

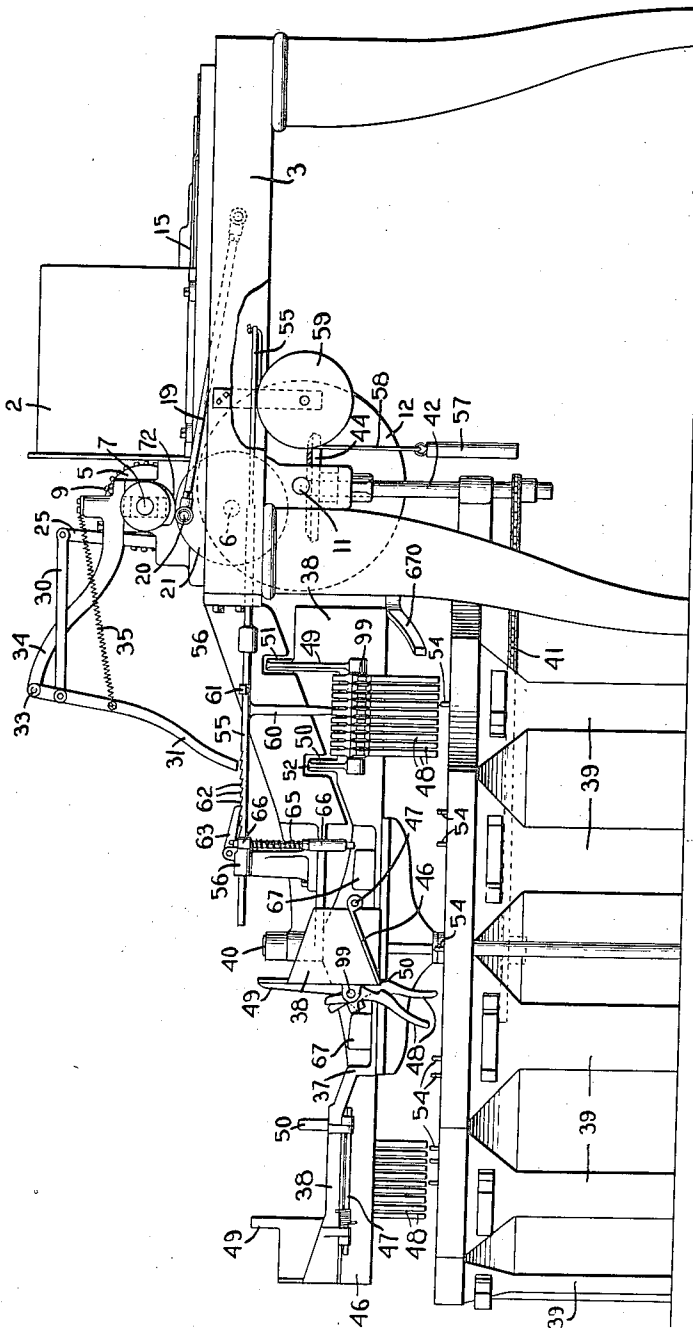
C. E. CLARKE & J. S. DELANEY.
MACHINE FOR GRADING AND SORTING LEATHER.

1,243,260.

Patented Oct. 16, 1917.

5 SHEETS—SHEET 1.

Fig. 1.



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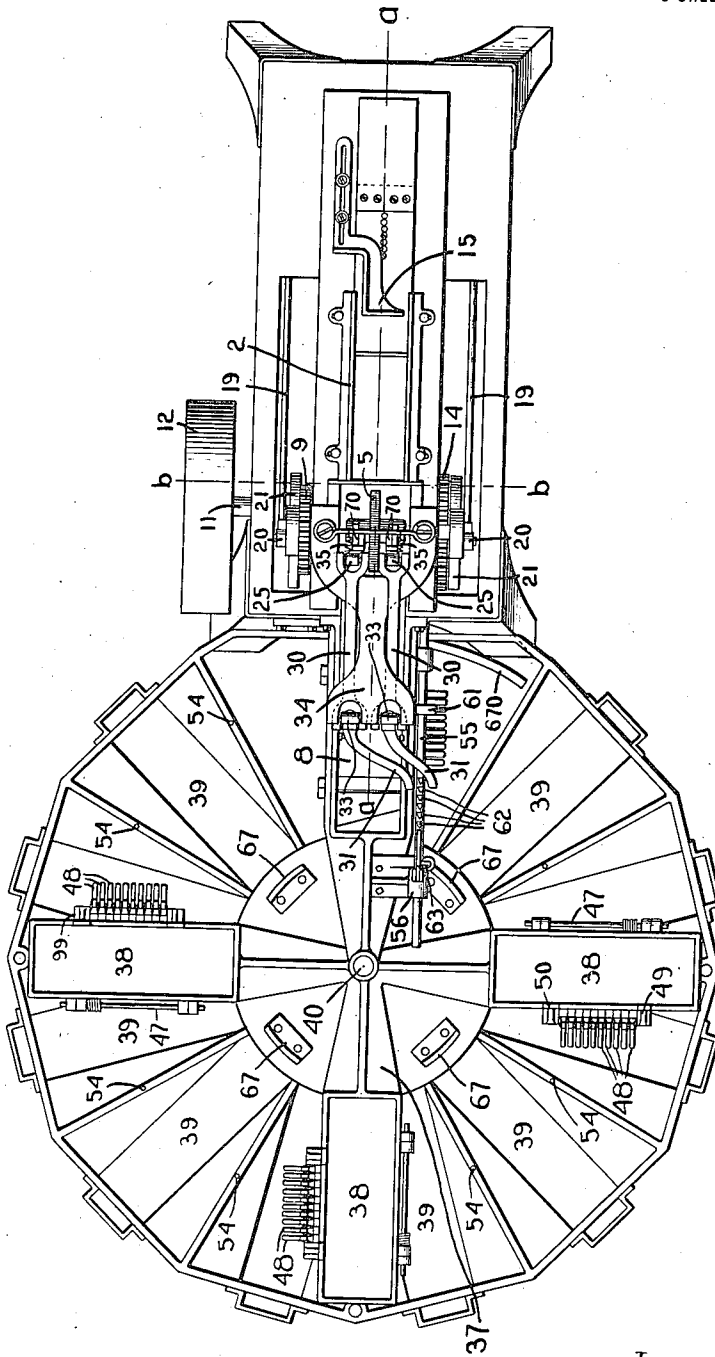
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5 SHEETS—SHEET 2.

Fig. 2.



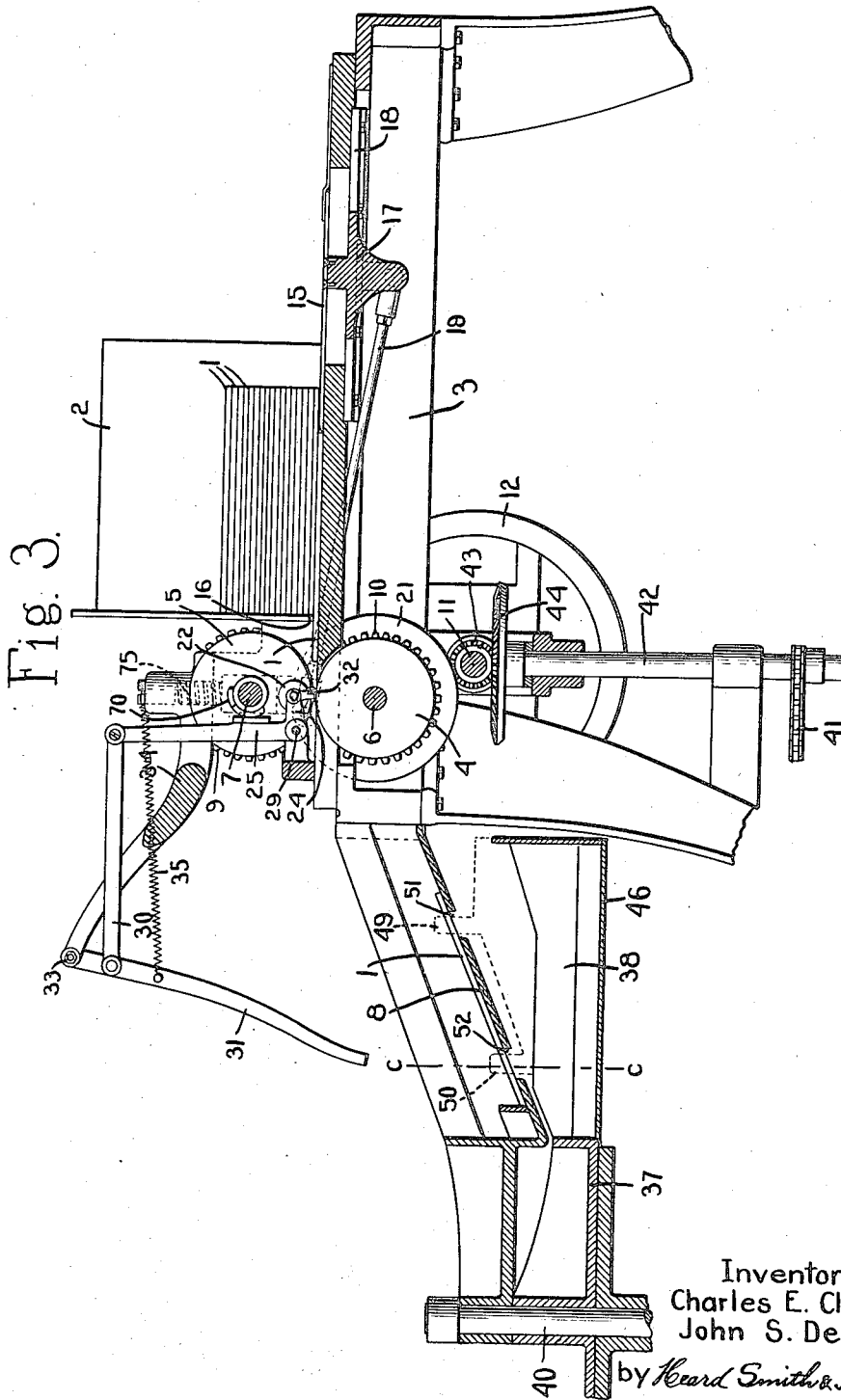
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5 SHEETS—SHEET 5.

Fig. 6

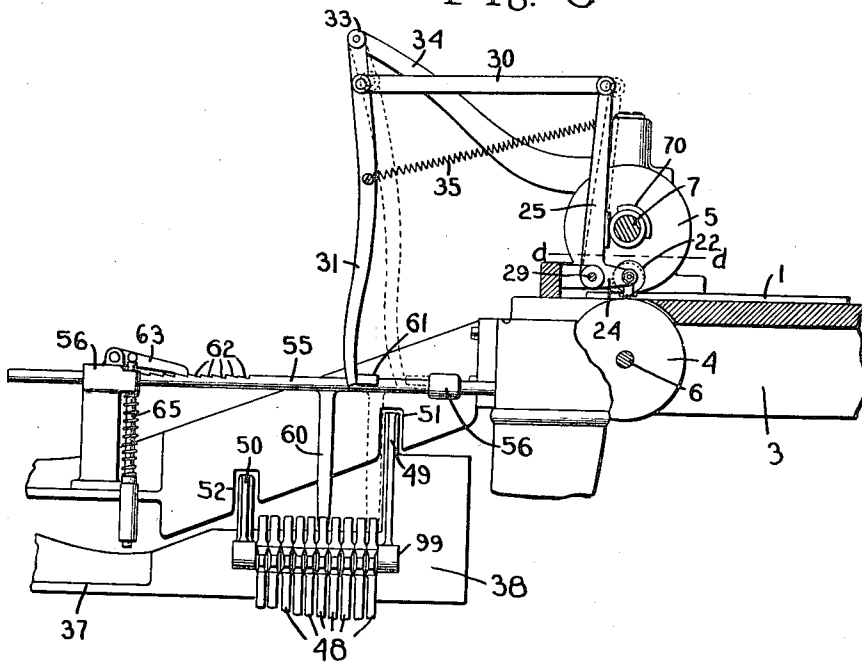


Fig. 8.

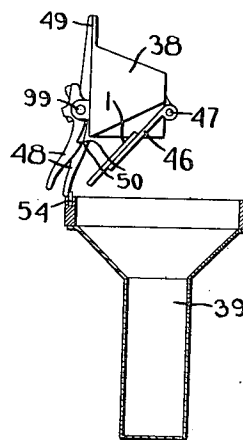


Fig. 7.

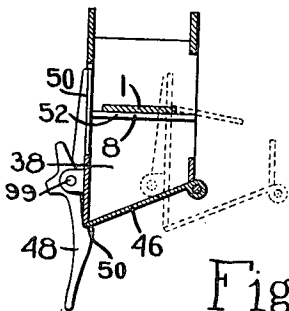
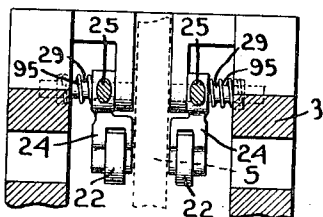


Fig. 9.



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UNITED STATES PATENT OFFICE.

CHARLES E. CLARKE AND JOHN S. DELANEY, OF WINTHROP, MASSACHUSETTS, ASSIGNORS OF ONE-THIRD TO CHARLES E. CLARKE, OF WINTHROP, MASSACHUSETTS, AND TWO-THIRDS TO JAMES ROBERTSON, OF WOBURN, MASSACHUSETTS.

MACHINE FOR GRADING AND SORTING LEATHER.

1,243,260.

Specification of Letters Patent.

Patented Oct. 16, 1917.

Application filed July 21, 1915. Serial No. 41,171.

To all whom it may concern:

Be it known that we, CHARLES E. CLARKE, a citizen of the United States, residing at Winthrop, county of Suffolk, State of Massachusetts, and JOHN S. DELANEY, a citizen of the United States, residing at Woburn, county of Middlesex, State of Massachusetts, have invented an Improvement in Machines for Grading and Sorting Leather, of which the following description, in connection with the accompanying drawing, is a specification, like characters on the drawing representing like parts.

This invention relates to a machine for grading and sorting leather and particularly to a machine adapted to grade and sort sole blanks, such as are used in the manufacture of shoes.

The invention has for its object to provide a novel machine for this purpose which will first accurately caliper the sole blanks to determine the thinnest spot in each and will then sort the calipered sole blanks according to the measurement thereof.

The device herein illustrated comprises a pair of feed rolls between which the individual sole blanks are fed, means to caliper the blanks as they pass between the feed rolls thereby to measure them for their thinnest portion, a movable carrier provided with pockets into which the calipered blanks are delivered from the feed rolls, a plurality of receptacles for receiving sole blanks of different thicknesses, and means controlled by the calipering mechanism to effect the delivery of the calipered sole blanks from the pockets in the carrier into the correct receptacle.

In order to give an understanding of our invention we have illustrated in the drawings a selected embodiment thereof which we will now describe, after which the novel features will be pointed out in the appended claims.

Referring to the drawings, Figure 1 is a side elevation of a machine embodying our invention;

Fig. 2 is a top plan view;

Fig. 3 is a vertical sectional view on substantially the line *a-a*, Fig. 2, illustrating the calipering mechanism;

Fig. 4 is a section on the line *b-b*, Fig. 2;

Fig. 5 is a detail sectional view of the calipering mechanism;

Fig. 6 is a fragmentary sectional view showing the operation of calipering a sole blank;

Fig. 7 is a sectional view on the line *c-c*, Fig. 3;

Fig. 8 is a view showing the operation of the selective mechanism in delivering a calipered blank into the correct receptacle.

Fig. 9 is a section on the line *d-d*, Fig. 6.

The sole blanks to be calipered are shown at 1 and are sustained in a suitable magazine 2 carried by a frame 3. The sole blanks are fed one at a time from the magazine to a pair of feed rolls 4 and 5 mounted on suitable shafts 6 and 7 journaled in the frame 3. Each sole blank 1 is calipered or measured as it passes between the feed rolls, and after it has been measured it is deposited by the feed rolls onto a platform 8 from which it is taken by the sorting mechanism and delivered into one of a plurality of bins or receptacles, depending upon the measurement of the sole blank.

The feed rolls 4 and 5 are positively driven from a driving shaft 11 journaled in the frame 3 and driven from a driving pulley 12. Any suitable means for driving the feed rolls 4 and 5 from the shaft 11 may be employed. As herein shown the shaft 11 has a pinion 13 thereon which meshes with a gear 14 fast on the shaft 6, and said shaft 6 has a gear 10 thereon meshing with a gear 9 fast on the shaft 7. The two shafts are thus geared together so that they operate in unison and they will be positively driven from the driving shaft 11.

The soles are fed singly from the magazine 2 to the feed rolls by means of a reciprocating pusher element 15 which is adapted to engage the rear edge of the bottom blank in the magazine and push the same forwardly through an opening 16 in the front wall of the magazine into position to be gripped by the feed rolls 4 and 5, as shown in Fig. 3. This pusher element is shown as secured to a carriage 17 reciprocating in suitable ways 18 formed in the bed of the frame 3, and the carriage is connected by links or connecting rods 19 to crank pins 20 secured to crank disks 21 fast on the shaft 6.

The pusher element is shown in Fig. 3 in its intermediate position and operating to push the lower sole blank forwardly into a position to be engaged by the feed rolls 4 and 5.

When the pusher element moves to its rearmost position the front edge thereof will be carried beyond the stack of sole blanks in the magazine and the bottom blank will be moved downwardly into a position to be engaged by the pusher element upon its next forward movement.

As stated above the sole blanks are calipered as they are fed forward by the feed rolls 4 and 5. In the manufacture of shoes it is customary to gage the thickness of a sole by the thinnest part thereof and the calipering mechanism herein illustrated is constructed so that it will not only caliper the sole to determine the thinnest part thereof, but will also preserve the measurement of the thinnest part, and cause the sorting mechanism to be set in accordance with said measurement, so that it will deliver the calipered sole into the correct receptacle therefor.

The calipering mechanism herein illustrated is in the form of two calipering rolls 22, one situated on either side of the feed roll 5 and each of which is pivotally mounted on the short arm of an elbow lever pivoted to the frame. These elbow levers are shown at 25, and they are provided with the short horizontal arms 24 on which the calipering rolls 22 are mounted, said elbow levers being pivotally mounted to the frame at 29. The long arm of each elbow lever is connected by a link 30 to a positioning finger 31 that is pivoted at 33 to a bracket 34 secured to the frame. Each positioning finger 31 is acted upon by a spring 35 which tends to move it toward the right, Figs. 1 and 3, and which, therefore, tends to throw the corresponding calipering rolls 22 downwardly.

As each sole blank is fed between the feed rolls 4 and 5 the calipering rolls 22 will be yieldingly held in contact therewith by the action of the springs 35. These calipering rolls will, of course, follow the surface contour of the sole blanks, and when a thicker portion of the blank passes under either roll said roll will be raised thereby rocking the elbow lever 25 and moving the positioning finger 31 to the left, while when the roll passes over a thin place in the sole, said roll will move downwardly, thus swinging the elbow-lever 25 in the opposite direction and moving the positioning finger 31 to the right, Fig. 3. The extreme position to the right which each finger 31 assumes during the calipering of any sole blank indicates the measurement of the thinnest place in the sole over which the corresponding calipering wheel 22 passes.

The sorting mechanism which will be presently described is controlled as to its operation by the extreme position to the right which either of the positioning fingers 31 assumes while any sole is being measured or calipered thereby to deliver said sole into the correct receptacle.

In the measuring of sole blanks it is customary to take the measurement adjacent the edges of the blank, and the calipering device herein shown is designed so that the calipering wheels 22 will follow the edge contour of the sole blanks. This is herein accomplished by so mounting the elbow levers 25 that they can have a lateral movement toward and from each other and by providing means which cause said levers to follow the edge contour of the sole blanks. Each lever 25 is shown as slidably as well as pivotally mounted upon its pivotal shaft 29, and each lever is acted upon by a spring 95 which tends to move it inwardly on the shaft toward the other lever. Each lever 25 is also provided with an extension 32 that acts as a gage and is situated to have engagement with the edge of the sole blank. As the sole blanks are fed beneath the calipering wheels they pass between the two gaging extensions 32 and the springs 95 hold these gaging extensions in contact with the edge of the sole blank during the feeding movement of the latter. As a consequence, the levers 25 will be moved toward or from each other as the width of the sole blank varies and the calipering wheels will thus always roll over and caliper the edge portion only of each sole blank.

Each sole blank is delivered from the feed rolls 4 and 5 onto an inclined platform 8, as shown in Fig. 3, from which it is taken by the sorting mechanism and delivered into the proper receptacle. The sorting mechanism herein illustrated comprises a movable carrier 37 having one or more pockets 38 therein into which the calipered sole blank is delivered from the receiving platform 8. Situated beneath the path of movement of the carrier 37 are a plurality of bins or receptacles 39 into which the calipered soles are delivered by the carrier 37 according to the measured thickness thereof. In the illustrated embodiment of our invention the carrier is shown as a circular member rotatable about its axis, and as provided with a plurality of radially arranged pockets 38, and the bins or receptacles 39 are arranged in a circular row beneath the carrier. This particular shape and construction of carrier, however, are not essential. The carrier is shown as sustained by a vertically-arranged shaft 40 which is geared to the driving shaft 11 to rotate in timed relation with the pusher 15. In the construction herein shown the shaft 40 is connected by means of a sprocket chain 41 with a vertically-ar-

ranged shaft 42 which is geared to the driving shaft 11 through bevel gears 43, 44, the driving mechanism being so timed and constructed that the carrier 37 will move forward a distance equal to the space between two adjacent pockets 38 at each feeding movement of the pusher 15.

Each pocket 38 is provided with an opening in its bottom adapted to be closed by a swinging closure 46 pivoted to the wall of the pocket at 47. The pockets are preferably so constructed that when the closure 46 is in position to close the open bottom, said closure will have the inclined position shown in Fig. 7. The closure 46 for each pocket is adapted to be held in its closed relation by any one of a plurality of latches 48 which are pivotally mounted on the side of the pocket, as at 99, and each of which has a shoulder 50 adapted to engage the edge of the closure 46 and hold it closed.

The carrier 37 is arranged so that during its rotation the pockets 38 pass beneath the platform 8 and the construction is such that as each pocket passes beneath the platform any sole blank which may be on the platform at the time is removed therefrom and deposited into the pocket. This is herein provided for by forming the wall of each pocket with two upwardly-projecting fingers 49, 50 which pass through slots or openings 51 and 52 formed in the platform 8 as the pocket moves beneath the platform. This is shown best in Fig. 3 and with this construction it will be evident that the passage of the fingers 49 and 50 through the openings 51, 52 will push laterally from the platform 8 any blank 1 resting thereon. The blank-ejecting fingers 49, 50 are on the rear side of the pocket so that as the sole blank 1 is pushed off from the edge of the platform it will drop into the pocket.

A selective device controlled by the calipering mechanism is provided which selects the particular latch 48 that is to become operative to hold the closure for each pocket in its closed relation, the selection being made in accordance with the thickness of the sole blank as determined by the calipering thereof. Each sole blank after it is deposited in its pocket 38 is carried around by the carrier until the pocket comes over the particular bin or receptacle 39 designed to receive the soles of the thickness of that in the pocket, at which time the operative latch 48 is released, allowing the closure 46 to open so that the sole blank will be deposited into the bin. This release of the latch 48 is provided for by latch-releasing projections 54, there being one for each of the bins or receptacles 39 and these projections 54 are so situated relative to each other that some one of the projections is in the path of movement of each one of the latches 48. In other words, during the rotation of the

carrier 37 each latch 48 passes over some one of the various latch-releasing projections 54. The projections 54 have such a length that when the latches 48 are in their inoperative position the ends of the latches will just clear the projections, but if any latch is thrown into its operative position the lower end thereof then occupies such a position that it will engage the particular projection 54 which is located in its path of movement, and the engagement of the projection with this operative latch 48 will move the latch backwardly thereby to release the closure 46.

The calipering mechanism has selective means associated therewith which selects and renders operative the particular latch 48 for any pocket corresponding to the measurement of the sole blank that is deposited in said pocket. This selective means is herein shown as a rod or bar 55 slidably mounted in bearings 56 carried by the frame and acted upon by automatically-operative means, herein shown as a weight 57 connected to the bar by a cord 58 which passes over a direction pulley 59, that tends normally to move the bar toward the left Fig. 1. This bar has a latch-operating finger 60 extending therefrom situated to engage the upper ends of the various latches 48 as the carrier rotates thereby to throw the latch into operative position, the particular latch which is acted upon by the finger 60 depending upon the position of the bar 55. This position is determined by the calipering mechanism. The bar 55 is provided with two projections 61 extending from opposite sides thereof and which are adapted to be engaged by the lower ends of the positioning fingers 31. The bar 55 is also shown as provided with a plurality of notches or ratchet teeth 62 with which a stop pawl 63 coöperates to prevent movement of the bar to the left Fig. 1.

As a sole passes between the feed rolls and is acted upon by the calipering rolls 22, the positioning fingers 31 will have a movement corresponding to variations in thickness of the sole at each edge thereof, and as either finger moves to the right when the corresponding calipering roll passes over a thin place in the sole, said finger will engage the projection 61 and move the bar 55 to the right into a position corresponding to the thickness of said thin spot. The bar 55 will be locked in this position by the stop pawl 63 if the finger 31 subsequently moves to the left by reason of the calipering roll passing over a thicker portion of the sole. When the sole has been completely calipered the bar 55 will have assumed a position determined by the maximum position to the right which either one of the positioning fingers 31 have assumed during the calipering operation, and this, of course,

is determined by the thinnest point in either edge of the sole.

After the sole is calipered it is delivered onto the platform 8 and during the movement of the carrier 37 it is ejected from the platform into one of the pockets 38. As the pocket 38 which is to receive the calipered sole approaches the platform the closure 46 is moved into position to close the opening in the bottom of the pocket by its engagement with the cam element 670, and after the closure 46 is in its closed relation and during the further movement of the carrier 37, the upper end of one of the latches 48 will come into engagement with the arm 60, said arm operating to throw the latch from its inoperative to its operative position thereby locking the closure 46 closed. The particular latch 48 which is thus selected to lock the bottom of the pocket closed depends upon the position of the finger 60, and this, as above described, depends upon the thickness of the sole at its thinnest spot, as determined by the calipering operation. The parts are so situated that the bottom of the pocket is closed and the closure 46 is locked just before the pocket passes underneath the platform 8, so that each sole blank 1 is received into a closed pocket and is retained therein. This blank will be carried around by the movement of the carrier until the lower end of the operative latch 48 engages the releasing projection 54 which is in its path of movement, and when this occurs the latch is released and the calipered sole is allowed to drop out into the bin or receptacle 39. The particular bin into which the sole is deposited is determined by the particular latch 48 which is rendered operative to lock the closure 46 in its closed relation, and this particular latch 48 is in turn selected or determined by the thickness of the thinnest spot in the sole blank as determined by the calipering thereof.

In order that the machine may operate properly it is, of course, necessary to re-set the selective mechanism for each sole blank, and we accomplish this herein by providing means to release the locking pawl 63 after a latch for each pocket has been thrown into operative position thereby so that the bar 55 can be re-set as the next sole is calipered. This is herein accomplished by a releasing plunger 65 which is connected to the pawl 63 and is slidably mounted in suitable bearings 66. The carrier 37 is provided with a plurality of cams 67, one for each pocket, and as the cams pass under the plunger 65, the latter is raised thereby releasing the pawl and allowing the bar 55 to be returned to its initial position through the action of the weight 57. The cams 67 are so situated that the bar 55 will be released after each calipering operation.

In order that the setting of the selective

mechanism may not be interfered with or disarranged by either calipering roll 22 running off from the end of the sole blank, we have provided means herein for positively lifting the calipering rolls from the sole blank just before the latter leaves the feed rolls, thus preventing either calipering roll from moving downwardly toward the feed roll 5 when said roll passes off from the end of the sole blank 1 and thus giving an erroneous position to the positioning finger 31. We provide for this by forming the shaft 7 with two cam projections 70 which are adapted to engage the upright arm of the bell crank levers 25 just before the calipering rolls 22 pass off from the end of the sole blank 1. These cams positively raise the rolls from the sole blank and thus prevent any erroneous measurement being made. The cams 70 are of such a length that they hold the calipering rolls elevated until the next sole has entered between the feed rolls 4, 5 and is positioned beneath the calipering rolls, at which times the cams pass out of engagement with the elbow levers 25 to allow the calipering rolls to drop onto the edges of the sole blank under the influence of the springs 35.

We have also provided means for separating the feed rolls slightly as a sole blank is fed between them, which means allows the feed rolls to come into frictional contact with the sole blank after it has fairly entered the space between them. This is accomplished by making the shaft 7 capable of slight vertical movement in its bearings and providing the shaft 7 with the cam members 72 that coöperate with the crank disks 21 fast on the shaft 6. The cam members are so constructed that they will lift the shaft 7 slightly, thus separating the feed rolls as the sole blank is introduced between the rolls, said cam permitting the rolls to assume their normal position after the end of the sole blank is in position to be engaged thereby. The shaft 7 is acted upon by suitable springs 75 which yieldingly hold the feed roll 5 in operative engagement with the sole blank 1.

While we have illustrated herein a selected embodiment of our invention, we do not wish to be limited to the constructional features shown.

We claim:

1. In a leather-grading and sorting machine, the combination with calipering mechanism to caliper every point along the entire length of the edge of a sole blank, of sorting mechanism to sort the calipered blanks in accordance with the measurements of the thinnest spot as determined by the calipering mechanism.

2. In a device of the class described, the combination with calipering mechanism to caliper the entire length of the edge of a

sole blank progressively from one end to the other, of sorting mechanism to sort the calipered blanks and comprising a plurality of receptacles, and means to deposit each calipered blank in that one of the various receptacles that corresponds to the measurement of the thinnest spot as determined by the calipering mechanism.

3. In a device of the class described, the combination with calipering mechanism to caliper every point along the entire length of the edge of a sole blank, of sorting mechanism controlled as to its operation by the calipering mechanism and operating to sort the calipered blanks in accordance with the measurements of the thinnest spot as determined by the calipering mechanism.

4. In a device of the class described, the combination with calipering mechanism constructed to caliper every point along the entire length of each edge of a sole blank, of sorting mechanism to sort the calipered blanks in accordance with the measurements of the thinnest spot along either edge as determined by the calipering mechanism.

5. In a device of the class described, the combination with calipering mechanism having means to caliper every point along the entire length of each edge of a sole blank, of sorting mechanism to sort the calipered blank, said sorting mechanism comprising a plurality of receptacles, and means to deposit each calipered blank in that one of the various receptacles that corresponds to the measurements of the thinnest spot along either edge of the blank as determined by the calipering mechanism.

6. In a device of the class described, the combination with calipering mechanism for calipering sole blanks, of sorting mechanism comprising a plurality of receptacles, a carrier to receive each calipered blank from the calipering mechanism, and means to cause said carrier to deliver each blank from that one of the various receptacles that corresponds to the measurement of the thinnest spot as found by the calipering mechanism.

7. In a device of the class described, the combination with calipering mechanism to caliper a sole blank, of sorting mechanism comprising a plurality of receptacles, a carrier to receive each calipered blank from the calipering mechanism, and means to cause said carrier to deliver into each receptacle all the blanks which have a predetermined measurement at the thinnest spot found by the calipering mechanism.

8. In a device of the class described, the combination with calipering mechanism to caliper the entire length of each edge of a sole blank, of sorting mechanism comprising a plurality of receptacles, a carrier to receive each calipered blank from the caliper-

ing mechanism, and means to cause said carrier to deliver into each receptacle all the blanks which have the same measurement at the thinnest spot found by the calipering mechanism.

9. In a device of the class described, the combination with calipering mechanism to caliper the entire length of the edge of a sole blank, of sorting mechanism comprising a plurality of receptacles, a carrier to receive each calipered blank from the calipering mechanism, and means controlled by the calipering mechanism to cause said carrier to deliver each blank into that one of the various receptacles that corresponds to the measurement of the thinnest spot found by the calipering mechanism.

10. In a device of the class described, the combination with a calipering mechanism for calipering sole blanks, of a carrier having a pocket into which the calipered blank is delivered from the calipering mechanism, a plurality of receptacles, means controlled by the calipering mechanism to discharge each blank from its pocket into one of the receptacles, depending on the thickness of the blank at the thinnest spot as found by the calipering mechanism.

11. In a device of the class described, the combination with calipering mechanism for calipering sole blanks, of a carrier having a pocket into which the calipered blank is delivered from the calipering mechanism and which is provided with a discharge opening, a closure for said opening, a plurality of receptacles, and means to open said closure thereby to discharge the blank from the pocket into one of the receptacles, depending on the measurement of the thinnest spot found by the calipering mechanism.

12. In a device of the class described, the combination with calipering mechanism for calipering a sole blank, of sorting mechanism comprising a movable carrier adapted to receive calipered blanks from the calipering mechanism, and means controlled by the calipering mechanism to discharge the blank from the carrier at a point in its movement determined by the thinnest spot measured by the calipering mechanism.

13. In a device of the class described, the combination with calipering mechanism to caliper a sole blank, of a carrier provided with a pocket to receive the calipered blank from the calipering mechanism, means to move the carrier, and means controlled by the calipering mechanism to open the pocket at a point in the movement of the carrier determined by the measurement of the thinnest spot found by the calipering mechanism.

14. In a device of the class described, the combination with calipering mechanism for calipering sole blanks, of a carrier provided

with a pocket to receive the calipered blank, said pocket having an opening, a closure for the opening, means to move the carrier, a plurality of separate latches each adapted to lock the closure closed, and means controlled by the calipering mechanism to select the latch used to hold the closure closed.

15. In a device of the class described, the combination with calipering mechanism for calipering sole blanks, of a carrier provided with a pocket to receive the calipered blank, said pocket having an opening, a closure for the opening, means to move the carrier, a plurality of separate latches each adapted to lock the closure closed, means controlled by the calipering mechanism to select the latch used to hold the closure closed, and means at different points in the travel of the carrier to release the various latches.

20 16. In a device of the class described, the combination with calipering mechanism to caliper the entire length of the edge of a sole blank progressively from one end to the other, of sorting mechanism to sort the calipered blanks in accordance with the

measurements of the thinnest spot as determined by the calipering mechanism.

17. In a device of the class described, the combination with calipering mechanism to caliper the entire length of the edge of a sole blank progressively from one end to the other, of sorting mechanism controlled as to its operation by the calipering mechanism and operating to sort the calipered blanks in accordance with the measurements of the thinnest spot as determined by the calipering mechanism.

18. In a device of the class described, the combination with calipering mechanism constructed to caliper the entire length of each edge of a sole blank progressively from one end to the other, of sorting mechanism to sort the calipered blanks in accordance with the measurements of the thinnest spot along either edge as determined by the calipering mechanism.

In testimony whereof, we have signed our names to this specification.

CHARLES E. CLARKE.
JOHN S. DELANEY.