Oct. 7, 1930.

R. C. SIMMONS

1,777,331

HEEL MACHINE

Filed Feb. 6, 1925

4 Sheets-Sheet 1

Fig. 2.

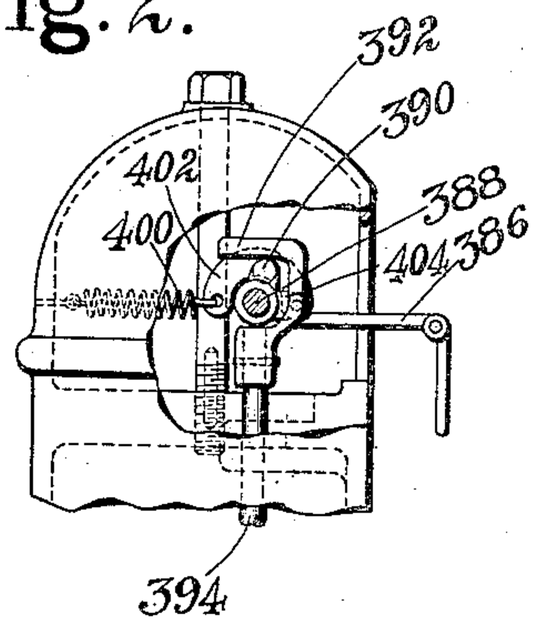

Fig. 1.

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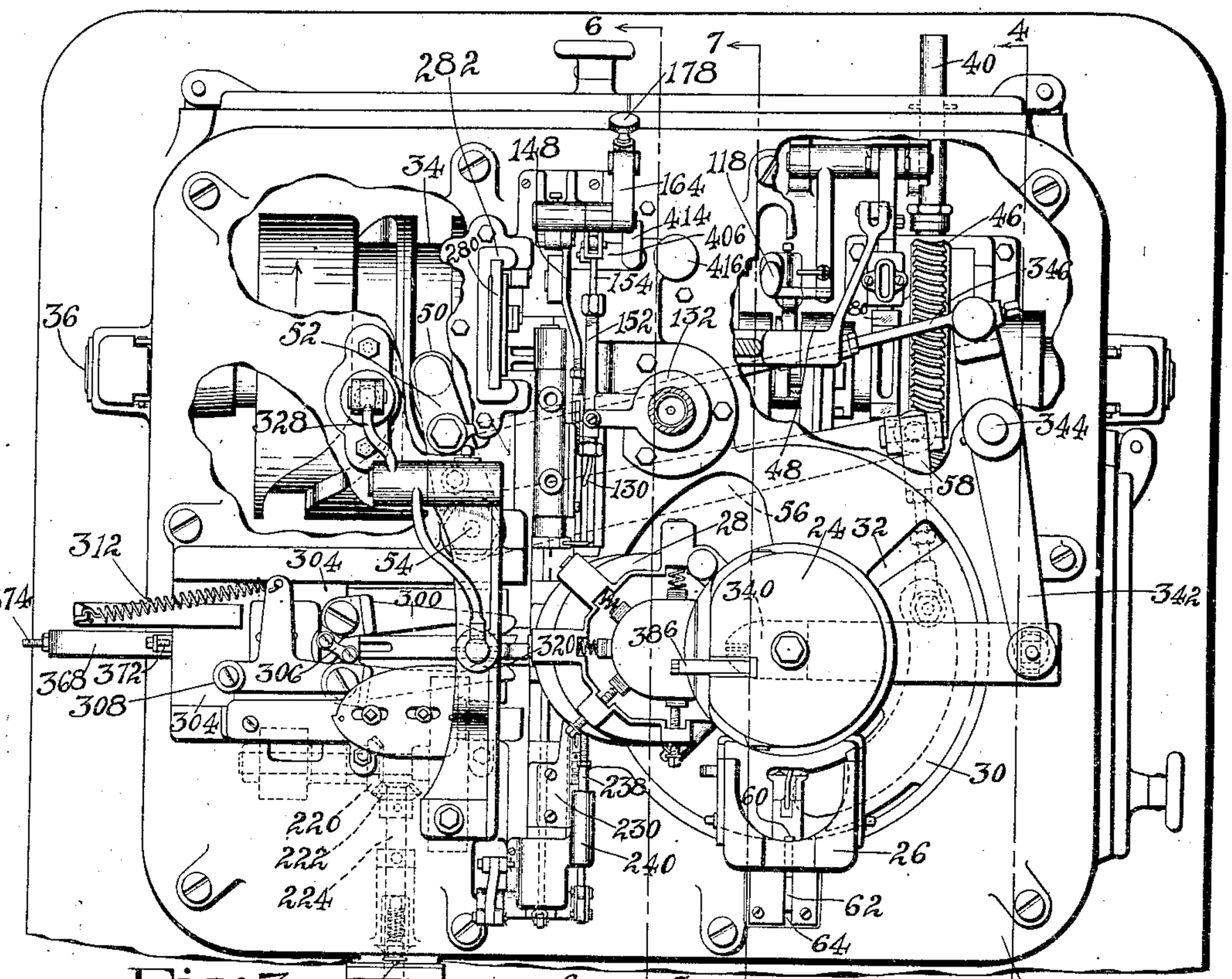

Fig. 3.

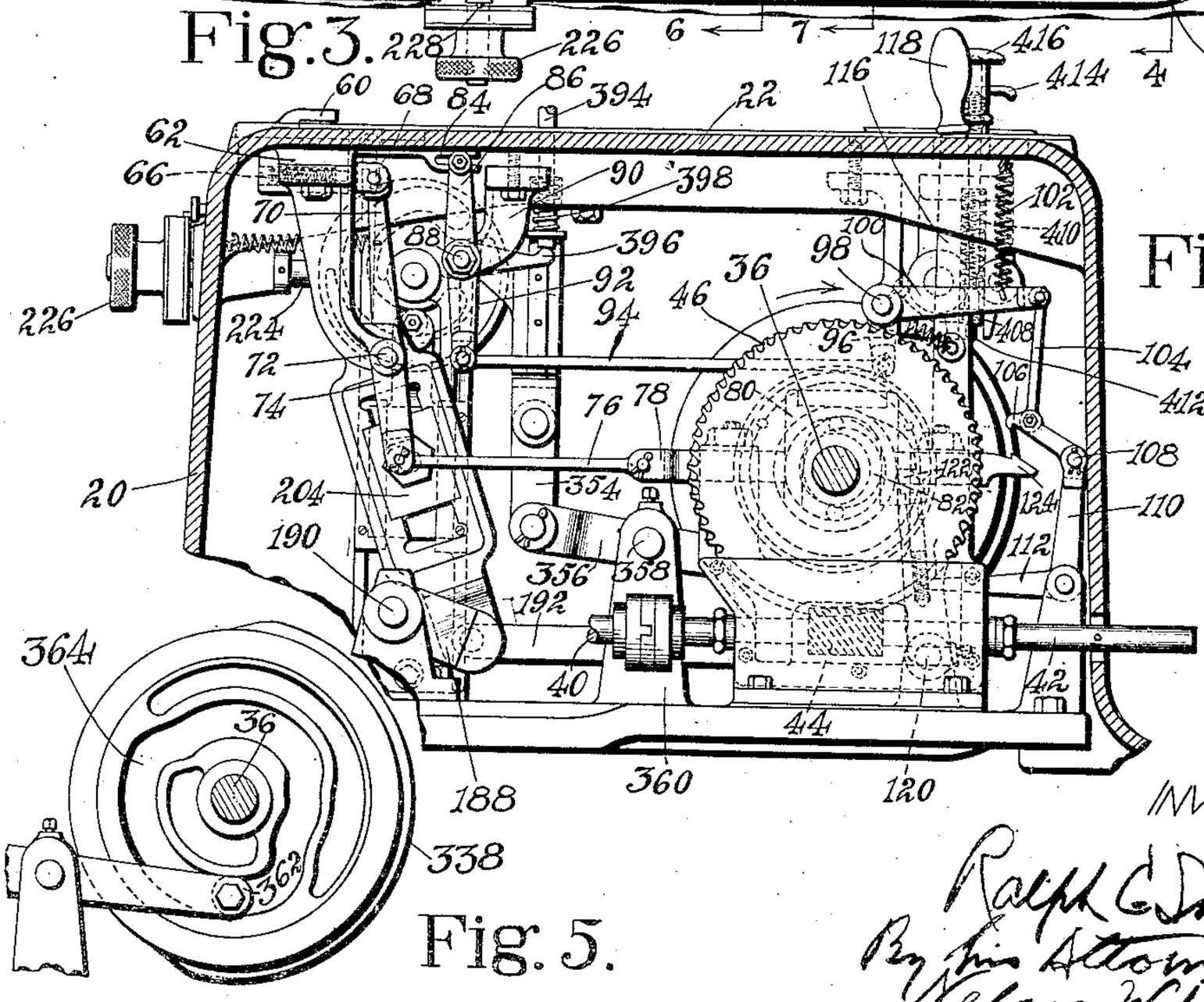

Fig. 4.

Fig. 5.

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HEEL MACHINE

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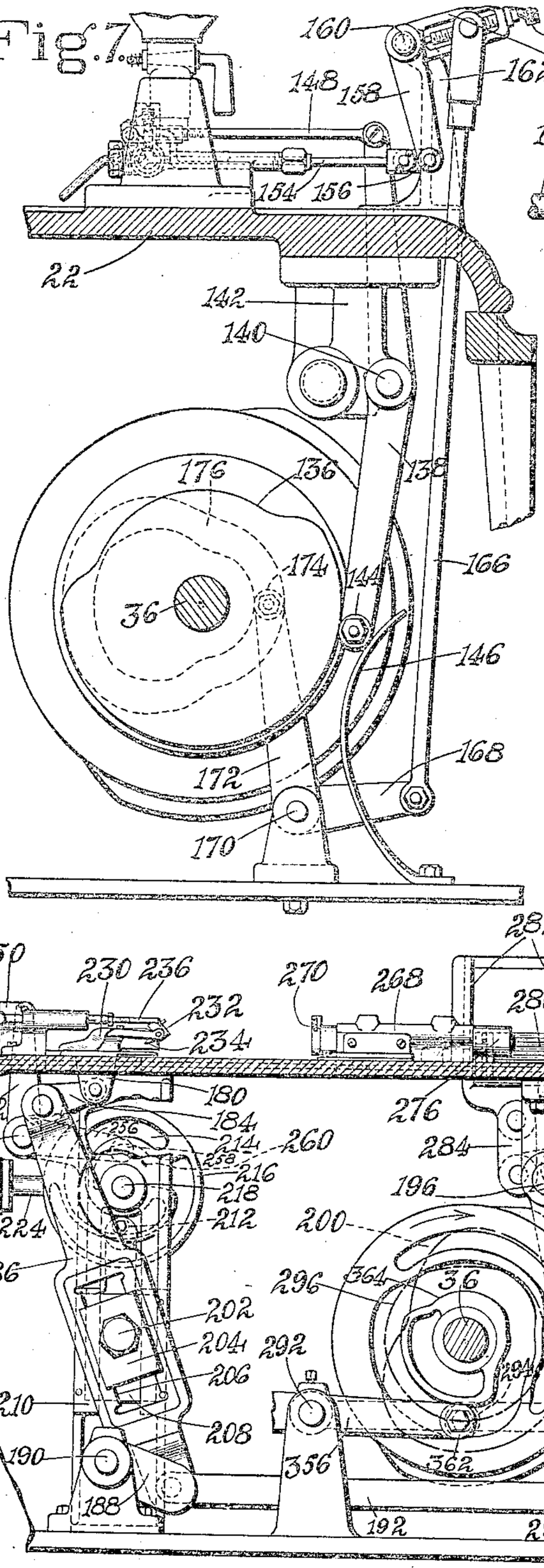
Fig. 7.



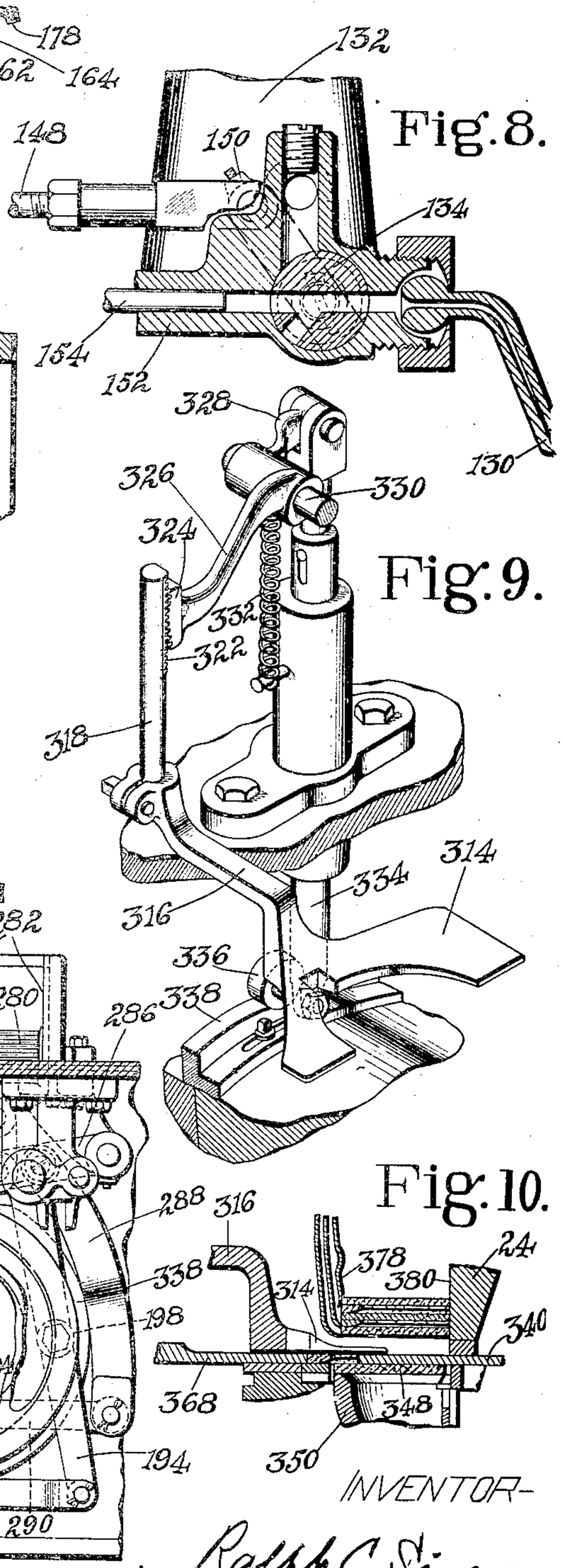


Fig. 8.

Fig. 9.

Fig. 6.

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HEEL MACHINE

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Fig. 11.

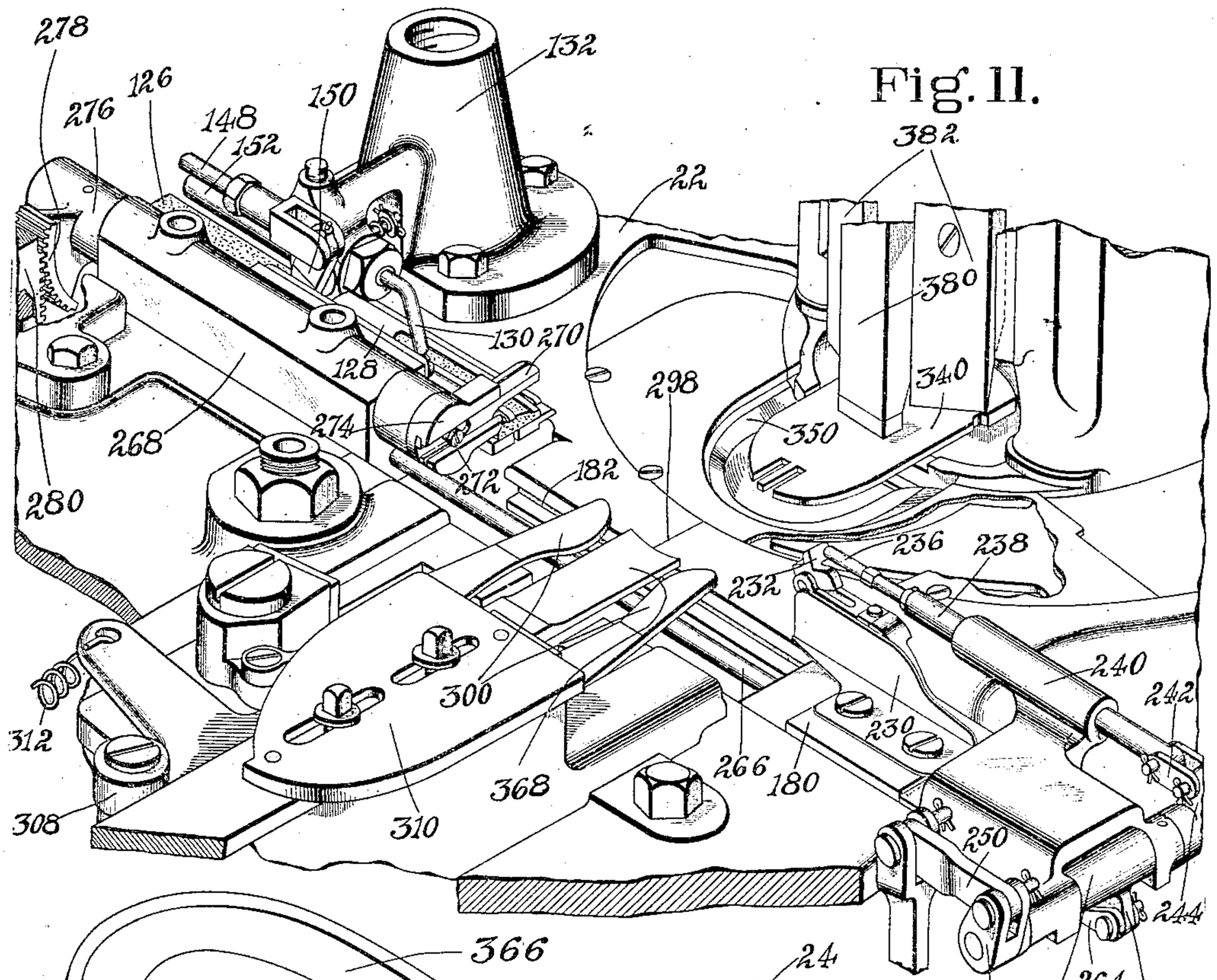


Fig. 12.

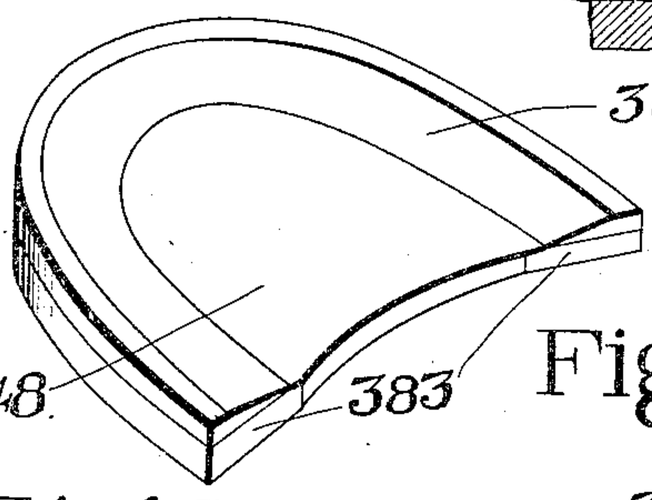
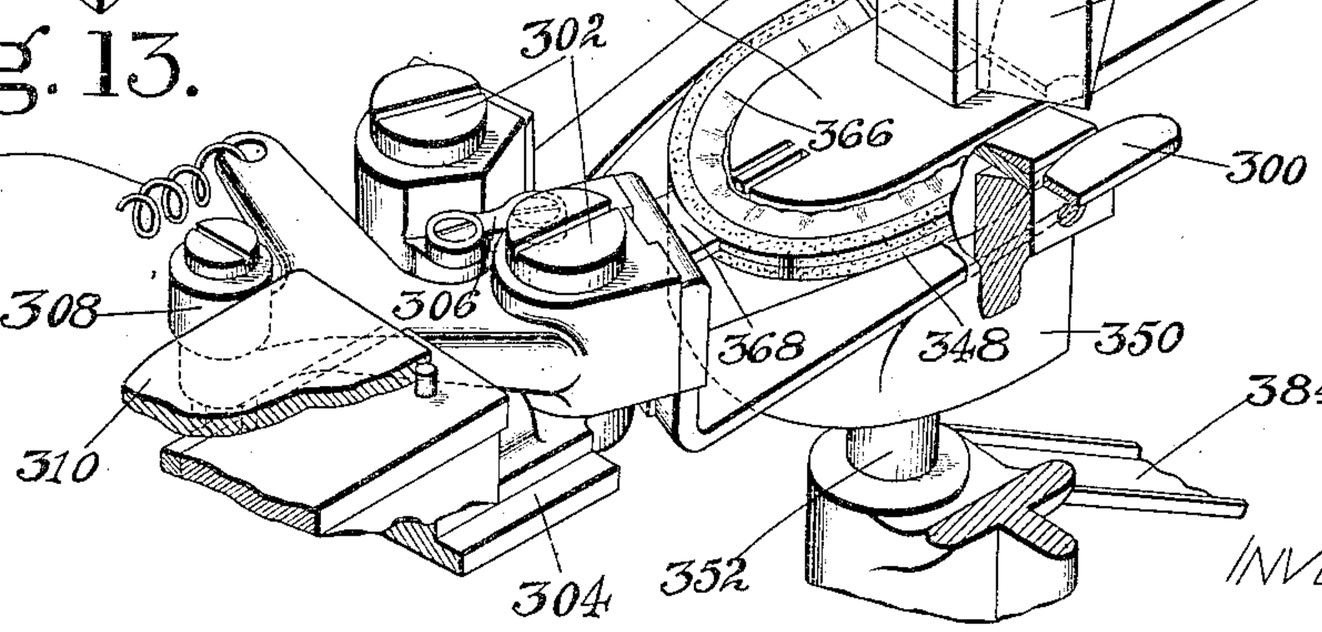


Fig. 13.



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Patented Oct. 7, 1930 1,777,331

UNITED STATES PATENT OFFICE

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HEEL MACHINE

Application filed February 6, 1925. Serial No. 7,399.

This invention relates to heel machines, being herein illustrated as embodied in a machine for making heel blanks, heel bases, or heel sections of various descriptions for use in the manufacture of boots and shoes, and it should be understood that the term "heel", as used in the following specification and claims includes, wherever the context permits, heel blanks in any of these forms.

The general object of the invention is to provide a compact and dependable machine for producing economically, at high speed, heel blanks or heel sections of great uniformity. A particular object is to provide such a machine for producing heel blanks or sections having certain characteristics by reason of which they are especially suited for use in the practice of the method of making shoes, involving the use of standardized parts, which is described and claimed in the copending application of George E. Warren, Serial No. 476,659, filed June 11, 1921, and more specifically for use in building heels of a particular type in a machine of the type of the machine which is described and claimed in my copending application Serial No. 757,241, filed Dec. 20, 1924; although many features of the invention are useful and valuable in connection with heel machines generally, without regard to the particular kind or type of heel or heel blank to be produced or handled.

With the accomplishment of the above stated objects in view, the invention provides a machine in which are co-operatively combined mechanisms which assemble a plurality of heel elements, such, for example, as a rand and a lift, into a heel blank and form upon the assembled blank a standardized positioning surface or a plurality of such surfaces in predetermined relation to each other. In this connection the term "lift" should be understood, throughout the following specification and claims, to designate not only a single layer of heel stock but any heel blank or heel section to which a rand is to be attached, since the particular thickness of the heel element to which the rand is to be attached is immaterial to the present invention.

In the illustrated embodiment of the invention provision is made for forming positioning surfaces upon the blank at the time when its elements are assembled, and a feature of the present invention consists in combining with mechanism for assembling a plurality of heel elements into a heel blank, means for providing the blank with a positioning surface, or surfaces, formed concurrently with the assembling operation. As herein shown positioning surfaces are formed on the breast face of the blank adjacent to its side edges.

Another feature, contributing to speed in operation and reduction of labor cost, resides in the provision of means for forming a rand to the shape of a heel lift and assembling the formed rand with a lift or lifts to produce a randed heel or heel section which may be a complete shoe heel, a base for a rubber heel, or a blank to be used in a machine such as that shown in my copending application above identified.

The illustrated machine is cyclically operated and is capable of producing automatically from rand stock in the form of a strip of indeterminate length and a supply of previously formed lifts or similar blanks randed heels of the kinds above mentioned. Means is provided for feeding, cementing and cutting off a measured length of rand strip, bending or forming the cut off rand to the shape of a heel lift, assembling it with a lift and introducing the rand and lift into a receiver or holder where the assembled blank is stacked with other similar blanks and held under pressure for a sufficient length of time to insure setting of the cement.

Other features of the invention provide improvements which are applicable to heel machines generally and which aid in securing uniformity in product, dependability in operation and safety for the operating mechanism. To these ends automatic devices are provided for stopping the power operation of the machine in the event of the receiver for the assembled blanks becoming full, the lift supply magazine becoming empty, or the end of the strip of rand stock being reached. For simplicity in operation it is advantageous to assemble in one cycle of operation of

the machine a rand with a lift which has been advanced to the assembling station in the machine in another cycle of operation, thus providing simply and effectively for rapidly producing a succession of blanks of substantially identical characteristics.

Further features relating to the formation and control of rands, trimming their breast ends, control of the application of cement, and other improvements contributing to the efficient and satisfactory operation of machines of the class indicated will be understood and appreciated from reading the following specification in connection with the accompanying drawings in which

Fig. 1 is a front elevation of the machine, parts of the casing being broken away to disclose the internal mechanism;

Fig. 2 is a view in side elevation of a portion of one of the automatic stop devices with which the machine is provided;

Fig. 3 is a plan view of the machine;

Fig. 4 is a vertical section of a portion of the machine, taken upon the line 4, 4 of Fig. 3;

Fig. 5 is a detail of the cams which operate the blank raising plunger and the holddown foot;

Fig. 6 is a vertical section upon the line 6, 6 of Fig. 3;

Fig. 7 is a vertical section upon the line 7, 7 of Fig. 3;

Fig. 8 is a sectional view of a detail of the paste controlling mechanism;

Fig. 9 is a perspective view of the rand holddown mechanism;

Fig. 10 is a sectional view of a detail of the rand and lift assembling mechanism;

Fig. 11 is a perspective view of the rand feeding, cementing and forming mechanism on an enlarged scale;

Fig. 12 is a perspective view of a detail of the rand forming mechanism with the parts in the positions which they occupy at the moment of completion of the forming operation; and

Fig. 13 is a perspective view of an assembled blank produced by the machine.

The illustrated machine is power driven, cyclically operated, and completely automatic. Mechanism is provided for feeding a heel lift or blank from a stack contained in a magazine to an assembling station, drawing out, cementing and cutting off a measured length of material from a rand strip of indeterminate length, forming the rand into the shape of the heel lift, pressing the cemented and formed rand upon the lift, trimming the ends of the rand and forming positioning surfaces upon the assembled blank, and forcing the assembled blank into a holder where it is held under pressure until the cement has set.

A base 20 supporting a table 22 surmounted by an upright, hollow column 24 carries the various elements and operating mechanisms of the machine. A lift magazine 26 is mounted at one side of the column 24 which forms a wall of the magazine for engaging and accurately determining the position of the breast edges of the lifts. Also secured to the face of the column at a position 90° removed from the magazine 26 is an upright tube 28, constituting a heel shaped holder or receiver in which the completed blanks are accumulated and held under pressure during the time required for the cement to set.

The lowermost lift or blank in the stack in the magazine 26 is separated from the remaining lifts or blanks in the stack and fed in a circular path to an assembling station beneath the tube 28 by an arcuate push plate 30 (see Fig. 3) guided for movement in a circular slot 32 in the table 22. Movement is imparted to the push plate 30 at proper times by a cam 34 secured to the main cam shaft 36 which extends lengthwise of the machine and carries a number of cams from which the movements of the various mechanisms are derived.

The cam shaft 36 is driven by an electric motor 38 (see Fig. 1) the shaft 40 of which is coupled to a shaft 42 upon which is a worm 44 meshing with a worm gear 46. The worm gear 46 is connected by a clutch 48 to the cam shaft 36 when power is to be transmitted to the cam shaft from the motor.

The cam 34 is engaged by a cam roll 50 at the end of one arm 52 of a bell crank lever mounted to swing in a horizontal plane about a fixed pivot 54. The other arm 56 of the bell crank lever is connected by an adjustable link 58 to the push plate 30, and it may be easily understood that each rotation of the cam shaft 36 imparts one complete oscillation to the push plate, feeding one blank from the bottom of the magazine 26 to the assembling station.

In order to insure accuracy and certainty in the feeding of lifts from the magazine 26 a reciprocating detector 60, shown in Figs. 3 and 4, is arranged to engage the lowermost lifts in the magazine and position them definitely with their breast edges against the column 24. The detector 60 is carried by a slide 62 moving in a guide slot 64 and connected through a yielding spring 66 and link 68 to a rocker arm 70 mounted upon a rock shaft 72. The shaft 72 also carries a rocker arm 74 which is connected by a link 76 to a slide 78 having a yoke 80 (Fig. 4) which embraces an eccentric 82 driven by the worm gear 46. By the mechanism just described reciprocating movement is continuously imparted to the detector 60, causing it frequently to engage and position the lowermost lifts in the magazine 26.

The detector 60 has also the function of causing the machine to be stopped in the

event of the supply of blanks in the magazine 26 becoming exhausted. If there is no lift in the magazine 26 to be engaged by the detector 60 the spring 66 will not be caused to yield and the detector slide 62 will move inward further than it would if it were stopped by engagement of the detector with a lift. In this event a slotted extension 84 of the slide 62 engages a pin in the end of a lever 86 secured to a rock shaft 88 journaled in a stationary bracket 90. Also secured to the shaft 88 is a rocker arm 92, the outer end of which is connected by a link 94 to an arm 96 secured to a rock shaft 98. An arm 100 secured to the shaft 98 is normally held up by a spring 102 and its outer end is connected by a link 104 to a hook 106 pivoted at 108 to one arm 110 of a bell crank lever, the other arm 112 of which is provided with a hook 114 arranged to engage a lever 116 having a handle 118 at its upper end and movable about a stationary pivot 120 at its lower end (see Fig. 4). The lever 116 carries a stop dog 122 controlling the clutch 48. When the lever is thrown to the left, as viewed in Fig. 4, the clutch is disengaged, and the operating mechanism of the machine stopped, although the motor 38 continues to run.

When the slotted extension 84 engages and operates the lever 86 the arm 100 is depressed until the hook 106 engages a co-operating hook 124 upon the rear end of the slide 78. The next forward movement of the slide causes the arm 110 to be drawn forward and the hook 114 to be disengaged from the lever 116. This lever which has been held toward the rear of the machine by the hook 114 is now permitted to swing forward whereupon the stop dog 122 disengages the clutch 48 and the machine is stopped. When a fresh supply of lifts has been placed in the magazine 26 the detector 60 is again prevented from moving inward far enough to cause engagement of the slide extension 84 with the arm 86, and the machine may be started by moving the handle 118 rearward until the lever 116 is engaged and held by the hook on the end of the arm 112.

The rand material is supplied in the form of a continuous strip 126 (Fig. 11) which is drawn through a guide 128 beneath a cement applying nozzle 130 to which cement is supplied from a container 132. Communication between the nozzle and the container is controlled by a two-way valve 134 (Fig. 8) which is operated by a cam 136 (Fig. 7) upon the shaft 36 through mechanism which will now be described.

A cam lever 138 is pivotally mounted at 140 upon a bracket 142 secured to the under side of the table 22. A cam roll 144 upon the lower end of the lever 138 is held in engagement with the cam 136 by a spring 146 bearing against the lower end of the lever. The upper end of the lever is connected by a link 148 to an arm 150 secured to the valve 134.

A pump cylinder 152 is arranged to communicate with the cement receptacle 132 through the two-way valve 134 when the latter is in one position and with the nozzle 130 when the valve is in its other position. A plunger 154 is operated in the cylinder 152 first to draw a charge of cement from the receptacle 132 and then, after the valve 134 is turned, to force the charge of cement out through the nozzle 130 upon the upper surface of the rand strip 126. The pump plunger 154 is connected by a link 156 (Fig. 7) to an arm 158 of a bell crank lever which is pivotally mounted at 160 upon a stationary bracket 162. The other arm 164 of the bell crank lever is connected by a link 166 to a rocker arm 168 secured to a shaft 170 to which is also secured a rocker arm 172 having at its end a cam roll 174 engaging a cam 176 upon the cam shaft 36. The connection between the upper end of the link 166 and the arm 164 is made adjustable by a thumb screw 178 for the purpose of varying the distance between the link and the pivot 160 and, consequently, the throw of the pump plunger 154, the stroke of the link being constant. The stroke of the pump plunger is varied for the purpose of securing and discharging the proper amount of cement for the particular length of rand to be produced, as will be described in detail hereinafter, but, whatever the amount of cement discharged, the period of time through which it is discharged is always the same.

The mechanism for intermittently feeding, measuring and cutting off the rand from the rand strip 126 will now be described. It is to be understood that the beginning end of the rand strip is preliminarily inserted in the guide 128 in the position illustrated in Fig. 11. A feed slide 180 is arranged to reciprocate in guide slots 182 formed in the table 22 and is connected by a link 184 to the upper end of a lever 186, the lower end of which is pivoted to a rocker arm 188 movable about a stationary fulcrum 190. The lower end of the lever 186 is also connected by a link 192 to a cam lever 194 movable about a stationary pivot 196 and provided with a cam roll 198 engaging a cam upon the cam shaft 36, the center line of the said cam being indicated at 200 in Fig. 6.

The lever 186 is constrained to rock about a fulcrum pin 202 which is vertically adjustable. A block 204, which is rotatable upon the pin 202, has a sliding fit between parallel surfaces 206 formed upon the lever 186, and the pin 202 is mounted in a slide 208 which is vertically adjustable in stationary guides 210. A roll 212 on the upper end of the slide 208 engages in a spiral cam track 214 cut in one face of an adjusting cam disk 216 which is secured to a shaft 218.

A beveled gear 220, also secured to the shaft 218, meshes with a similar beveled gear 222 (Fig. 3) upon a shaft 224 having at its outer end a manually operable knob 226, a spring pressed pin 228 being provided to maintain the adjustment. Rotation of the adjusting knob 226 will raise or lower the fulcrum pin 202 and, consequently, vary the throw, but not the time in which it occurs, of the upper end of the lever 186 and the feed slide 180 which is connected thereto, since the throw of the lower end of the lever 186 is constant. Furthermore, by virtue of the mechanism just described, the path of movement of the upper end of the lever 186 is nearly a straight line instead of an arc of a circle as would be the case if the lever were pivoted directly upon the fulcrum pin 202, and the movement imparted to the feed slide 180 is substantially uniform in velocity.

Mounted upon the feed slide 180 is a bracket 230 (Figs. 6 and 11) to which is pivoted a feed dog 232 having a sharp prong 234 for engaging the rand strip. When the feed slide is moved to the inward limit of its movement the prong 234 engages the top of the rand strip 126 and as the slide returns toward the front of the machine the rand strip is drawn out by it through the guide 128.

The amount of rand strip drawn out is controlled by adjustment of the fulcrum 202 and a stop 236 is located in a position to be engaged by the feed dog 232 to withdraw the prong 234 from the rand strip when the feeding thereof is finished. The stop 236 is threaded into a rod 238 (Fig. 11) slidably mounted in a stationary bearing 240. The rod 238 is connected by links 242 to a rocker arm 244 upon a shaft 246 which also has secured to it a rocker arm 248. The arm 248 is connected by a link 250 to an arm 252 secured to a shaft 254 upon which is an arm 256 having at its outer end a roll 258 which engages in a cam path cut in the face of the disk 216 opposite to that in which the cam path 214 is cut. The center line of the cam path for the roll 258 is indicated by the dotted line 260 in Fig. 6. It will be understood that when the knob 226 is turned to adjust the throw of the lever 186 a simultaneous adjustment of the stop 236 will be effected, so that the prong 234 will always be withdrawn from the rand strip at the end of the stroke of the feed slide.

The shaft 246 carries a third rocker arm 262 connected by links 264 to a rod 266, the rear end of which is fastened to a slide 268 which supports the rand strip guide 128 and a knife 270 for cutting off the required length of rand from the strip. The knife 270 is secured by a screw 272 in a holder 274 upon the end of a rocker member 276 journaled in the slide 268. This rocker member has secured to it a gear segment 278 which meshes with a wide rack 280 arranged to slide vertically in stationary guides 282 (see Figs. 3 and 6).

The lower end of the rack 280 is connected by a link 284 to a lever 286 which is connected by a link 288 to a cam lever 290 movable about a stationary pivot 292 and provided with a cam roll 294 engaging a cam secured to the cam shaft 36, the center line of the cam track being indicated by the dotted line 296 in Fig. 6. The cam 296 is so timed that the rack 280 will be reciprocated and the knife 270 will be oscillated to cut off the rand at the proper time.

The elements of the mechanism already described are so proportioned that the adjustment of the knife carrying slide 268 and the feed dog stop 236 are equal and opposite, with the result that no matter what is the length of the rand drawn out and cut off its center will always be at the place indicated by the line 298 in Fig. 11.

The cemented rand, when it has been cut off from the strip, is straight, and must be bent or formed to the shape of the blank to which it is to be applied. This is accomplished by a pair of forming fingers 300, pivoted at 302 upon a slide 304 (Fig. 3), connected together for equal and opposite movement by a link 306. An extended portion of one of the forming fingers 300 carries a cam roll 308 arranged to engage the edge of a stationary template or cam 310 which is correctly shaped to cause the fingers to move through the proper paths to form the rand to the contour of the edge of the lift. The roll 308 is held to the edge of the template by a spring 312.

The foot portion 314 of a holddown 316 (Fig. 9) is disposed immediately above the cut off rand and is held depressed, while the rand is being bent or formed, in a position where it holds the rand down substantially flat, preventing the rand from buckling up during the forming operation. The holddown is carried by a vertically movable stem 318 slidably mounted in an upright guide 320. One side of the stem 318 is provided with a rack 322 meshing with a gear segment 324 upon an arm 326 rigidly connected to an arm 328 movable about a stationary pivot 330. The arm 328 is lowered, to elevate the holddown, by a spring 332 and is raised by a vertically moving plunger 334 having at its lower end a cam roll 336 (Fig. 9), engaging a cam 338 upon the cam shaft 36.

In the forming of the rand a properly shaped plate 340 (Figs. 3, 11 and 12) cooperates with the forming fingers 300. The forming plate 340 is arranged to slide in a right line transversely of the machine and is actuated at the proper times by an arm 342 movable about a stationary pivot 344 and connected by a link 346 to the bell crank lever arm 52, the forming plate 340, there-

fore, being actuated by the same cam 34 which actuates the push plate 30. The relative timing of the various mechanisms will be described later in the description of the operation of the machine. It is sufficient at this point to state that when the forming plate 340 is projected to the position shown in Figs. 11 and 12 the push plate 30 has fed a lift 348 from the magazine 26 around to a position beneath the forming plate.

The lift 348 is supported by a horseshoe-shaped plunger 350, the hollow interior portion of which is large enough to admit the forming plate 340. The plunger 350 is reciprocable vertically and has a depending stem 352 connected by a link 354 to a lever 356 pivoted at 358 in a stationary bracket 360. The lever 356 (see Figs. 5 and 6) carries a cam roll 362 which engages and is operated by a cam 364 secured to the cam shaft 36.

The timing is such that immediately after the former plate 340 is projected and the lift 348 is fed under it the forming fingers 300 move inwardly, bending the cut off rand 366 around the plate 340 and forming it to the shape of the lift 348 upon which it is deposited.

To aid in securing a perfect formation of the rand the slide 304 carries a yielding pusher 368 arranged to engage the center of the rand and determine the position of the rear edge of the formed rand. The pusher 368 is slidably mounted in the slide 304 and is drawn toward the right, as seen in Fig. 1, by a spring 370 to a position relative to the slide which is determined by the adjustment of a stop screw 372 threaded through a lug projecting upwardly from the pusher and arranged to engage the end of the slide. The screw 372 will ordinarily be so adjusted that the operative end of the pusher 368 will be in line with the ends of the rand forming fingers 300.

Another stop screw 374, also threaded through a lug upon the pusher 368, is arranged to engage a stationary surface 376 to limit the distance through which the pusher 368 can be projected. The screw 374 is normally so adjusted that the pusher is stopped when the rear edge of the rand 366 is even with the rear edge of the lift 348, as shown in Fig. 12, although the fingers 300 move further to complete the formation of the rand.

After the rand is formed the plunger 350 is elevated, forcing the lift 348 and the rand 366 upward into the receiving tube or holder 28. Inasmuch as the cement from the nozzle 130 is applied to the upper face of the rand, the rand is not secured to the lift 348 below it but to the last similar lift previously forced into the holder. The holder contains a number of spring fingers 378 (Fig. 10) arranged to press the breast edges of the assembled blanks against a flat surface 380 formed upon the column 24 and constituting one wall of the holder. A pair of stationary knives 382 is secured to the column, the knives being so located that as a blank is forced upwardly past them the ends of the rand are trimmed off and definite, standardized positioning surfaces 383 (see Fig. 13) are formed on the breast face of the blank adjacent to its side edges. These positioning surfaces may be utilized in assembling the blank which is the product of this machine with other lifts to form a heel in the machine of my copending application Serial No. 757,241, filed Dec. 20, 1924. The trimmings severed by the knives 382 are conducted away by a chute 384 (Fig. 12).

In order to prevent blanks from overflowing from the top of the holder or receiver 28 in case the holder should be allowed to become filled, a detector finger 386 (Figs. 1, 2 and 3) is located in the path of the rising column of blanks near the top of the holder. The finger 386 is secured to a shaft 388 journaled in bearings in the column 24. Also secured to the shaft is an arm 390 which, when in the position illustrated in Fig. 2, supports a yoke 392 to which is secured a depending rod 394, the lower end of which, as illustrated in Fig. 4, passes through the table 22 and engages an arm 396 upon the rock shaft 88. A compression spring 398 surrounding the lower end of the rod 394 tends continually to depress the rod. When the detector finger is engaged and lifted by the growing column of blanks in the holder 28 the shaft 388 (Fig. 2) is rotated through about a half revolution in a counter-clockwise direction by a spring 400 pulling upon a link 402 connected to an arm 404 secured to the shaft. This partial rotation of the shaft occurs as soon as the finger 386 has been raised sufficiently to bring the line joining the anchorage of the stationary end of the spring 400 and the pivotal connection between the link 402 and the arm 404 above the axis of the shaft. When this movement of the shaft occurs the yoke 392 is deprived of its support and the rod 394 is depressed by the spring 398, causing the shaft 88 to be rocked and the machine to be stopped in the same manner as when the said shaft is rocked by the arm 86, as heretofore described.

Means have already been described for stopping the machine automatically in the event of the supply of lifts in the magazine 26 becoming exhausted or in the event of the holder 28 becoming overfull. In order to avoid the possibility of producing incomplete blanks provision is also made for stopping the machine when the supply of rand strip material is used up. To this end a finger 406 (Fig. 3) is arranged to overlie and rest upon the rand strip near the point where the latter is drawn into the machine. The said finger is mounted upon a vertically slidable

rod 408 depressed by a spring 410 (Fig. 4) and bearing at its lower end upon an arm 412 secured to and extending rearwardly from the rock shaft 98. A handle 414 secured to the finger 406 permits the latter to be raised against the tension of the spring to allow the beginning end of the rand strip to be inserted beneath the finger. When the end of the rand strip is reached and the finger 406 is allowed to drop the arm 412 is depressed, the shaft 98 rocked and the machine automatically stopped, as heretofore described.

An additional manually operable emergency stop 416, the lower end of which also engages the arm 412, is provided for use in case an operator in the vicinity thereof should perceive the necessity of stopping the machine quickly.

Having described the various operating mechanisms of the machine and their mechanical relation to each other, a connected statement of their sequence of operation will now be given. Assuming a supply of lifts to be contained in the magazine 26, cement in the receptacle 132 and a rand strip in the guide 128, the parts of the machine are in the positions illustrated in Fig. 3. The motor 38 is running and the detector 60 is being continuously reciprocated, causing the lowermost lifts in the magazine 26 to be accurately positioned with their breast edges against the column 24. The handle 118 is thrown back to permit engagement of the clutch 48, and the cam shaft 36 begins to rotate. The push plate 30 and the rand forming plate 340 simultaneously advance during about 95° of rotation of the cam shaft feeding a lift into assembling position beneath the forming plate. Early in the advance of the push plate and forming plate the previously elevated plunger 350 descends, reaching its lowest position in time for the lift to be fed in above it, as shown in Fig. 10. The rand feeding slide 180, which was partially advanced when the machine started, advances until the prong 234 engages the end of the rand strip 126 and is then immediately retracted, drawing the rand strip with it. The pump plunger 154 is timed to eject a continuous stream of cement from the nozzle 130 upon the rand strip during exactly the time that the strip is moving and the stroke of the plunger is adjusted to produce the desired amount of cement during that time. As soon as the slide 180 has completed its outward movement the knife 270 is operated to cut off the rand. Meanwhile the plunger 350 has risen slightly to press the lift 348 against the under side of the plate 340 where it remains while the rand is being formed. As soon as the rand is cut off the holddown 314 descends upon it, holding it flat and the forming fingers 300 advance to form the rand around the end of the plate 340 between the lift 348 and the holddown 314. During this forming operation the knife 270 is returned to its inoperative position.

At the conclusion of the forming operation the rand forming plate 340 and the lift push plate 30 are retracted to their initial positions, after which the plunger 350 rises sufficiently to force the lift 348 and the rand 366 up into the holder 28, the rand forming fingers 300 retreating to their initial position. The holddown 314 is raised and finally the rand feed slide 180 is advanced about two-thirds of the way toward the end of the rand strip 126, whereupon the cycle of operations is complete and everything is ready for it to be repeated. The machine continues to operate automatically in cycles, as above described, until it is either stopped manually or by any one of the several automatic stop devices previously described.

Having described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. In a heel machine, the combination of means for assembling a heel lift and a rand into a heel blank, and means for forming accurately a standardized positioning surface upon the blank.

2. In a heel machine, the combination of means for assembling a heel lift and a rand into a heel blank, and means for forming upon the blank a plurality of positioning surfaces in accurately predetermined relation to each other.

3. In a heel machine, the combination of means for assembling a heel lift and a rand into a heel blank, and means for forming standardized positioning surfaces upon both the rand and the lift.

4. In a heel machine, the combination of means for forming a rand and assembling it with a heel lift to form a heel blank, and means for forming an accurate positioning surface upon the blank.

5. In a heel machine, the combination of means for assembling a plurality of heel elements into a heel blank, and means for forming an accurate positioning surface upon the blank concurrently with the assembling operation.

6. In a heel machine, the combination of a holder for a plurality of heel blanks, means for inserting heel blanks successively into the holder, and a plurality of knives for forming separated positioning surfaces upon the blanks as they are inserted into the holder.

7. In a heel machine, the combination of a holder for a stack of heel blanks, a plunger for inserting blanks into the holder, and a plurality of knives co-operating with the plunger to form separated positioning surfaces upon the blanks.

8. In a heel machine, the combination of mechanism for assembling a heel lift and a rand, and means for forming positioning sur-

faces on the breast face of the assembled blank adjacent to its side edges.

9. In a heel machine, the combination of a source of supply of heel lifts, means for separating a lift from said source of supply, and means for forming a rand and assembling it with said lift.

10. In a heel machine, the combination of a source of supply of heel lifts, means for separating a lift from said source of supply, means for forming a rand and assembling it with said lift, and means for attaching the rand to the lift.

11. In a heel machine, the combination of a heel lift magazine, means for separating a lift from the magazine and feeding it to an assembling station, and means for forming a rand, assembling it with and securing it to said lift at said assembling station.

12. In a heel machine, the combination of a heel lift magazine, means for successively feeding individual lifts from said magazine to an assembling station, and means for successively forming individual rands, attaching them to the respective individual lifts, and forming the assembled blanks into a stack.

13. In a heel machine, the combination of a lift magazine, means for separating a lift from the magazine and feeding it to a position in alinement with an assembling station, means for depositing a rand upon said lift, and means for advancing the rand and the lift to said assembling station.

14. In a heel machine, the combination of a source of supply of heel lifts, means for separating a lift from said source of supply and feeding it to a position in alinement with an assembling station, means for depositing a rand upon said lift, and means for advancing the rand and the lift to said assembling station.

15. In a heel machine, the combination of a source of supply of heel lifts, a source of supply of unformed rands, means for cementing a rand separated from the last mentioned source, means for forming said rand, mechanism for assembling a heel lift from the first mentioned source with the cemented rand, and means for pressing the assembled lift and rand together.

16. In a heel machine, the combination of means for measuring off and severing a rand of predetermined length from a rand strip of indeterminate length, and means for forming said rand to the shape of a heel lift.

17. In a heel machine, the combination of a rand strip feeding and measuring device, a rand cementing device, a rand severing cutter, and a rand former.

18. In a machine of the class described, the combination of an intermittently operated rand feeder, a cementer, and a power drive for the cementer, said power drive being so timed relatively to the rand feeder as to cause the cementer to apply cement to a rand only during the time it is being fed by the feeder.

19. In a machine of the class described, a rand feeder having a feeding movement of variable extent, in combination with a cement applying device timed to apply cement to a rand only during said feeding movement, regardless of variations therein.

20. In a machine of the class described, a rand feeder having a variable feeding movement, in combination with a cement applying device having provision for varying the quantity of cement applied and timed to apply cement to a rand only during the feeding movement thereof, regardless of the extent of said movement or the quantity of cement applied.

21. In a machine of the class described, the combination of mechanism for feeding, measuring and cutting off a rand from a rand strip, and means for applying cement only to a measured length of the strip equal to the portion which is cut off.

22. In a cyclically operating heel machine, the combination of means for advancing a heel lift to an assembling station in one cycle of operation of the machine, and means for assembling a rand with the lift at said assembling station in another cycle of operation of the machine.

23. In a heel machine, the combination of a heel blank holder, means for feeding a lift to a position in alinement with the holder, means for cementing and feeding a rand to a position between the lift and the holder, and means for inserting the lift and the rand into the holder.

24. In a cyclically operating heel machine, the combination of a source of supply of heel lifts, means for moving a lift from said source of supply to an assembling station in one cycle of operation of the machine, a source of supply of rands, and means for cementing a rand and applying it to said lift in the next cycle of operation of the machine.

25. In a heel machine, the combination of an upright heel blank holder open at its lower end, cementing means for applying cement to the upper face of a rand, and means for introducing the cemented rand into the lower end of the holder and pressing its cemented face into engagement with the lower face of a lift already in the holder.

26. In a heel machine, the combination of an upright holder for a stack of heel blanks, means for feeding a lift to a position beneath the holder, means for cementing the upper surface of a rand and feeding it to a position between the lift and the holder, and means for pressing the lift and the rand upward into the holder to cause the cemented surface of

the rand to be pressed against a lift already in the holder.

27. In a machine of the class described, the combination of an intermittent rand strip feeder, and means for automatically disengaging the feeder from the rand strip at the end of each feeding movement.

28. In a machine of the class described, the combination of an intermittent rand strip feeder having a movement of variable extent, and means for disengaging the feeder from the rand strip at the end of each feeding movement, regardless of variations therein.

29. In a machine of the class described, the combination of an intermittent rand feeder having a variable throw, a stop element for disengaging the feeder from the rand at the end of said throw, and means for simultaneously varying the throw of the feeder and the position of the stop, to maintain a fixed time relation between the movement of the feeder and its disengagement from the rand.

30. In a machine of the class described, the combination of a reciprocating rand strip feeder having a variable throw, means for controlling the limit of movement of said feeder, a cutter arranged in co-operative relation to the rand strip, and means for varying the position of the cutter.

31. In a machine of the class described, the combination of a rand strip feeder having a variable throw, a cutter arranged in co-operative relation to the rand strip, and means for simultaneously varying the limit of movement of the feeder and the position of the cutter.

32. In a machine of the class described, the combination of a rand strip feeder having a variable throw, a cutter arranged in co-operative relation to the rand strip, and means for equally and oppositely varying the limit of movement of the feeder and the position of the cutter.

33. In a machine of the class described, the combination of a source of supply of unformed rands, and a template controlled device for forming rands from said source of supply to the shape of a heel lift.

34. In a machine of the class described, the combination of a source of supply of unformed rands, movable formers for forming a rand from said source of supply to the shape of a heel lift, and a template co-operating with said formers to determine their paths of movement.

35. In a heel machine, the combination of power driven means for operating upon a heel blank, a heel blank holder, means for inserting blanks successively into said holder, and means for stopping power operation of the machine when the holder is filled.

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

RALPH C. SIMMONS.