

June 18, 1940.

D. PARKS

2,204,820

DETECTING MECHANISM FOR SOLE GRADING MACHINES

Filed May 12, 1939

3 Sheets-Sheet 1

FIG. 1.

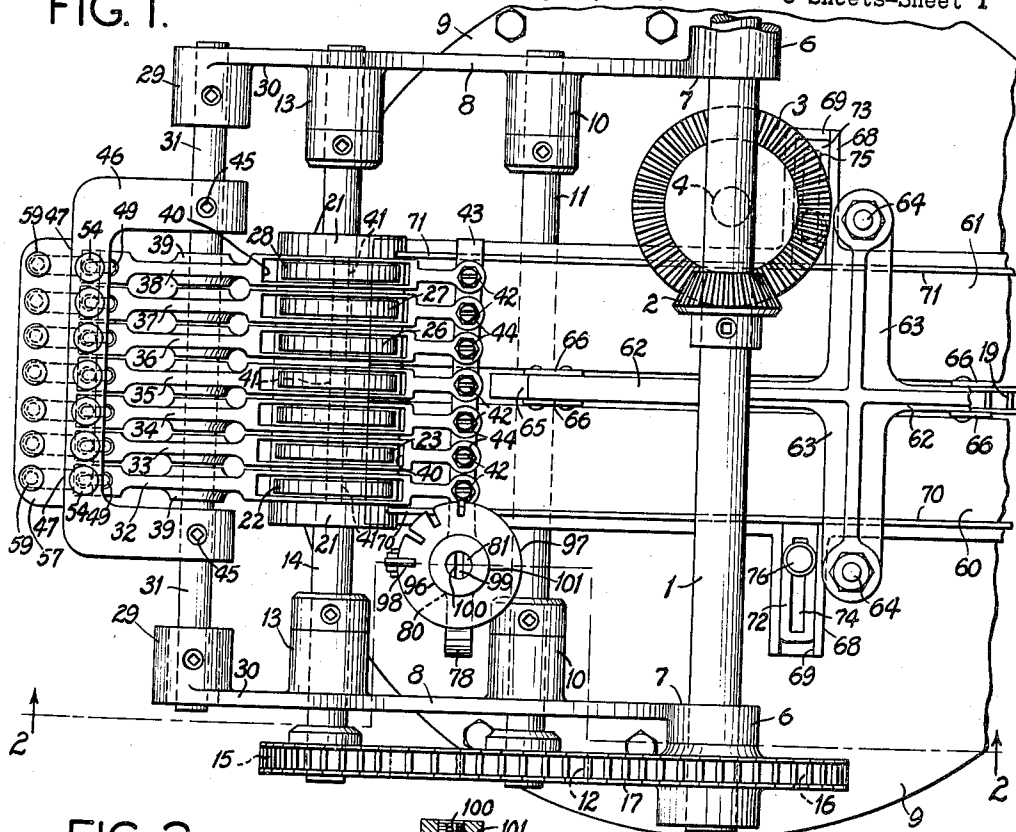
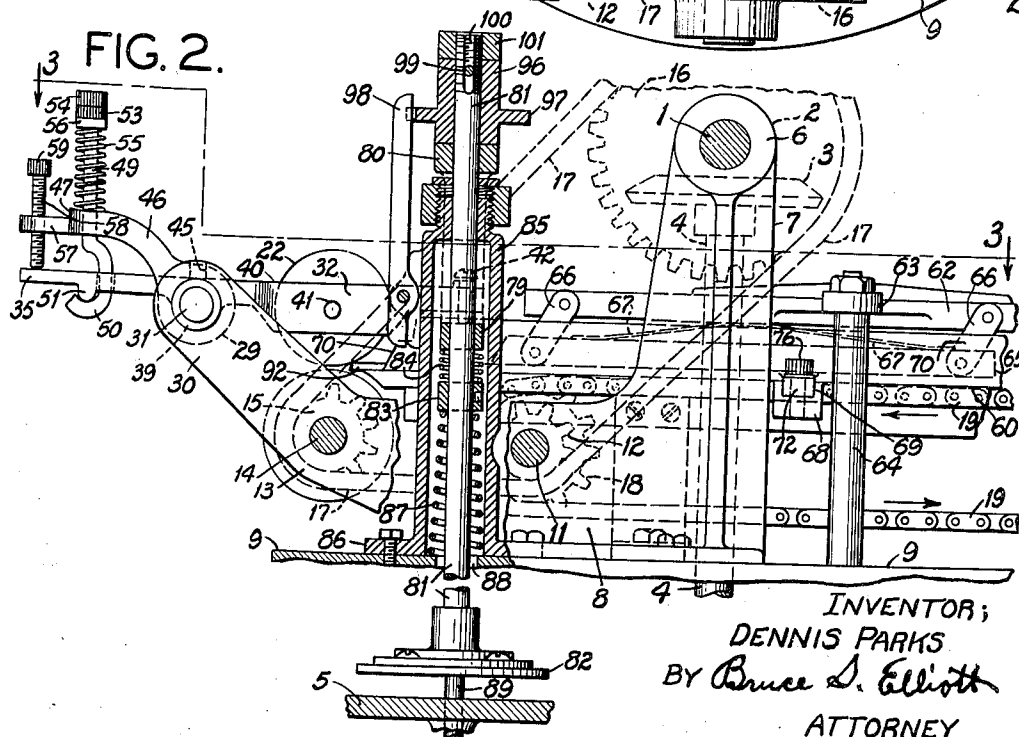


FIG. 2.



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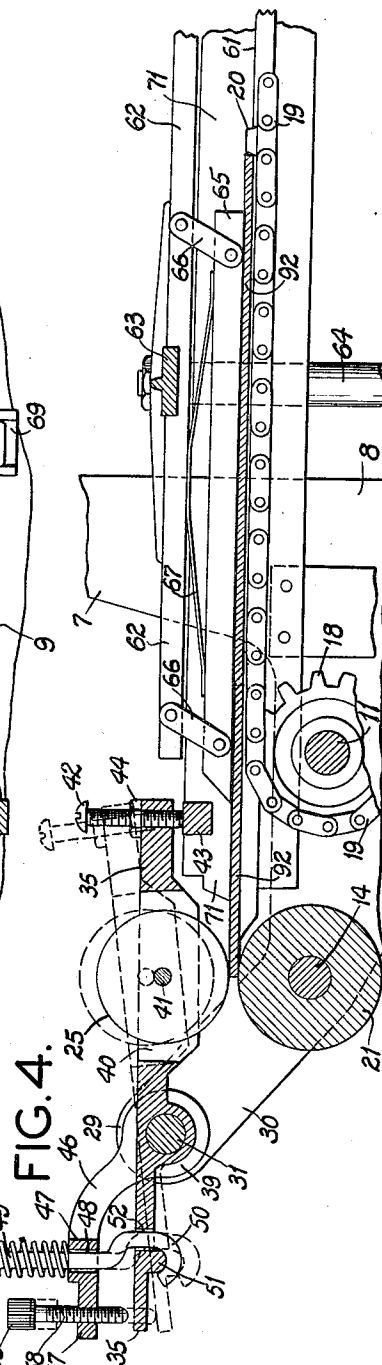
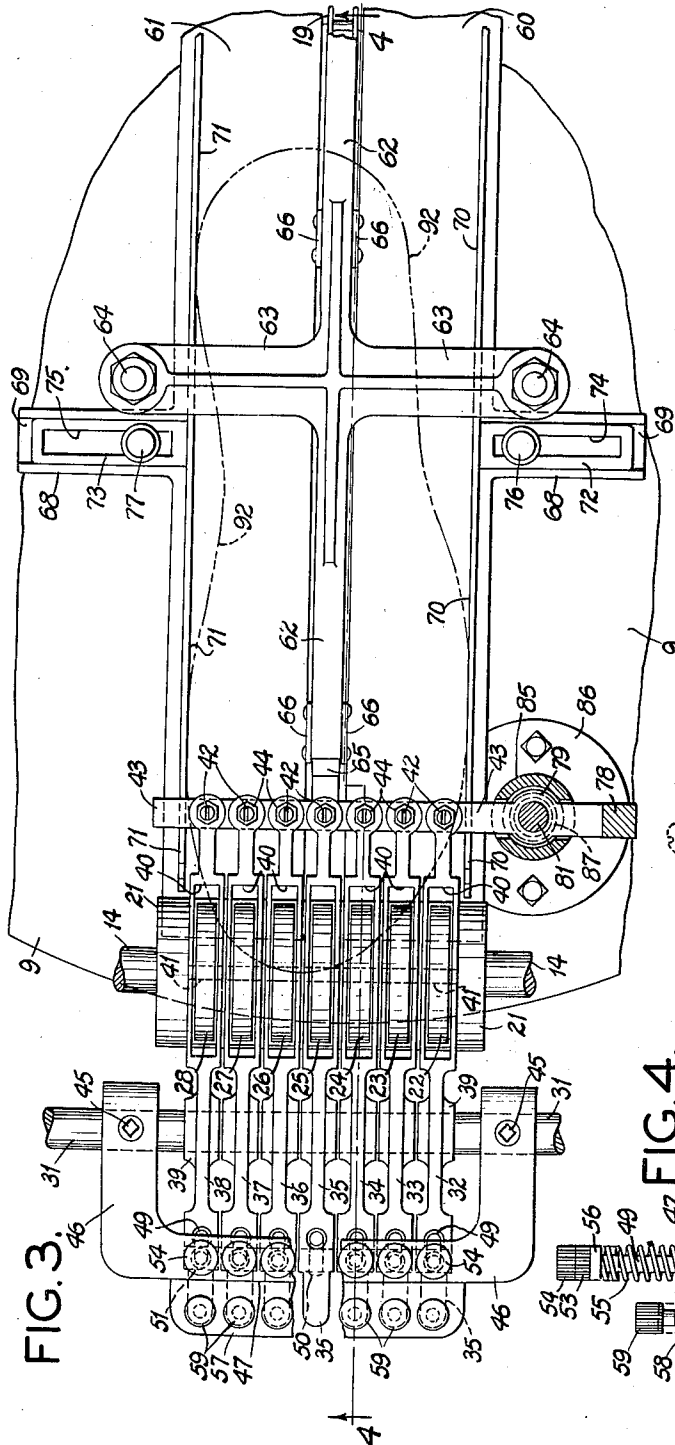
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3 Sheets-Sheet 2



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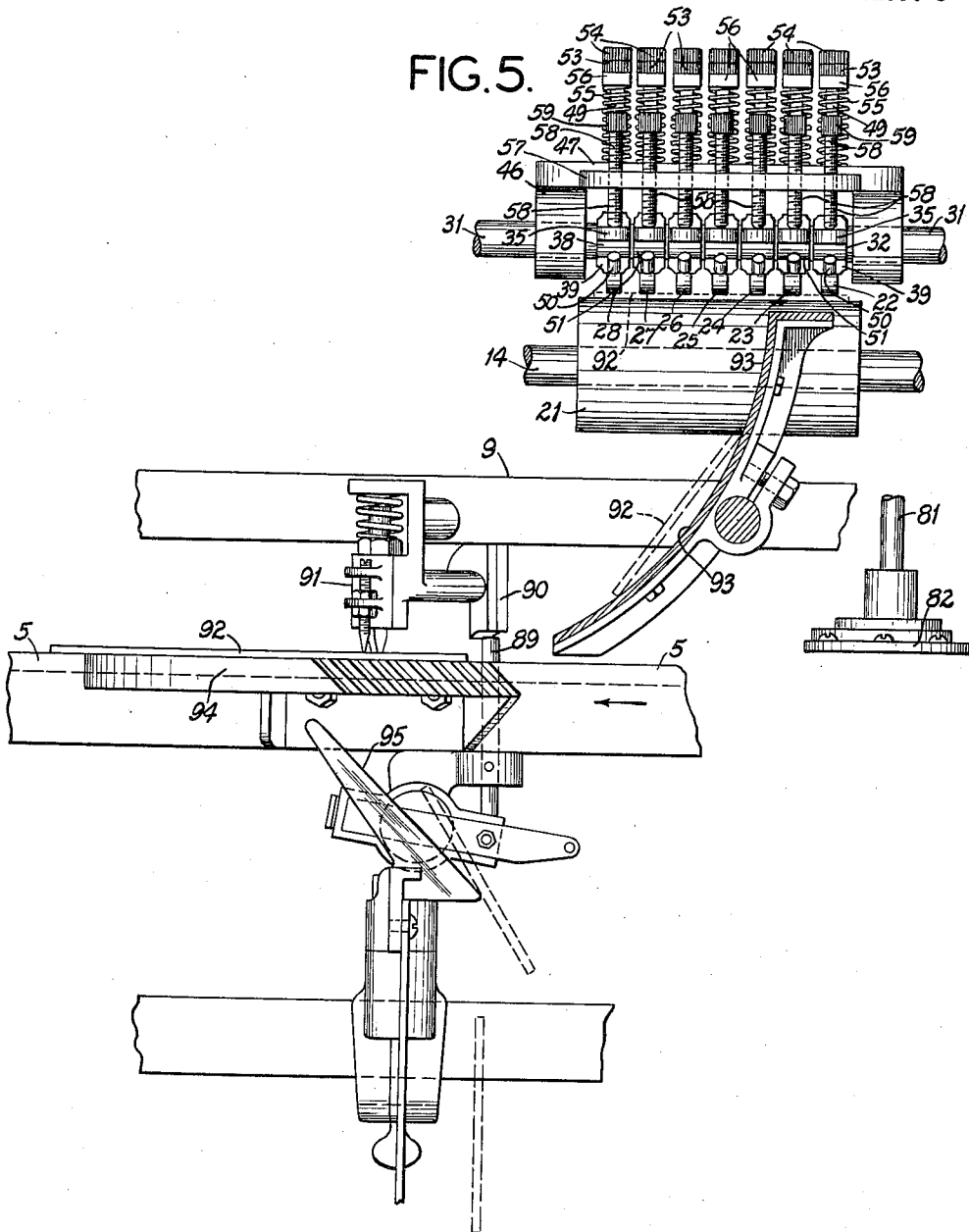
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DETECTING MECHANISM FOR SOLE GRADING MACHINES

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3 Sheets-Sheet 3

FIG. 5.



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DETECTING MECHANISM FOR SOLE
GRADING MACHINES

Dennis Parks, St. Louis, Mo.

Application May 12, 1939, Serial No. 273,215

9 Claims. (Cl. 33-148)

The general object of this invention is to provide novel grade detecting mechanism for sole grading machines, which will enable soles of various sizes and widths to be readily graded along appropriate imaginary lines of grading extending longitudinally of the soles at the sides of the forepart, or tread, portion thereof.

It is customary in the shoe industry to grade soles according to the thickness of the thinnest portion of the sole detected by the grading mechanism; and it is also customary to subject only the edge portion of the sole at either side to the grading operation; and usually the grading or detecting mechanism is arranged to operate along lines at either side of the forepart removed anywhere from one half to three quarters of an inch from the sides of the sole.

Sole grading machines as now commonly employed for this purpose employ substantially cylindrical detecting rollers which are raised or lowered by variations in the thickness of the sole as the latter are successively passed under them to set the grading mechanism, which latter term is used to cover, generally, either mechanism for stamping the soles according to the thickness at the thinnest portion thereof detected by the grading rollers, or mechanism for causing soles of like thickness to be assembled in bins or the like by automatic mechanism, or mechanism for sorting the graded soles, whether stamped or not. Some types of machines embody in the grading mechanism a knife, or other means for skiving the soles to reduce them to the thickness of the thinnest portion of the sole detected by the grading rollers, and the soles are stamped and sorted.

In certain machines of this character the cylindrical grading rollers are made adjustable toward and from each other, but as the rollers are of uniform diameter throughout they possess very little adaptability to grading along lines extending at any required distance from the sides of the sole when it is desired to grade soles of any greatly varying widths, extending from the width of soles for children's shoes up to the width of the largest size of soles for men's shoes.

It is the object of my invention to provide novel adjustable grading mechanism which may be readily adapted to grade soles of any width, from the smallest to the largest size employed, and which will also enable the grading to be properly performed on soles varying in contour as well as width.

With the above general object in view, my in-

vention resides in providing a bank of grading rollers of uniform diameter and superimposed above a feeding roller common to all of the grading rollers, the grading rollers being arranged in close juxtaposition to each other and being mounted for rotation in individual, movable supports, capable of being adjusted to raise certain of the rollers out of operative position, whereby any two rollers of the bank of rollers may be selected for the grading operation, while the other rollers may be raised above the two selected rollers so as not to be affected by the passage of soles under the latter rollers in the grading operation.

Another object of the invention is to provide adjustable guides for properly feeding soles of different contours under the selected roller. For example, if substantially straight soles are being graded, two of the grading rollers at equal distances from the central roller of the bank would be selected and the guides adjusted to insure the soles being fed under these rollers. But if the soles being graded have a decided "swing" at one side, then a grading roller for this side of the sole further removed from the central grading roller would have to be selected, and either or both guides would be adjusted to insure the passing of the soles in the proper position under the selected rollers.

As the bank of rollers is as wide as the widest sole that would be graded, and as the grading rollers are close enough together to allow the rollers in the central portion of the bank to be selected for the smallest width of sole that would be graded, it is obvious that any two rollers in the bank of rollers may be selected which are the proper distances apart to grade along the opposite sides of the sole; and that any two rollers, other than the two rollers at the extreme ends of the bank, separated by the required distance from each other, may be selected, so that the two selected rollers may be nearer to, or farther from, either side of the bank of rollers, according to the contour of the soles being graded at any particular time.

The invention also embodies novel means for raising, or rendering inoperative, the grading rollers not being used in the grading operation.

I have shown my improved grading mechanism as embodied in a machine of the type illustrated in the pending application of Dennis Parks, Serial No. 209,399, filed May 21, 1938; and as the present invention is only concerned with the provision of a bank of grading rollers, with means for selectively utilizing any two of such

rollers, and with adjustable guides for soles to be passed under said rollers, only so much of said machine is illustrated as is necessary to render a complete grading operation understandable. That is to say, as the soles pass under the grading rollers, the latter detect the thinnest part of the soles at either edge, and the roller passing over the thinnest part of the sole is caused to adjust the height of a grading pin which is coordinated in movement with the grading mechanism, and each pin so adjusted in position as each sole passes under the grading rollers selectively operates any one of a series of mechanisms which are designed to stamp the grade of the sole thereon and to cause it to be discharged into one of a series of bins for soles of that particular grade. The mechanism for stamping and sorting the graded soles is fully described in the Parks application referred to and in the present case I have shown simply a portion of this mechanism to illustrate the operation thereof in cooperation with my improved grading rollers.

In the accompanying drawings:

Fig. 1 is a plan view of a part of the upper portion of a sole grading machine showing my invention applied thereto;

Fig. 2 is a vertical sectional view taken on the line 2—2 of Fig. 1;

Fig. 3 is a sectional plan view on an enlarged scale taken on the line 3—3 of Fig. 2;

Fig. 4 is a longitudinal sectional view taken on the line 4—4 of Fig. 3, and

Fig. 5 is a broken view, partly in front elevation and partly in section, and viewed from the left of Fig. 1.

Referring now to the drawings, the numeral 1, Fig. 1, indicates a drive shaft, driven in any suitable manner, as by a pulley (not shown), and having a bevel pinion 2 meshing with a bevel gear 3 which is fast on the upper end of a vertical shaft 4, Fig. 2, which through the medium of gear connections, not shown, operates to rotate a circular carrier 5 (Fig. 5) in the direction indicated by the arrow thereon.

The drive shaft 1 is mounted in bearings 6 provided on the upright portions 7 of a frame member 8, which is secured on the upper side of a circular platform 9 (Figs. 2 and 5) located above the rotary carrier 5.

Mounted in bearings 10 provided in the side frame members 8 is a cross-bar 11, which is provided at one end with a sprocket 12 (Fig. 2).

Mounted in bearings 13 on said frame members is a cross-shaft 14 having on one end a sprocket 15 in line with the sprocket 12. The drive shaft 1 is provided on one end with a sprocket 16 in line with the sprockets 12 and 15. Mounted on these three sprockets, to be driven by the sprocket 16, is a sprocket chain 17. The shaft 11 has mounted thereon centrally of its length a second sprocket 18 (Figs. 2 and 5) on which is mounted one end of a continuous sprocket chain 19, which is driven by the sprocket 18 and is provided at intervals with projecting lugs 20. The sprocket chain 19 is a feed chain, and is adapted, in the operation of the machine, to be continuously rotated by the sprocket 18, each lug 20 in turn operating to engage the rear end of a sole and carry it forward to the grading mechanism, as will presently appear. The shaft 14 has also fixedly secured thereon a feed roller 21, which operates by frictional contact to pass each sole delivered to it by the feed chain 19 beneath a bank of grading rollers, indicated consec-

tively by the numerals 22, 23, 24, 25, 26, 27, and 28 (Figs. 1 and 3). The manner of mounting and operating these grading rollers will now be described.

Fixedly secured at its opposite ends in bosses 29, provided on the upper ends of upwardly inclined portions 30 of the side frame member 8, is a cross-bar 31. The series of grading rollers 22—28 are respectively mounted for rotation in a series of grading arms denoted, in order, by the numerals 32, 33, 34, 35, 36, 37, and 38, each of which is provided towards its outer end with a bearing 39 by means of which it is pivotally mounted on the cross-bar 31. Each of these grading arms is widened and recessed, as indicated at 40, to provide a housing for a grading roller, which is rotatably mounted therein on a short axle 41 mounted at its ends in opposite sides of the recess 40. At its extreme outer end, each of the grading arms 32—38 is provided with a set screw 42, extending through and projecting beyond the bottom of the grading arm, and adapted to rest on a grading bar 43, (Figs. 1, 3 and 4) which extends beneath the series of set screws 42. Each set screw is provided with a binding nut 44 for maintaining it in adjusted position. That is to say, each lower end of each set screw is adapted to lightly contact the upper side of the grading bar 43 when the particular grading roller of its grading arm is in operation, and the adjustment referred to is a mere shop adjustment to secure the proper contact of the screws with the grading bar.

Secured on the cross-bar 31, as by binding screws 45, is a yoke frame 46, which extends beyond either side of the series of grading arms 32—38. This yoke frame projects rearwardly and upwardly from the cross-bar 31 and has a straight portion 47, which is parallel with the cross-bar and is provided with a series of equidistant apertures 48, in each of which is mounted a rod 49 having a hook 50 on its lower end. Each of the grading arms 32—38 projects rearwardly of the cross-bar 31 and is provided on its underside with a lug 51 forming a contact bearing which is seated in the hook 50. To this end, the shank of each hook projects through an opening 52, (Fig. 4), in the rear extension of each grading arm, and its hook 50 extends under and engages the contact bearing 51. Each of the rods 49 is screw threaded at its upper end and has mounted thereon an adjusting nut 53 and clamping nut 54, and surrounding each rod is a coil spring 55, which extends between the straight portion 47 of the yoke frame 46 and a washer 56, which is engaged by the adjusting nut 53, by turning which nut the tension of the spring 55 may be regulated.

Projecting rearwardly from the straight portion 47 of the yoke frame is an integral flange 57 which is provided throughout its length with a series of equidistant apertures, in each of which is mounted an adjusting screw 58 having a knurled head 59 for turning it. Each adjusting screw 58 is positioned directly over the rear extension of a grading arm, 32—38, and the lower end of the screw normally engages the rear end of the grading arm, shown by Fig. 2. However, when a sole is passed under the two grading rollers, said grading rollers and the forward end of the grading arms, are raised, turning the rear end of said grading arms below, and out of contact, with their adjusting screws 58, as shown with respect to the grading arm 35 in Fig. 4. For guiding the soles as they are being fed to the

grading rollers I employ the following mechanism.

Suitably supported by the two side frame members 8 are two parallel supports 60, 62, respectively, which are flat and smooth on their upper sides to permit soles to be readily moved thereover. The inner edges of these supports are separated a sufficient distance to permit the upper run of the feed chain 19, and the lugs 20 carried by said chain, to work between them, the upper run of the chain being slightly below the upper surface of the supports, and the lugs 20 being adapted to project above the same to engage the rear end of soles placed on the supports to carry them rearwardly to the grading mechanism.

Located above and extending parallel with the upper run of the feed chain 19 is a stationary bar 62, (Figs. 1 to 4), which may be formed integral with a casting 63, the central portion of which extends transversely of the machine beyond the outer sides of the supports 60, 61, and is supported at opposite ends on standards 64, which rise from the stationary platform 9, as shown by Fig. 2. The numeral 65 indicates a presser bar, which is supported from the bar 62 by means of pivoted links 66, and is normally pressed downward toward feed chain 19 by means of a leaf spring 67 interposed between its upper side and the under side of a bar 62, being maintained in parallel relation with the upper run of the chain, or with the platform 60—61, by means of the links 66, as will be understood. Each of the supports 60 and 61 is provided with a lateral extension 68, each of which is recessed on its upper side to provide a groove 69, serving as a guideway. Slidably positioned on the top of each of the supports 60 and 61 is a guide-rail, 70, 71, respectively, which are parallel with each other and each of which is provided intermediate its ends with a lateral projection, 72, 73, respectively, which are provided with slots, 74, 75, respectively, which work over binding nuts, 76, 77, respectively. According to the width of soles to be graded, the binding nuts 76, 77, are loosened and guide-rails 70, 71, adjusted in position on the supports 60, 61, so as to engage opposite sides of the soles, to insure of their being carried forward by the feed chain 19 in the proper path to pass under the two grading rollers selected for detecting the thinnest part of either edge portion of the soles. Either guide-rail can be adjusted in position on its support independently of the other in order to properly direct the path of soles differing in contour.

In practice the soles to be graded will be removed one at a time from a bin mounted over the supports 60, 61, by the lugs 20 on the feed chain 19, in the manner described and illustrated in the Parks application above referred to. However, for the purpose of the present description, it may be assumed that the soles are placed on the supports one at a time by the operator in position to be engaged by the respective lugs 20 on the feed chain and thereby be carried to the grading rollers and forced between any two of these rollers and the feed roller 21, the latter thereafter causing the sole to be moved under said grading rollers until it passes beyond the same.

According to the width of the soles, or to their particular contour, two of the grading rollers are selected for operation which will engage the sole along lines adjacent its edge portions, as the sole is fed under them by the feed roller 21, and the rollers not employed are raised to inopera-

tive position. This is accomplished, as shown by the dotted line in Fig. 4, by screwing down the adjusting screws 58 so as to depress the rear ends of the grading arms 32—38 carrying the grading rollers which are to be rendered inoperative. In this operation, the lugs 51 of the grading arms affected will force the hooks 50 downward against the resistance of their springs 55, and the forward ends of the grading arms will be lifted to raise the contact screws 42 out of engagement with the grading bar 43. Thus, in the operation of grading soles as commonly practiced,—that is, by detecting the thinnest part of the sole at either edge portion,—five of the grading rollers, in the present instance, will be raised to inoperative position, while two of these rollers will be employed in the grading operation. If, for any reason, it should be desired to detect the thinnest portion occurring in any part of the sole, all of the grading rollers, or as many as necessary for the purpose, could be employed.

As to the grading rollers in operation, such as the roller 25 shown in Fig. 4, the spring 49 normally exerts a regulated upward pull on the rear end of its grading arm, so that when a thin portion of the sole passes under this grading roller, the power of the spring will be added to the force of gravity in causing the roller 25 to fall to the extent delimited by such thin portion of the sole and thus move the grading bar 43 downward a proportionate distance. If a subsequent thicker portion of the sole passes under the grading roller 25, the result will be that the contact screw 42 will be lifted out of engagement with the grading bar 43, but the latter will remain in the position to which it had previously been lowered by reason of the roller 25 descending into the thinner part of the sole.

The grading bar 43 is curved upward and back upon itself as indicated at 78 in Figs. 1 and 3, the body of the bar being provided with a guide bearing 79, and the curved portion, which is parallel with the body of the bar, with a guide portion 80, these guide bearings slidably receiving a slide bar 81, carrying at its lower end a grading head 82, as shown by Fig. 2. A collar 83 is secured on the slide bar 81, and a coil spring 84 is interposed between this collar and the underside of the guide bearing 79 of slide bar 81. The slide bar and its connected parts are located in an open housing 85 mounted on the platform 9, as indicated at 86, and a coil spring 87 is interposed between the platform and the collar 83. The slide bar 81 extends through an opening 88 in the platform 9. As the grading bar 43 is lowered by reason of a thin spot in a sole passing under one of the grading rollers, the slide bar 81 will be lowered by reason of the guide bearing 79 on the grading bar exerting pressure on spring 84 which in turn exerts pressure on the collar 83 fast on said slide bar.

The motions of the machine are so synchronized that one of a series of grading pins 89 mounted in the rotary carrier 5, will pass under the grading head 82 as a sole is passing under the grading rollers, and said grading pin will be lowered to the extent that the grading head is lowered by the descent of one or the other of the grading rollers. In the continued movement of the carrier 5, the adjusted grading pin 89 will pass from under the grading head 82 and engage one or the other of a series of contact members 90, Fig. 5, and turn the sole engaging and clamping mechanism, indicated generally by 91, into engagement with the sole 92, which previously has been

discharged by the feeding roller 21 on to a slide 93, from which it falls on to a table 94 on carrier 5, where it is engaged by the holding and marking device 91 as previously stated. In the further rotation of carrier 5, the sole being held by the device 91, table 94 will move from under it and the graded and marked sole will fall on to a slide 95, whence it is delivered into a bin.

Referring to Fig. 2, the curved portion of the grading bar 43 is held in contact with the underside of a hub 96 provided with a setting disc 97, which is held in adjusted position by a locking lever 98. The hub 96 is locked to the slide bar 81 by means of a pin 99 passing through said hub and a slot 100 formed in the upper end of the slide bar. The upper end of slide bar 81 is screw threaded and provided with an adjusting head 101 which bears against the upper end of hub 96 of the setting disc. The purpose of the setting disc is to enable the operator to turn the grading head 82 so as to determine the length of the grading operation in accordance with the length of soles being graded; and the purpose of the adjusting head is to enable the slide bar 81 and its grading head 82 to be raised or lowered to secure accuracy in the grading of the soles, all of which is fully set forth in the Parks application referred to and need not be more fully described, as these features, in themselves, form no part of the present invention.

The grading rollers 22-28 may be of any desired thickness, and are located in as close proximity to each other as it is mechanically possible to do. While I have found that seven of these grading rollers will ordinarily be sufficient to enable an ordinary width or contour of sole to be graded, the number of these rollers could be increased if thought desirable, and where, in a particular factory, the soles do not greatly vary in width or contour, five grading rollers may prove sufficient for grading purposes.

Whatever number of rollers employed, it will be seen that the invention enables the operator to select and place in operation any two grading rollers in a bank, thus affording a wide range of adjustment without in any manner disturbing the normal setup of the machine. It will be of course apparent that other means than adjusting screws could be employed for holding the inoperative rollers elevated, but adjusting screws provide a simple and inexpensive way of accomplishing this result.

I claim:

1. Grading mechanism for a sole grading machine comprising, in combination, a bank of grading rollers, means for selectively rendering inoperative any of said grading rollers not required for a grading operation, and means for feeding soles under and in contact with the rollers in operation.

2. Grading mechanism for a sole grading machine comprising, in combination, a bank of grading rollers arranged in close juxtaposition, means for selectively rendering inoperative any of said grading rollers not required for a grading operation, and means for feeding soles under and in contact with the rollers in operation.

3. Grading mechanism for a sole grading machine comprising, in combination, a bank of independently mounted grading rollers arranged in close juxtaposition, means for selectively rendering inoperative any of said grading rollers not required for a grading operation, and means

for feeding soles under and in contact with the rollers in operation.

4. Grading mechanism for a sole grading machine comprising, in combination, a bank of independently mounted grading rollers arranged in close juxtaposition, means for raising to inoperative position any of said grading rollers not required for a grading operation, and means for feeding soles under and in contact with the rollers in operation.

5. Grading mechanism for a sole grading machine comprising, in combination, a bank of grading rollers more than three in number, means for selectively rendering inoperative all but two of said grading rollers, and means for feeding soles under and in contact with the two rollers left in operation.

6. Grading mechanism for a sole grading machine comprising, in combination, a bank of at least five grading rollers arranged in close juxtaposition, means for selectively rendering inoperative all but two of said rollers, means for feeding soles under said two grading rollers, adjustable means for guiding the feed of the soles to cause the side edge portions only thereof to pass under said two grading rollers.

7. Grading mechanism for a sole grading machine comprising, in combination, a support, a bank of grading rollers arranged in close juxtaposition and extending transversely of said support, means for selectively rendering inoperative all but two of said grading rollers required for a grading operation, means for feeding soles over said support and under and in contact with the two rollers in operation, and adjustable guiding means on said support for causing the side edge portions only of the soles to pass under said two grading rollers.

8. Grading mechanism for a sole grading machine comprising, in combination, a depressible grading bar, a series of independently pivotally mounted grading arms, a grading roller mounted in each grading arm, a series of adjusting screws normally in engagement, respectively, with the upper side of said grading bars, and adapted to be turned to raise the forward ends of all but two of said grading arms and carry the rollers mounted therein to inoperative position, an adjusting device mounted in the opposite end of each grading arm and normally in contact with the upper side of said grading bar, and means for feeding and guiding soles to cause their side edge portions only to pass under and in contact with said two grading rollers.

9. Grading mechanism for a sole grading machine comprising, in combination, a depressible grading bar, a series of independently pivotally mounted grading arms operatively associated at their forward end with said grading bar, a grading roller mounted in each grading arm, adjustable means associated respectively, with the other end of each grading bar, and adapted to be operated to selectively raise the forward ends of all but two of said grading arms to lift the rollers mounted therein out of operative position, springs operating normally to hold the forward ends of the grading arms in contact with the upper side of said grading bar, and means for feeding and guiding soles to cause their side edge portions to pass under and in contact with said two grading rollers.

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