid from the pipes 285 and 236 passes through its exhaust chamber and drains through the exhaust outlet 249 into the sump. The middle valve 250 is arranged to permit passage of pressure fluid from the manifold 186 through the pipes 244 and 278 to the cylinder 168 to actuate the piston 166 and through it to effect the retraction of the outer heel forms through mechanism presently to be described. The lower sleeve valve 252 in its lower position connects the manifold to the pipe 246 through which pressure fluid passes to the cylinder 242 and the lower end of the motor 232. The governor valve 280 is in this pressure line but it will be understood that the pressure fluid passes freely through the chamber 284 of the governor valve, said valve in this

case merely serving as an elbow connecting the pipes 244 and 246.

For retracting the outer heel forms, the piston 166 is connected by a link 300 (Fig. 9) to a lever 302, to the opposite end of which is anchored a flexible cable 304 which passes over a pulley 306 and is connected to the carrier 52 on which the outer heel forms are mounted.

In the illustrated two-station machine, the upper in one station remains under molding pressure while a molded upper is removed from the other station and another upper to be molded is placed therein and the outer heel forms in said other station begin their advancing movement. As said heel forms advance, they act through the cable 304 to rock the lever 302 to retract the piston 166. This lever also operates through mechanism now to be described to impart downward movement to the slide valve assembly in the first station thereby effecting the release of fluid pressure in said first station and the retraction of the operating parts to their rest positions. It will be understood that two such trains of mechanism are provided in the illustrated two-station machine. Referring to Fig. 9, the lever 302 in the right-hand station, indicated as station B in Fig. 9, and a similar lever 303 in the left-hand station, indicated as station A, are freely mounted upon a cross-shaft 321 extending through both stations of the machine. Extending laterally from the lever 302 is an arm 308 having a hub 309 which is freely mounted on the shaft 321 and lies adjacent to the hub of the lever 303 in station A. Similarly, an arm 311 extends laterally from the lever 303 and has a hub 313 freely mounted on the shaft 321 and positioned adjacent to the lever 302 in station B. Extending from the hub 309 of the arm 308 are short arms 312 between which there is pivotally mounted an arm or thrust member 314, the free end of which is seated at the base of a notch 316 in the upwardly extending arm of a bent lever 318 freely mounted on a cross-shaft 320 extending through both stations of the machine. Similarly, the hub 313 of the arm 311 has extending therefrom two short arms 315 between which there is pivotally mounted an arm or thrust member 317, the free end of which is seated at the base of a notch in a bent lever 319 freely mounted on the shaft 320. The bent lever 318 is connected by a link 322 to the upper sleeve valve 248 in station A while the corresponding bent lever 319 is connected by a link 323 to the upper sleeve valve in station B. It will be seen that while the lever 302 is positioned in station B and operates on the outer heel forms in station B, the arm 308 extending from said lever operates on the thrust member 314 in station A. To enable each thrust member to operate on its bent lever, there is formed in its free end a shoulder 324 which engages the bent lever at the bottom of the notch 316. Upon completion of the downward movement of the valve assembly by the operation of the bent lever, the end of a screw 326 projecting upwardly from an arm 328 extending forwardly with a downward inclination from the forward portion of the bent lever engages the thrust member and lifts it sufficiently to disengage its shoulder 324 from the bent lever and during the continued movement of the lever 302, the arm moves freely through the notch in the bent lever into its position in station A as illustrated in Fig. 9 in which position it will not interfere with the upward movement of the slide valve assembly by the treadle in the next succeeding cycle of the machine.

It is important that the flange former assembly return to its lowermost position before the flange formers commence their inward or retracting movement in order to avoid any displacement or abrasion of the molded flange of the upper by contact of the flange formers therewith during their retracting movement. This necessitates a return or downward movement of the large piston 142 (Fig. 3) before the return movement of the piston 130 commences. In order to insure this result, the cylinder 128 is provided with an exhaust line which opens immediately upon downward movement of the sleeve valve assembly while the exhaust line from the flange former cylinder 134 is not open until the rotary valve body has completed its return movement. Referring to Fig. 11, the exhaust fluid from the large cylinder 128 passes through a pipe 330 and through a sleeve valve 332 mounted on said pipe and controlled by a forked arm 334 secured to the rockshaft 277 which arm carries rolls 336 which operate in an annular groove 338 in the valve 332. Downward movement of the link 266 actuates the arm to rock the shaft 277 and the arm 334 thereon to move the sleeve valve 332 into position to open the exhaust line from the large cylinder 128; and said valve remains in this position until the treadle 268 is actuated to rock the shaft 277 to move the sleeve valve 332 into a position in which it closes said exhaust line.

In the operation of the machine, the treadle 268 is depressed, pulling downwardly on the two links 270 in the two stations of the machine, there being but one treadle for the two stations. Referring now to Fig. 9, the downward movement of the link 270 in station A imparts rearward movement to the horizontal link 274 which operates through mechanism hereinbefore described to set the sleeve valves for the initiation of the power cycle of the machine. In station B the valves are still open to pressure and, consequently, the horizontal link 274 is in its forward position and the treadle actuated bell crank lever 272 moves idly advancing the cross-pin 342 in the vertical arm of the bell crank lever from the forward end of the slot 344 in the horizontal link 274 to the rearward end of said slot. Referring now to Fig. 11, upon depression of the treadle, the sleeve valves 248, 250, and 252 are moved upwardly into their position illustrated in station B and pressure fluid moves upwardly into the right-hand chamber of the manifold 186. Inasmuch as the middle valve 250 is now positioned to close the pressure line extending downwardly from the manifold and the upper valve 248 is in its open position, pressure fluid flows upwardly from the manifold and through the pipe 285 communicating with the small cylinder 88 and also through the pipe 236 communicating with the upper motor cylinder 238. During the advancement of the piston 90 by pressure fluid in the cylinder 88, fluid is drawn into the larger cylinder 80 from the surge tank 94 through the pipe 96; the flow of fluid from the surge tank continuing until the piston 90 closes the port 98. Immediately upon the closing of said port, the sleeve 64 will have uncovered the port 100 in the cylinder 80 to admit pressure fluid from the pipe 190. During the initial advancement of the piston 90 pressure fluid enters the cylinder 238 and moves the motor 232 downwardly to operate the rotary valve R thereby opening in sequence the service ports in the valve casing communicating respectively with the pipes 190, 192 and 194 which serve the three cylinders 80, 134 and 128 in the order named. As the motor

232 moves downwardly fluid in the lower cylinder 242 is exhausted slowly through the pipe 246. Inasmuch as the lower sleeve valve 252 is now positioned to close the pipe 244, exhaust fluid from the cylinder 242 passes outwardly through the governor valve G which has previously been adjusted to control the speed of downward movement of the motor. Thus, the speed of operation of the rotary valve is determined and the operations of the machine are properly timed. During the closing movement of the outer heel forms 32 in station B, the cable 304 swings the lever 302 in a clockwise direction thereby actuating the arm 314 in station A (see Fig. 9) to swing the bent lever 318 in a clockwise direction thereby moving the sleeve valves 248, 250 and 252 downwardly into their position illustrated in Fig. 11, and at the same time moving the horizontal sleeve valve 332 forwardly to open the exhaust line 330 from the cylinder 128, thus permitting the downward or return movement of the piston 142 together with the flange former assembly by the heavy spring 148; thereby bringing the flange formers out of contact with the upper. Inasmuch as the opening of the exhaust lines from the cylinders 80 and 134 awaits the operation of the rotary valve it will be understood that the flange former assembly is returned to its downward position with the flange formers out of contact with the upper before the outer heel forms 32 and flange formers 34 are retracted. In its lowermost position the upper sleeve valve 248 closes the pipe 237 extending upwardly from the manifold 186 and opens the exhaust outlet 249 in said valve to the pipes 285 and 236. The middle sleeve valve 250 is now in its open position and consequently pressure fluid flows downwardly from the manifold through said valve and through the pipe 278 communicating with the cylinder 168, thus actuating the piston 166 which operates through the lever 302 and cable 304 to retract the outer heel forms 32 upon the opening of the exhaust line from the cylinder 80. The lower slide valve 252 is also in its open position and conducts pressure fluid from the manifold downwardly through the free passage in the governor valve G and to the cylinder 242, thus moving the motor 232 upwardly and operating the rotary valve in station A in a clockwise direction to connect the pipes 190 and 192 to the exhaust outlet 346 in the valve casing.

In certain respects, the operation of the work engaging parts on the upper differs from the operation performed by the machine illustrated in my Patent No. 1,891,259, above referred to, although in general the operations performed by the two machines are substantially alike. Referring to Figs. 20 to 23, the upper is positioned heightwise thereof for the molding operation by the engagement of its bottom edge with plates 348 secured by down-turned extensions 350 to the flange formers 34, said plates being adjustable on the flange formers to vary the width of the outturned margin of the upper. After mounting the upper on the heel form 30, the operator draws forwardly on the upper to hold it firmly against the inner heel form and then depresses the treadle to start the power operation of the machine. The outer heel forms 32 advance into their upper-molding position illustrated in Fig. 21 before the flange formers 34 commence their outward movement. During the latter part of the closing movement of the outer heel forms, their lower edges force the lower portion of the upper inwardly beyond the working edge of the flange formers thereby turning the bottom mar-

gin of the upper outwardly about 45° into the position illustrated in Fig. 21 to start the flange forming operation. The advancement of the bottom edges of the outer heel forms forces the bend in the upper into an angular recess formed between the body portion of the inner heel form and the base portion 352 thereof (Fig. 23). Upon completion of the advancement of the outer heel forms 32, the flange formers 34 move outwardly and rearwardly with only light upward pressure. This operation of the flange formers bends the outturned margin of the upper upward to some extent but without drawing the upper tightly about the bottom edges of the forms 32, thus leaving the upper stock between the bottom edges of the forms 32 and the grooved base portion of the inner heel form substantially untensioned and free to be molded by the subsequent heightwise movement of the flange formers into the groove in the base of the inner heel form. Upon completion of the outward and rearward movement of the flange formers they are moved heightwise of the upper into their position illustrated in Figs. 22 and 23 to perform the flange molding operation. During said molding operation, the upper materials are forced into the angular groove at the base of the inner heel form to mold a well-defined crease line therein, as illustrated in Fig. 23. As in the machine of my patent above referred to, the flange is bent upwardly or overmolded by the heightwise movement of the flange formers to an extent substantially commensurate with the normal spring-back of the upper materials.

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

1. In a machine for shaping shoe uppers, the combination with inner and outer upper shaping molds, of flange forming members, and pressure fluid operated means for moving the flange forming members heightwise of the upper, said means being positioned in heightwise alinement with the upper and arranged for movement heightwise of the upper.

2. In a machine for shaping shoe uppers, the combination with inner and outer upper shaping molds, of flange formers, means for carrying said flange formers, and fluid pressure means for actuating said carrying means to move the flange formers heightwise of the upper, said actuating means being positioned in heightwise alinement with the upper and arranged for movement heightwise of the upper.

3. In a machine for shaping end portions of shoe uppers, the combination with inner and outer upper shaping molds, of flange formers, a carrier for said flange formers, a piston on which said carrier is mounted, and a cylinder in which said piston is mounted for movement heightwise of the upper.

4. In a machine for shaping end portions of shoe uppers, the combination with inner and outer upper-shaping molds, of flange formers operable to form an outturned flange in the upper, a carrier for said flange formers, means for imparting outward flange forming movement to said flange formers, a piston on which said carrier is mounted, and a cylinder in which said piston is mounted for movement heightwise of the upper.

5. In a machine for shaping shoe uppers, the combination with upper-shaping molds and flange forming means, of a carrier for said flange forming means, a piston on which said carrier is

mounted, yielding means for exerting a light pressure on said carrier heightwise of the upper, and pressure fluid means for actuating said piston to apply heavy pressure to said carrier heightwise of the upper.

6. In a machine for shaping shoe uppers, the combination with inner and outer upper-shaping molds, of flange formers for forming an outturned flange in the upper, a carrier for said flange formers, and a piston movable heightwise of the upper to cause the flange formers to form the outwards flanged portion of the upper against said outer molds.

7. In a machine for shaping shoe uppers, the combination with inner and outer upper-shaping molds, of flange formers, a piston for moving said flange formers lengthwise of the upper, a second piston for moving said flange formers heightwise of the upper, and a cylinder in which said second piston is mounted for movement heightwise of the upper.

8. In a machine for shaping shoe uppers, the combination with upper-shaping molds, of flange-forming means, a piston for imparting to said flange-forming means movement heightwise of the upper, a relatively light spring for exerting a light pressure on said flange-forming means, fluid pressure means for actuating said piston to apply heavy pressure to said flange-forming means, and a relatively heavy spring for effecting a quick retraction of said piston.

9. In a machine for shaping shoe uppers, the combination with upper-shaping molds, of flange-forming members, a piston for moving said flange-forming members lengthwise of the upper, and a second piston for moving said flange-forming members heightwise of the upper.

10. In a machine for shaping shoe uppers, the combination with upper-shaping molds, of flange-forming members, a piston for moving said flange-forming members lengthwise of the upper, a second piston for moving said flange-forming members heightwise of the upper, and a source of pressure fluid for actuating said pistons.

11. In a machine for shaping shoe uppers, a pair of upper-shaping molds constructed and arranged to act on the outer surface of the upper, flange-forming members, pressure fluid actuated means for actuating said molds, and pressure fluid actuated means operable in the direction of the height of the upper to actuate said flange-forming members.

12. In a machine for shaping shoe uppers, a pair of upper-shaping molds constructed and arranged to engage the outer surface of the upper, flange-forming members, a pressure fluid actuated piston for closing said molds on the upper, a second fluid pressure actuated piston for moving said flange-forming members heightwise of the upper, and a cylinder in which said second piston is mounted for reciprocating movement heightwise of the upper.

13. In a machine for shaping shoe uppers, a pair of upper-shaping molds constructed and arranged to engage the outer surface of the upper, flange-forming members, a pressure fluid actuated piston for closing said molds on the upper, a second fluid pressure actuated piston for moving said flange-forming members heightwise of the upper, and a cylinder in which said second piston is mounted for reciprocating movement heightwise of the upper in a path positioned in alinement with the upper heightwise thereof.

14. In a machine for shaping shoe uppers, a pair of upper-shaping molds constructed and ar-

ranged to engage the outer surface of the upper, flange-forming members, a pressure fluid actuated piston for closing said molds on the upper, a second fluid pressure actuated piston for moving said flange-forming members heightwise of the upper, a cylinder in which said second piston is mounted for reciprocating movement heightwise of the upper, and a third pressure fluid-actuated piston for retracting said upper-shaping molds.

15. In a machine for shaping shoe uppers, a pair of upper-shaping molds constructed and arranged to act against the outer surface of the upper, flange-forming members, pressure fluid-actuated means for closing said molds on the upper, a second pressure fluid-actuating means for retracting said molds, and a third pressure fluid-actuated means for moving said flange-forming members lengthwise of the upper.

16. In a machine for shaping shoe uppers, a pair of upper-shaping molds constructed and arranged to act against the outer surface of the upper, flange-forming members, pressure fluid actuated means for closing said molds on the upper, a second pressure fluid actuating means for retracting said molds, a third pressure fluid actuated means for moving said flange-forming members lengthwise of the upper, and a fourth pressure fluid actuated means for moving said flange-forming members heightwise of the upper after they have completed their lengthwise movement.

17. In a machine for shaping shoe uppers, a pair of upper-shaping molds constructed and arranged to act on the outer surface of the upper, pressure fluid operated means for actuating said molds, connections from said means to opposite side portions of said molds, and yielding means for holding the molds open.

18. In a machine for shaping shoe uppers, a pair of upper-shaping molds constructed and arranged to act on the outer surface of the upper, pressure fluid actuated means for advancing and closing said molds, and yielding means interposed between the pressure fluid-actuated means and the molds for holding the molds in their open position until they meet the resistance of the work.

19. In a machine for shaping shoe uppers, a pair of upper-shaping molds constructed and arranged to act on the outer surface of the upper, pressure fluid actuated means for advancing and closing said molds, yielding means interposed between the pressure fluid actuated means and the molds for holding the molds in their open position until they meet the resistance of the work, and a second pressure fluid actuated means for retracting said molds.

20. In a machine for shaping shoe uppers, a pair of upper-shaping molds constructed and arranged to act on the outer surface of the upper, pressure fluid actuated means for advancing the molds in their open position and a second pressure fluid actuated means for closing the molds on the upper.

21. In a machine for shaping shoe uppers, a pair of upper-shaping molds constructed and arranged to act on the outer surface of the upper, pressure fluid, actuated means for advancing the molds in their open positions, and a second pressure fluid actuated means for closing the molds on the upper, said second pressure fluid actuated means being rendered operative to close the molds by the resistance of the work to further advancement of the molds in their open position.

22. In a machine for shaping shoe uppers, a

pair of upper-shaping molds constructed and arranged to act on the outer surface of the upper, pressure fluid actuated means for advancing the molds in their open positions, a second pressure fluid actuated means for closing the molds on the upper, and a cylinder in which both of said pressure fluid-actuated means are concentrically mounted.

23. In a machine for shaping shoe uppers, a pair of upper-shaping molds constructed and arranged to engage the outer surface of the upper, a hollow piston for closing said molds on the upper, a second piston operable within said hollow piston for advancing said molds in their open position, and yielding means interposed between said molds and the hollow piston for holding the molds in their open position until they meet the resistance of the work.

24. In a machine for shaping shoe uppers, a pair of upper-shaping molds constructed and arranged to act on the outer surface of the upper, pressure fluid actuated means for advancing the molds under relatively light pressure to bring them into proximity to the work, pressure fluid actuated means for thereafter advancing the molds under relatively heavy pressure, and pressure fluid actuated means for closing the molds on the work.

25. In a machine for shaping shoe uppers, a pair of upper-shaping molds constructed and arranged to act on the outer surface of the upper, a source of pressure fluid, a member for advancing said molds having a relatively small pressure fluid area, a second member for advancing said molds having a relatively large fluid pressure area, and a third pressure fluid actuated member for closing said molds on the upper.

26. In a machine for forming an outturned flange in a shoe upper, the combination with upper-embracing molds and flange formers for bending the bottom margin of a shoe upper outwardly about said molds, of an inner form provided with a recess so constructed as to form a crease line in the upper at the root of said outturned flange upon the application of pressure to said outturned flange, and means for moving said flange formers heightwise of the upper to apply pressure to said flange.

27. In a machine for forming an outturned flange in a shoe upper, the combination with upper-embracing molds and flange formers for bending the bottom margin of a shoe upper outwardly about said molds, of an inner form which supports the upper for the operation of said molds and is provided with an angular recess adjacent to the bend line of said outturned flange, and means for forcibly moving said flange formers heightwise of the upper to mold the stock in the region of the bend line into the angular recess of said inner form.

28. In a machine for forming an outturned flange in an end portion of a shoe upper, the combination with end-embracing molds and flange formers operable to bend the bottom margin of the upper outwardly about said molds, of an inner form on which the end portion of the upper is supported for the operation of said molds, said form having an angular recess extending about its work engaging surface along a line adjacent to the bend line of said outturned flange, means for moving said flange formers outwardly while maintaining a relatively light pressure thereon heightwise of the upper, and means operating on said flange formers after the completion of their outward movement to apply heavy

pressure to the upper heightwise thereof in the region of said bend line thereby to mold the upper materials in the region of the bend line within the angular recess provided in the inner form.

29. In a machine for forming an outturned flange in an end portion of a shoe upper, an inner form on which the upper is supported, molds for shaping the upper against said inner form, and outwardly movable flange formers so constructed and arranged that in their retracted position they occupy a space wider than the base portion of the inner form and thus provide abutments against which said molds turn the bottom margin of the upper outwardly to initiate the flange forming operation.

30. In a machine for shaping shoe uppers, a pair of end-embracing forms, a carrier on which said forms are removably mounted, and means for closing said forms, said means including connections which are readily detachable to permit the removal of said forms from the machine.

31. In a machine for shaping shoe uppers, a pair of end-embracing forms, a carrier on which said forms are removably mounted, an actuator for said carrier, a second actuator for closing said forms, and connections from said second actuator to said forms, said connections being readily detachable to permit the removal of the forms from the carrier.

32. In a machine for shaping shoe uppers, a pair of end-embracing forms, a carrier for said forms, said carrier and forms being constructed and arranged for interengagement to determine and control the closing movement of said forms, and means for actuating said forms including connections which are readily detachable to permit the removal of said forms from the carrier.

33. A two-station machine having, in each station, a pressure fluid actuated piston, a second pressure fluid actuated piston, a train of mechanical connections from said second pressure fluid actuated piston for retracting said first-mentioned piston, said connections including a lever, a valve controlling the operation of said second piston, and mechanical connections from said lever in each station actuated by a movement of said lever effected by the advancement of said first-mentioned piston for operating the valve in the other station.

34. A two-station machine having, in each station, an operating means, pressure fluid actuated means for advancing said operating means, a pressure fluid actuated member for retracting said operating means, a valve for controlling the application of pressure fluid to said member, mechanical connections from the operating means for retracting the pressure fluid actuated member in the same station, said connections including a lever, and mechanical connections from said lever for operating the valve in the opposite station.

35. A two-station machine having, in each station, an operating instrumentality, pressure fluid actuated means for advancing said operating instrumentality, a pressure fluid actuated member for retracting said operating instrumentality, a valve for controlling the application of pressure fluid to said member, mechanical connections from said member to said instrumentality, including a lever having an extension and connections from said extension for operating the valve in the other station.

36. A two-station machine having, in each station, an operating instrumentality, pressure fluid actuated means for advancing said operat-

ing instrumentality, a pressure fluid actuated member for retracting said operating instrumentality, a valve for controlling the application of pressure fluid to said member, mechanical connections from said member to said instrumentality including a lever having an extension, connections from said extension for operating the valve in the other station, and manually operable means for resetting said valve for the advancement of said operating instrumentality.

37. In a machine for shaping shoe uppers, a pair of upper-shaping molds constructed and arranged to engage the outer surface of the upper, a pressure fluid actuated piston for actuating said molds, a pair of flange formers, a pressure fluid actuated piston for operating said flange formers, a pressure fluid actuated piston for relatively moving the molds and the formers to mold the flange, a selector valve for determining the sequence of operation of said pistons, a pressure fluid actuated motor for operating said selector valve, and a valve for determining the speed of operative movement of said motor.

38. In a machine for shaping shoe uppers, a pair of upper-shaping molds constructed and arranged to engage the outer surface of the upper, a pressure fluid actuated piston for actuating said molds, a pair of flange formers, a pressure fluid actuated piston for operating said flange formers, a pressure fluid actuated piston for relatively moving the molds and the formers to mold the flange, a valve for determining the sequence of operation of said pistons comprising a casing having outlet ports which communicate with said pistons, a rotary valve body mounted in a bore in said casing, the peripheral surface of said valve body being provided with a plurality of pressure fluid passages which are brought into communication with said outlet ports by actuation of said valve body, a pressure fluid actuated motor for actuating said valve body, a motor cylinder, and a valve for restricting the flow of exhaust fluid from said motor cylinder thereby to determine the speed of operative movement of said motor.

39. A two-station machine having in each station a pressure fluid actuated motor and a valve for controlling application of pressure fluid to said motor, a treadle common to both stations, operating connections from said treadle to the valve in each station, a second valve in each station for controlling application of pressure fluid for reversely operating the respective motors, and automatic means in each station for operating the second valve in the opposite station.

40. In a power-operated shoe machine, a form constructed and arranged to operate on the outer surface of a shoe upper, a pressure fluid actuated member for advancing said form, and a cylinder in which said member operates, said cylinder being characterized by a drainage groove open to the interior of the cylinder.

41. In a power-operated shoe machine, a form constructed and arranged to operate on the outer surface of a shoe upper, a pressure fluid actuated member for advancing said form, and a cylinder in which said member operates, said cylinder being characterized by a drainage groove, one wall of which is constructed and arranged to wipe free fluid from said member during relative movement of the member and the cylinder.

42. In combination, a piston rod, a small piston head on said rod, a relatively large piston head on said rod, a small cylinder in which said small piston head is mounted, a sleeve in which

said large piston head is mounted, and a large cylinder surrounding said sleeve, said small cylinder having a port communicating with said small piston head, said large cylinder having a port which is initially covered by said sleeve and which communicates with said large piston head upon being uncovered by movement of said sleeve, work engaging means actuated by movement of said sleeve, and a carrier for said work engaging means actuated by movement of the piston rod.

43. In combination, a piston rod, a small piston head on said rod, a relatively large piston head on said rod, a small cylinder in which said small piston head operates, a sleeve in which said large piston head operates, a large cylinder surrounding said sleeve, said small cylinder having a first port communicating with said small piston head and a second port communicating with said large piston head, and a tank from which fluid is drawn through said second port into the large cylinder by movement of the large piston head, said large cylinder having a port which is initially covered by said sleeve and which communicates with said large piston head upon being uncovered by movement of said sleeve, said

second port being covered by the advancement of the small piston head before the port in the large cylinder is uncovered by movement of the sleeve.

44. In combination, a pressure fluid actuated piston, a hollow piston in which said piston is slidably mounted, a cylinder in which said hollow piston is mounted for longitudinal movement, work engaging jaws arranged to be actuated by said piston, and yielding means constructed and arranged to hold said jaws open during the initial advancement of said piston.

45. In combination, an operating member comprising a rod, a piston head carried by said rod, a carrier connected to said rod, work engaging jaws mounted on said carrier, a sleeve in which said piston head is mounted, means connecting said sleeve to said jaws, a cylinder in which said sleeve is mounted and yielding means interposed between the carrier and the sleeve for holding said jaws open, said means yielding upon initial contact of the jaws with the work to permit said sleeve to advance relatively to the piston head to close said jaws on the work.

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