E. E. WINKLEY.

MACHINE FOR SORTING HEEL LIFTS.

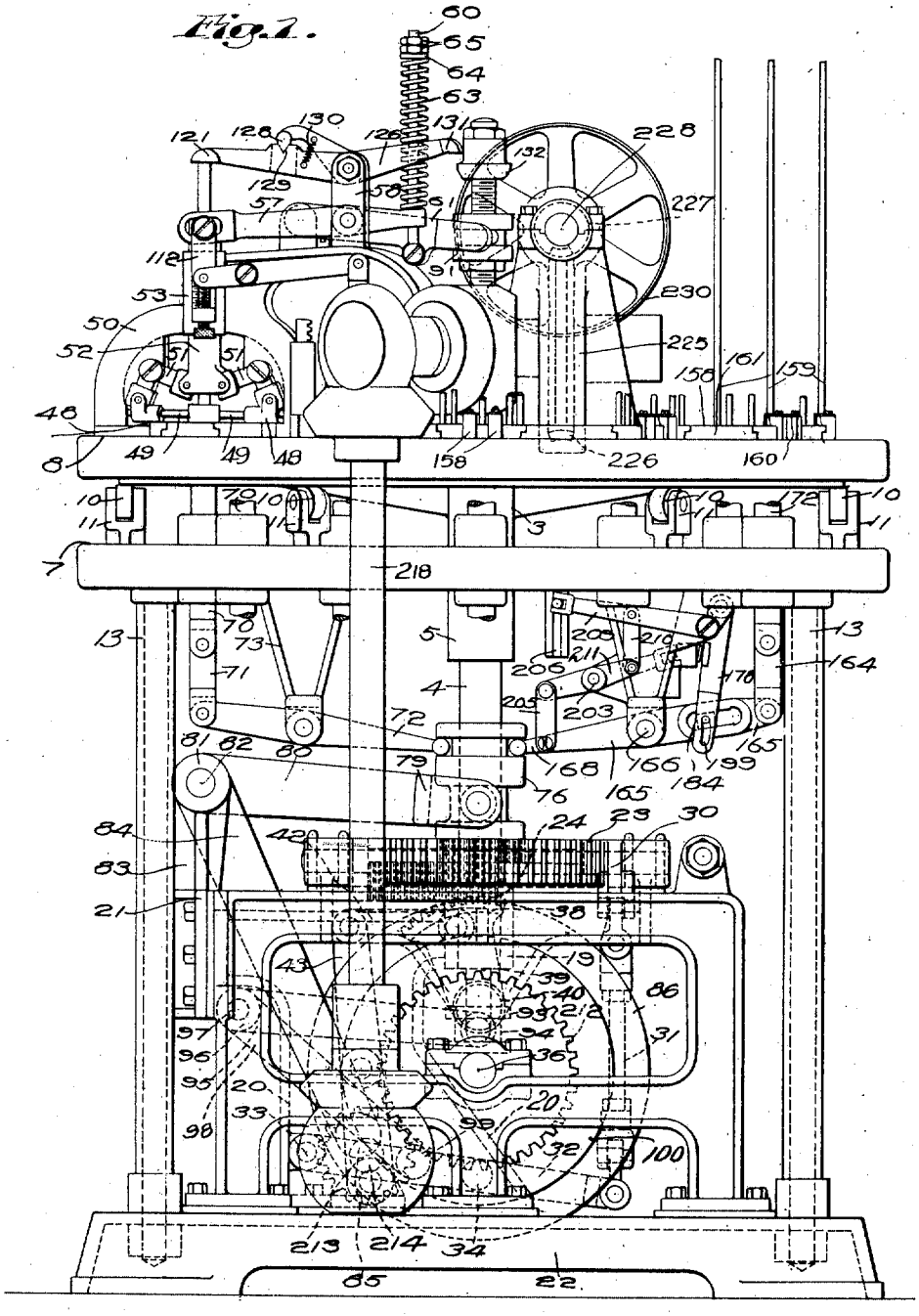
APPLICATION FILED AUG. 5, 1912.

1,234,434.

Patented July 24, 1917.

7 SHEETS—SHEET 1.

Fig. 1.



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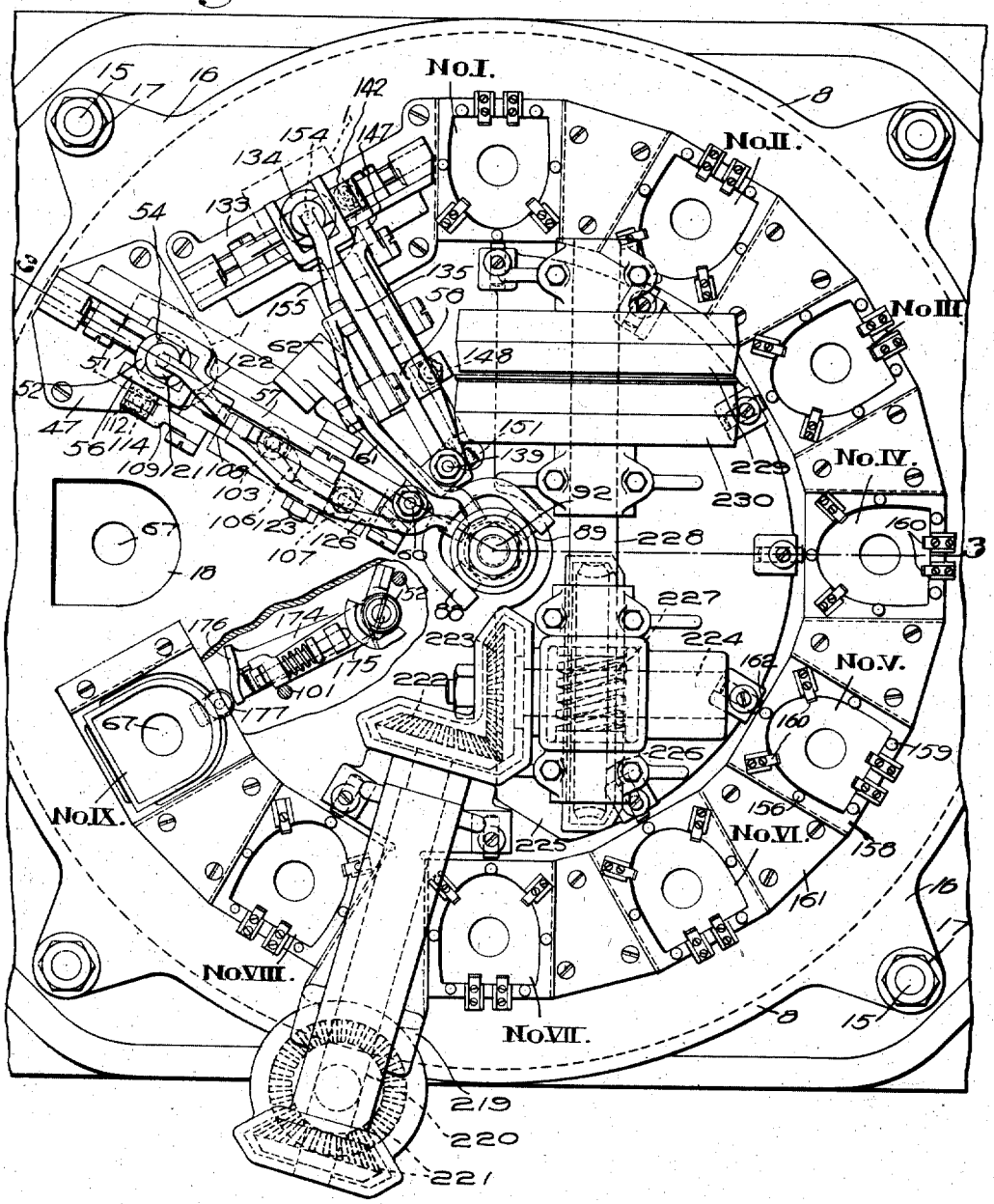
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7 SHEETS—SHEET 2.

Fig. 2.



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7 SHEETS—SHEET 3.

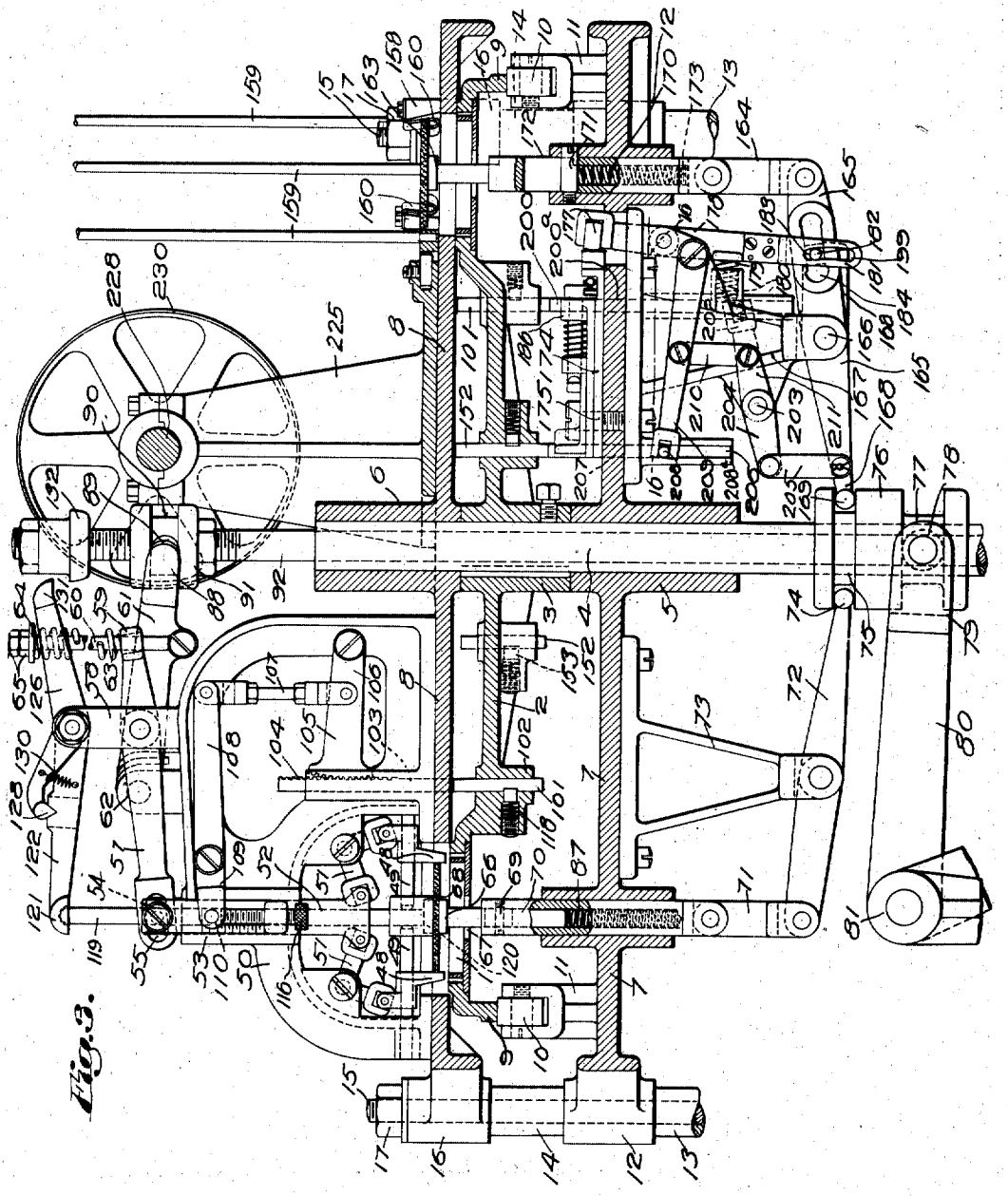


Fig. 3.

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7 SHEETS—SHEET 4.

Fig. 3.

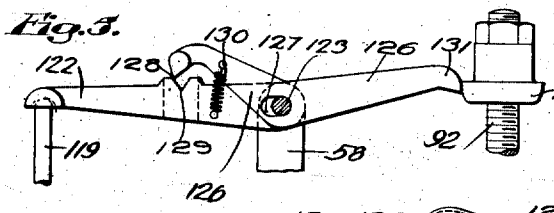
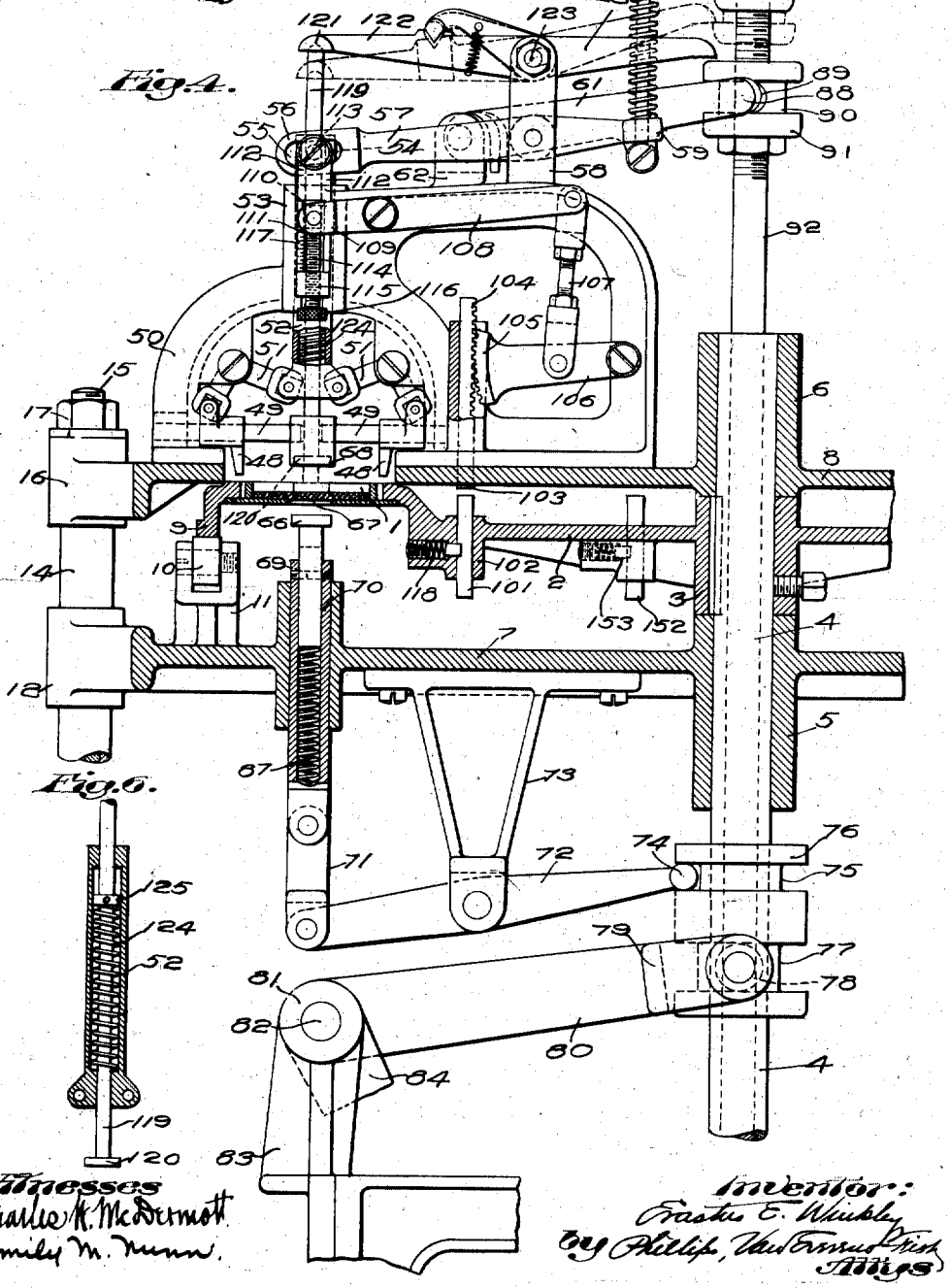


Fig. 4.



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7 SHEETS—SHEET 5.

Fig. 7.

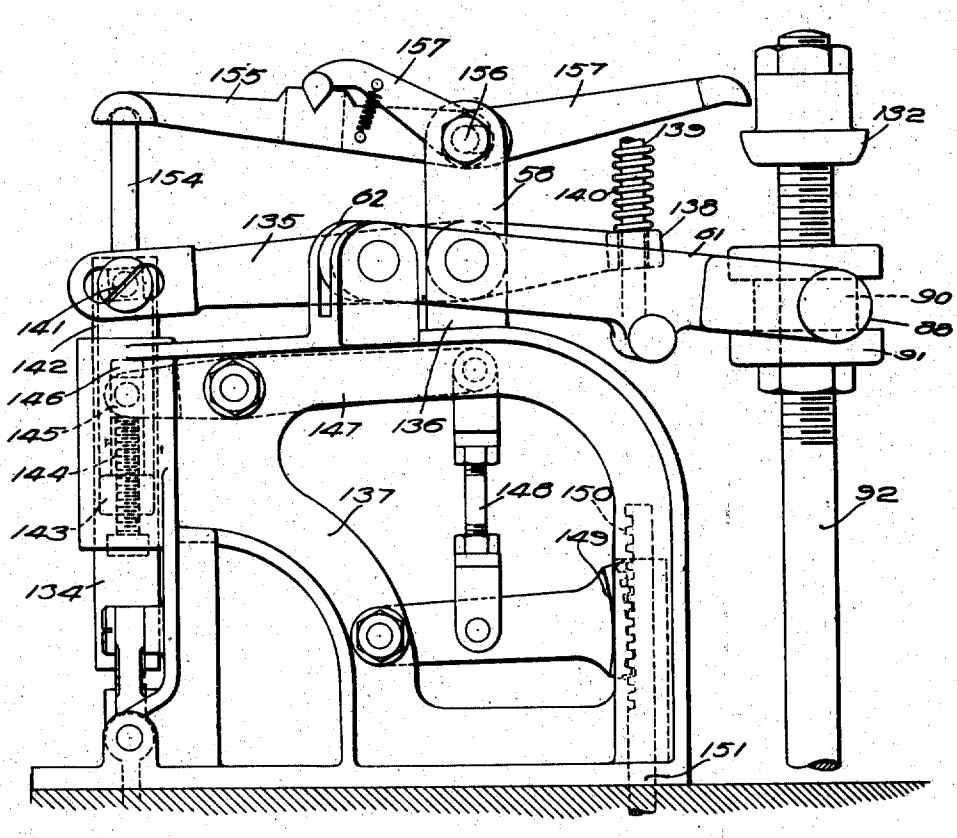
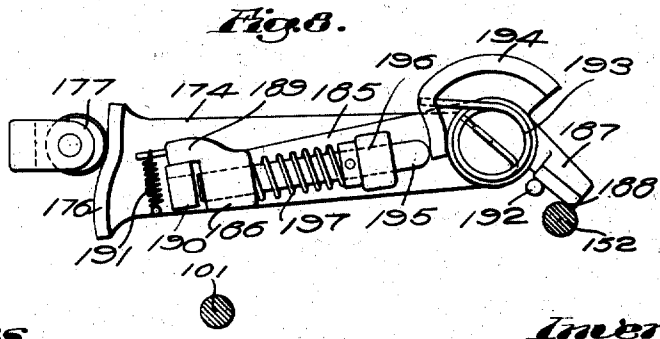


Fig. 8.



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7 SHEETS—SHEET 6.

Fig. 12.

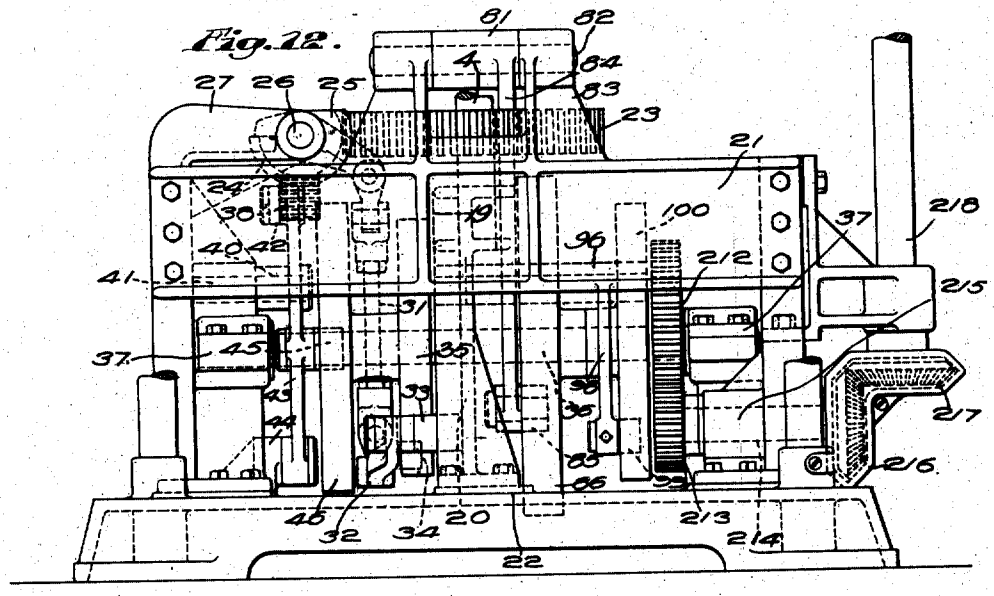


Fig. 9.

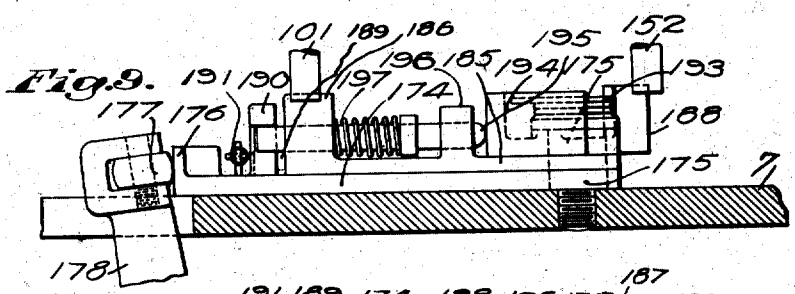


Fig. 10.

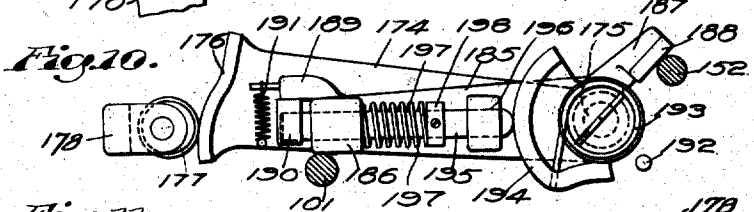
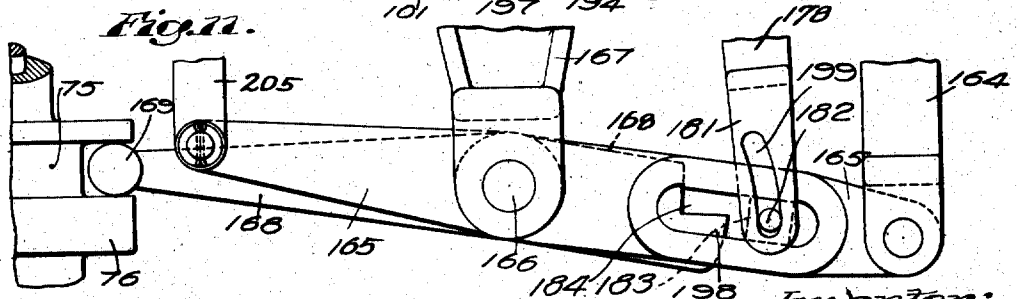


Fig. 11.



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7 SHEETS—SHEET 7.

Fig. 14.

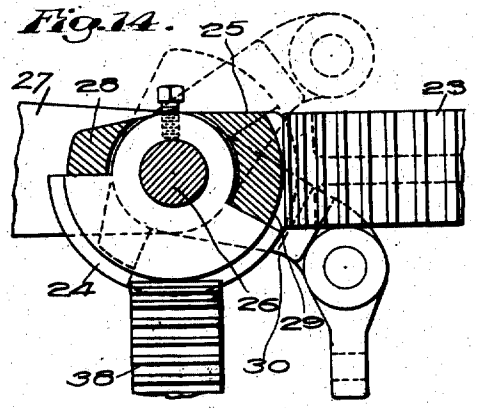


Fig. 15.

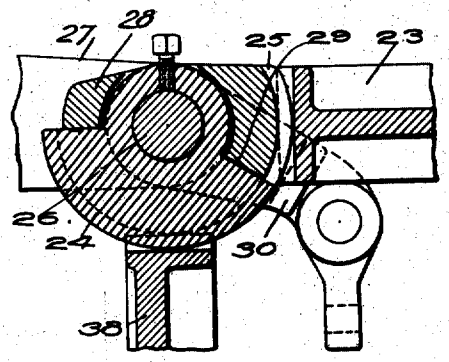


Fig. 13.

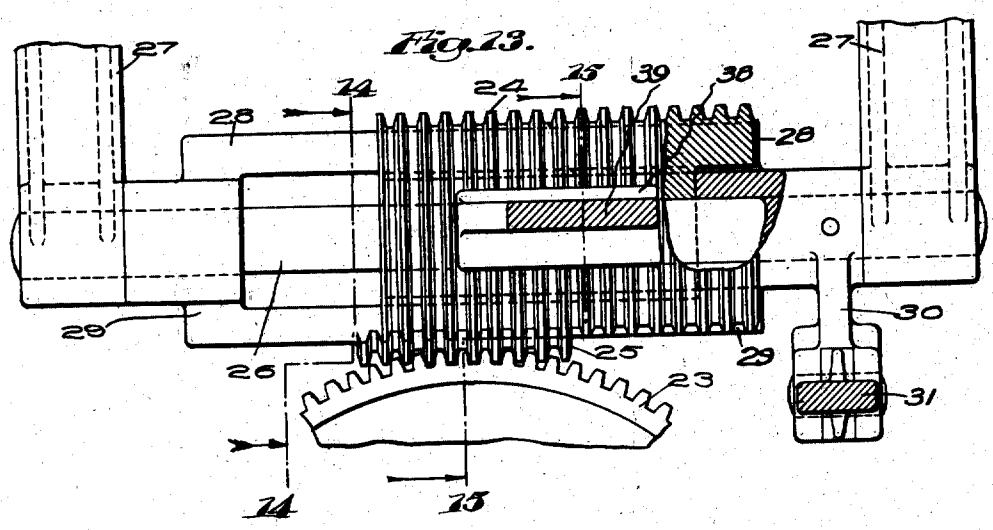
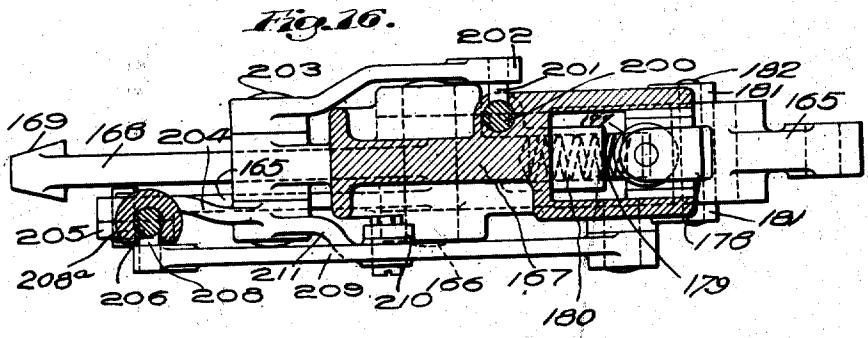


Fig. 16.



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UNITED STATES PATENT OFFICE.

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MACHINE FOR SORTING HEEL-LIFTS.

1,234,434. Specification of Letters Patent. Patented July 24, 1917.

Application filed August 5, 1912. Serial No. 713,327.

To all whom it may concern:

Be it known that I, ERASTUS E. WINKLEY, a citizen of the United States, residing at Lynn, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Machines for Sorting Heel-Lifts; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to a machine for sorting heel lifts and the like. The uses of the invention will be elucidated in connection with its application to the problem of sorting heel lifts.

In the manufacture of shoes it is customary to prepare heels for application to the shoes by dinking out a number of heel-shaped lifts from suitable heel stock, assembling the dinked out lifts in a pile, and subjecting the pile to several tons of pressure to form a substantially integral heel blank. After the blank has been nailed to a shoe a toplift is spanked on the blank, and the blank is then trimmed to its final shape by a suitable trimming tool associated with a guide which engages the peripheral edge of the toplift in order that the blank may be trimmed in accordance with the form of the toplift. In making a pair of shoes it is desirable that the toplifts prepared for application to each shoe of the pair be uniform in size so that the final shape of the two heels may be uniform. Although toplifts prepared for application to shoes of the same size and style are dinked, by the same die, out of suitable heel stock it is found in practice that they are not always uniform in size at the time of the spanking-on operation. This is due to the fact that the stock, from which the toplifts are dinked, is tempered to facilitate the dinking out operation, which tempering causes variations in area due to the shrinkage of the toplifts as they dry. As the heel blank applied to a shoe is trimmed in accordance with the form of the toplift spanked thereon, it will readily be seen that variations in area due to the shrinkage of the toplifts prepared for application to a pair of shoes will cause variations in the form of the toplifts and consequent variations in the shapes of the finished heels which, of course, is undesirable.

By reason of the shrinkage above referred to, it has been found desirable to sort or grade heel-lifts in accordance with their actual dimensions after such shrinkage has occurred, rather than in accordance with the sizes of the dies by which they were cut, thereby insuring the use, in both shoes of a pair, or in all shoes of a single lot, of lifts of the same size; and the inventor has discovered that this may be done, with substantial accuracy, by measuring each lift as to both its width and its length, and then dividing the lifts into grades each containing only lifts which have the same length and the same width.

The object of the present invention is to produce a machine by which the sorting operation just described may be carried out, preferably in an automatic manner.

To the foregoing end the invention resides in a machine having instrumentalities by which heel-lifts or similar articles may be measured as to two or more dimensions at an angle to each other, such, for example, as width and length, together with means for sorting the lifts in accordance with the dimensions so measured.

In addition to the feature of the invention above referred to, other features of the invention consist in certain devices, combinations and arrangements of parts as fully set forth hereinafter, the advantages of which will be readily understood by those skilled in the art.

The various features of the present invention will be readily understood from an inspection of the accompanying drawings illustrating the preferred embodiment of the invention, in which,

Figure 1 is a right side elevation of the machine;

Fig. 2 is a plan;

Fig. 3 is a vertical, sectional elevation on the line 3—3, Fig. 2, the lower portion of the machine being cut away;

Fig. 4 is an enlarged detail, in section, of the length-measuring station;

Fig. 5 is a detail, in right side elevation, of the devices for actuating the stripper for returning the lift to its compartment;

Fig. 6 is a detail, in sectional elevation, of the stripper and its support;

Fig. 7 is a detail, in substantially front elevation, of the devices located at the width-measuring station;

Fig. 8 is a detail, in plan, of the devices, actuated by the indicators, for operatively connecting the selectors to the actuator;

Fig. 9 is a detail, in elevation, of the parts illustrated in Fig. 8;

Fig. 10 is a view similar to Fig. 8, but showing the parts in a different position;

Fig. 11 is a detail in right side elevation showing the connection between a selector and the actuator;

Fig. 12 is a detail, in front elevation, of the lower portion of the machine;

Fig. 13 is an underside view, in detail, of the devices for locking and actuating the lift carrier;

Figs. 14 and 15 are sectional elevations on the lines 14—14 and 15—15, Fig. 13 respectively; and

Fig. 16 is a detail, in sectional plan, along the line 16—16, Fig. 3.

The main features of the preferred form of the invention, as designed for sorting heel lifts, may be briefly described as follows:—

The machine is provided with a rotary carrier, having, conveniently, twelve compartments, each shaped to hold a heel lift. This carrier is intermittently rotated to bring each compartment successively to a station, which may be termed for convenience, a "loading station," where the lifts are placed in the compartments. Each lift loaded at the loading station is advanced first to a station called for convenience the "length-measuring station," then to a station called for convenience the "width-measuring station," and thereafter to one of nine stations called for convenience "storage stations." The measurement of each lift is determined by a pair of coöperating fingers at each of the measuring stations, and the dimensions of each lift, from the standard for which the machine has previously been set, are indicated on a pair of indicators associated with said lift, one indicating the length and the other the width. A normally inoperative selector for storing the lifts is located at each storage station. When, during the rotation of the carrier, a lift is advanced to a station reserved for the storage of lifts having the dimensions of the advancing lift, the selector is connected, by the indicators traveling with the lift, with an actuator which actuates the selector to store the lift. After storing any lift the indication on the indicators is immediately destroyed, so that there will be no danger of unnecessarily actuating other selectors associated with other storage stations.

In the embodiment of the invention illustrated in the drawings, the lifts are loaded, one by one, into a series of heel lift shaped compartments 1 formed in a rotary circular carrier 2 (Fig. 3) at a loading station, and this carrier is intermittently rotated to register each lift so loaded with a length-measuring station, with a width-measuring station, and with nine successive storage stations. The lift carrier 2 is provided with a hub 3 secured to a hollow shaft 4 rotatably supported in bearings 5 and 6 on a stationary frame plate 7 and a stationary cover plate 8 respectively. The periphery of the carrier 2 is provided with a depending flange 9 which is supported by a series of rolls 10 carried between the bifurcations of lugs 11 projecting from the plate 7 (Figs. 1 and 3). The periphery of the plate 7 is provided with four bosses 12, each of which is clamped between two sleeves 13 and 14, (Fig. 3) on a vertical rod 15. The periphery of the cover plate 8 is also provided with four bosses 16, each of which is clamped to the sleeve 14 by a nut 17 on the upper end of the rod 15.

The cover plate 8 is formed with a heel-lift shaped opening 18 (Fig. 2) at the loading station. In the operation of the machine the lift carrier 2 is intermittently rotated in a clock-wise direction (viewing Fig. 2) to successively register its empty compartments with this opening. Each time that an empty compartment in the lift carrier is registered with the opening 18 a lift is placed in the compartment, either by hand or by some suitable form of automatic lift delivering mechanism, preferably the latter.

The lower end of the shaft 4 is journaled in a bearing 19 formed in an angular bracket 20 (Figs. 1 and 12) the upper end of which is secured to a plate 21 forming one of the sides of the machine, and the lower end of which is secured to a plate 22 forming the base of the machine. The shaft 4 carries a gear 23 (Figs. 1, and 12 to 15) which is alternately engaged by an actuating rack 24, to rotate the lift carrier 2, and by a locking rack 25 to lock the lift carrier from movement. The actuating rack 24 is secured to a shaft 26 mounted to reciprocate, substantially in the plane of the gear 23, through bearings 27 (Fig. 13) formed in the machine frame. The locking rack 25 is loosely mounted on the shaft 26 and is held from longitudinal movement on the shaft by engagement with the bearings 27. The locking rack 25 is provided with radially projecting arms 28 and 29 which embrace the actuating rack 24 in the manner shown in Fig. 14, so that when the locking rack is rocked into engagement with the gear 23 to lock the lift carrier 2 from movement, the actuating rack 24 is rocked out of engagement with the gear 23, and when the locking rack 25 is rocked out of engagement with the gear 23 the actuating rack 24 is rocked into engagement with the gear 23.

In order to rock the locking rack 25 into and out of engagement with the gear 23 it is provided with an arm 30 which is joined,

through a link 31, (Fig. 1), to an arm 32 pivotally mounted on the angular bracket 20 at 33 (Fig. 1). The arm 32 carries a roll 34 engaged in a groove formed in a cam 35 (Fig. 12) on a cam-shaft 36 supported in bearings 37 bolted to the base plate 22. Through the connections described the locking rack 25 is rocked to bring it and the actuating rack 24 alternately into engagement with the gear 23.

After the actuating rack 24 has been rocked into engagement with the gear 23 in the manner described, it is reciprocated on the shaft 26 to rotate the gear 23 and thus impart a rotative step to the lift carrier 2. To this end the rack 24 is engaged by a toothed segment 38 beneath it (Figs. 1, 12 to 15) formed on an arm 39 (Fig. 1) projecting from a hub 40 (Fig. 12) pivotally mounted on a pin 41 secured to the machine frame. The arm 39 is connected by a horizontal link 42 (Fig. 1) to an arm 43 pivotally mounted on a bracket 44 (Fig. 12) carried by the plate 22. The arm 43 carries a roll 45 engaged by a groove formed in the face of a cam 46 on the cam shaft 36.

In order to prepare for the production of heels of uniform shape in accordance with the object of the invention, the machine is provided with mechanism for measuring, as compared to a fixed standard, in both length and width of each of the lifts loaded in the carrier 2, and for thereafter sorting the lifts in holders in such manner that all the lifts in a single holder will have for all practical purposes the same length and width. To this end at each rotative step of the carrier 2, a lift is advanced from the loading station 18 to a length measuring station indicated at 47 (Fig. 2). The length of each lift is detected by a pair of coöperating fingers 48 which are mounted for reverse reciprocation on rods 49 (Figs. 1, 3 and 4) carried by a yoke frame 50 bolted to the cover plate 8. The fingers 48 are connected, by a pair of bell-crank levers 51 pivoted on the yoke frame 50, to a hollow cylindrical rod 52 (shown particularly in Fig. 6) mounted to reciprocate vertically in a boss 53 formed on the frame 50. The upper end of the rod 52 is provided with a T-shaped head 54 (Figs. 2 and 4) the arms of which are embraced by slots 55 formed in a yoke 56 on one end of an arm 57 pivotally mounted on a bracket 58 carried on the frame 50. The other end of the arm 57 is provided with a perforated boss 59 (Fig. 4) loosely surrounding a rod 60 pivotally mounted on an arm 61, which is pivoted in turn between lugs 62 carried by the frame 50. A spring 63, coiled around the rod 60, is loosely interposed between the boss 59 and a washer 64. The washer is loosely mounted on the rod 60 and backed by a set of adjusting and locking nuts 65. The purpose of this spring will presently be explained in connection with the mechanism for actuating the measuring fingers 48.

In order to elevate the lift, located at the length-measuring station, so that it may be in a position to be embraced by the fingers 48, a plunger 66 (Figs. 3 and 4) is arranged to work through an opening 67 formed in each one of the lift compartments, for elevating each lift against the lower end of a hollow cylindrical block 68 carried by the rods 49. The plunger 66 is connected, by a pin and slot connection 69, to a cylindrical hollow rod 70 mounted for reciprocation in the plate 7. The lower end of the rod 70 is connected, by a link 71, to a lever 72 pivotally mounted intermediate its ends on a bracket 73 depending from the plate 7. The other end of the lever 72 is provided with a rounded end 74 which engages an annular groove 75 formed in a collar 76 hereinafter called for convenience "the actuator", loosely mounted on the shaft 4. In order to actuate the plunger 66 to cause it to pass through the opening 67 and elevate the lift located at the length-measuring station against the block 68, the actuator 76 is provided with a second annular groove 77 which is engaged by rolls 78 carried by the arms of a yoke 79. The yoke 79 is formed on one end of an arm 80 projecting from a sleeve 81 (Figs. 1 and 4) carried by a pivot rod 82 supported by brackets 83 projecting from the plate 21. A second arm 84 (Figs. 1 and 12) projecting from the sleeve 81 carries, at its lower end, a roll 85 which engages a groove formed in a cam 86 on the shaft 36. As soon as the lift carrier 2 has been rotated to bring the lift from the loading station to the length-measuring station the plunger is actuated, through the connections described, to elevate the lift and press it against the block 68. To permit the plunger 66 to operate upon lifts of different thicknesses the hollow rod 70 carries a coiled spring 87 (Figs. 3 and 4) arranged to yieldingly support the plunger 66.

In order to reversely actuate the detecting fingers 48 to cause them to open and close and when closed to yieldingly engage the breast and back of the lift held against the block 68 by the plunger 66, the arm 61 is provided with a yoke 88 (Figs. 2, 3 and 4) which supports a pair of rolls 89 which are embraced by an annular groove 90 formed in a collar 91 adjustably secured to a vertical rod 92. The vertical rod 92 is slidably mounted, in the hollow shaft 4 and is provided, at its lower end, with a collar 93 (Fig. 1). The collar 93 is provided with an annular groove 94 which is engaged by a pair of rolls carried by a yoke formed on one end of an arm 95 projecting from a sleeve 96 carried by a pivot rod 97 on the

plate 21. A second arm 98 (Fig. 12) projecting from the sleeve 96 carries at its lower end a roll 99 engaged by a groove formed in a cam 100 on the shaft 36. This cam 100 positively controls the movement of the arm 61 and, through its connection to the arm 57, the opening and closing of the measuring fingers 48. As soon as the lift is positioned against the block 68 by the plunger 66 the cam 100, through the connection described, lowers the rod 92. This causes the rod 60 to be carried downward. The pressure of the spring 63 on the boss 59 of the arm 57 causes the arm 57 to follow down with the arm 61 and the measuring fingers 48 are thus actuated into engagement with the breast and back of the lift (see Fig. 3). The throw of the cam 100 imparts a greater movement to the arm 61 than is necessary to cause an engagement of the fingers 48 with the lift. The spring 63, therefore, performs two functions, it takes up the excess throw of the cam 100 and it provides for a yielding engagement of the lift by the measuring fingers (see Fig. 1).

In order to serve as a guide for the sorting of the lifts in accordance with their length it is desirable to indicate in some manner the length of each lift. In the embodiment of the invention illustrated in the drawings the length of the lifts is indicated by a series of vertical indicating pins 101 (Figs. 3 and 4) slidably mounted in suitably bored bosses 102 formed in the carrier 2. As each of the lifts is registered with the length-measuring station the pin 101 associated with the lift is brought directly beneath a plunger 103 slidably mounted in the frame 50. The shank of the plunger 103 is formed as a rack 104, which is engaged by a segment 105 formed on a lever 106, pivotally mounted on the frame 50. Intermediate its ends the lever 106 is connected, by an adjustable rod 107, to a lever 108 pivotally mounted on the frame 50. The other end of the lever 108 is provided with a yoke 109 (Fig. 2) which embraces a block 110 pivotally mounted between the arms of the yoke. The block 110 is slidably mounted in a slot 111 formed in a link 112 (Figs. 2 and 4) which is pivoted, at its upper end, on a pin 113 which passes through the slots in the arms of the yoke 56 and into the T-shaped head 54 of the rod 52. The block 110 normally lies in the upper end of the slot 111, but may also be engaged by the upper end of a screw 114, which is threaded in a lug 115 formed on the link 112 and is provided with a knurled head 116 by which it may be turned.

In order that the measuring devices may be adjusted to adapt the machine to operate upon heel-lifts of different lengths and sizes, the adjusting-screw 114 may be raised or lowered in the lug 115. This has the effect of providing more or less lost motion between the measuring fingers and the plunger 103 by which the indicator 101 is set. The larger the degree of such lost motion, the greater the inward movement of the measuring fingers necessary to cause the indicator to be set to a given position, so that by moving the screw 114 downwardly the machine is adjusted for the smaller sizes of heel-lifts and vice versa.

After the length of the lift has been measured and indicated, the fingers 48 are returned to their inoperative position by the release of the spring 63, and the plunger 66 is lowered. To prevent the lift from sticking on the hollow block 68 after the plunger 66 withdraws therefrom, a stripper is provided for returning the lift to its compartment in the lift carrier 2. This stripper is in the form of a plate 120 on the lower end of a rod 119. This rod slides vertically through perforations in the block 68, and the rod 52, and the plate 120 normally rest in a recess in the bottom of the block. The upper end of the rod 119 engages a cup 121 (Figs. 3, 4 and 5) formed on one end of an arm 122 pivotally mounted upon a rod 123 carried by the bracket 58. The stripper 120 is normally held up by a coiled spring 124 (Fig. 6) which is interposed between the bottom of the hollow rod 52 and a collar 125 carried by the rod 119. The rod 123 carries a lever 126 (Fig. 5) the hub of which is provided with a slot 127, so that the lever may have a limited sliding movement on the rod. One arm of the lever 126 is provided with a V-shaped nose 128 which is normally held in a groove 129, formed in the arm 122, by a coiled spring 130 secured to the lever 126 and the arm 122 respectively. The other arm of the lever 126 is arranged in the path of movement of a collar 132 adjustably mounted on the rod 92. When the rod 92 is moved downwardly to cause the fingers 48 to embrace the lift, the rounded surface on the collar 132 slides over the rounded end 131 of the lever 126, elevates the nose 128 out of the groove 129, and slides the lever 126 to the left (see Fig. 5) to permit the collar 132 to pass beneath the end 131 without actuating the stripper, after which the spring 130 returns the lever 126 to its original position (see Fig. 3). When the rod 92 is elevated to separate the fingers 48 from the lift the flat face on the collar 132 strikes the flat face on the bottom of the end 131, which causes the lever 126 and the arm 122 to move as one piece, thus actuating the stripper 120 and moving it downward to return the lift to its compartment.

After the lift has been returned to its compartment and the collar 132 has disengaged itself from the bell crank 126, the

spring 124 immediately returns the stripper 120 to its normal position (see Fig. 4) and the carrier 2 is again actuated to advance the lift from the length measuring station to the width measuring station indicated at 133 (Fig. 2). At this station the width of the heel-lift is measured by instrumentalities substantially the same as those at the length-measuring station, except that the measuring fingers are arranged to engage the lateral edges instead of the ends of the lift.

The width measuring fingers are actuated from a hollow cylindrical rod 134 (Fig. 7), with a T-shaped head, which is connected at its upper end to one end of a lever 135 pivoted upon a bracket 136 projecting from a yoke frame 137 carried by the cover plate 8. The other end of the lever 135 is provided with a perforated boss 138 which loosely embraces a rod 139 pivoted on the lever 61. The lever 135 is yieldingly connected to the lever 61 by a spring 140 coiled around the rod and loosely interposed between the lug 138 and a washer backed by adjusting and locking nuts similar in all respects to the washer 64 and nuts 65 on the rod 60, (Fig. 4). With this construction the width measuring fingers are actuated to measure the width of the lift located at the width measuring station simultaneously with the operation of the length-measuring fingers upon the lift located at the length measuring station.

In order to indicate the width as measured by the fingers 48 the upper T-shaped end of the cylindrical rod 134 carries a pin 141 (Fig. 7) upon which a depending link 142 (Figs. 2 and 7) is pivotally mounted. The lower end of the link 142 is provided with a lug 143 which carries a screw 144 threaded through the lug. The upper end of the screw 144 coöperates with a block 145 which is slidably mounted in a slot 146, formed in the link 142, and pivotally mounted between the arms of a yoke formed in a lever 147 pivoted on the frame 137. The other end of the lever 147 is connected, through an adjustable link 148, to a toothed segment 149 pivoted on the frame 137. The segment 149 meshes with a rack 150 formed on a vertical plunger 151 slidably mounted in the frame 137 and cover plate 8 and arranged directly over an indicating pin 152 (Figs. 3 and 4) slidably mounted in a suitably bored boss on the carrier 2. The indicator 152 is retained by a spring pressed plunger 153 (Fig. 4) arranged to engage the surface of the pin.

The width measuring station is also provided with a stripper, similar to the stripper 120, for returning the lift to its compartment after its width has been detected and indicated. This stripper is located at the bottom of a vertical rod 154 movable within the hollow rod 134, the uppper end of which is engaged by one end of an arm 155 pivoted on a rod 156 carried by the bracket 136. The rod 156 carries a lever 157 which is constructed and arranged similar to the lever 126, to permit the collar 132 on the rod 92 to pass beneath it without actuating the stripper, and to actuate the stripper when the collar 132 is returned to its original position.

After the length and width of a lift have been measured and indicated the lift is advanced to the first of a series of nine storage stations, shown more particularly in Figs. 1, 2 and 3. These stations are arranged in a circular series around the periphery of the cover plate 8, which is provided with a series of openings to permit the lifts to be forced upwardly from the compartments into a series of lift holders. As shown in Figs. 1 and 2 (see Station No. V) each lift holder consists of a plate 158 provided with a central lift shaped opening corresponding to the shape of the opening 18 in the cover plate 8 and the compartments in the carrier 2. The plate carries a series of vertical rods 159 arranged to hold the lifts in a stack, two of the rods engaging the breasts of the lifts, two the lateral edges of the lifts, and one the backs of the lifts. The plate 158 also carries four bent spring tongues 160 (Fig. 3) which permit the lifts to be forced up into the holders but prevent the lifts from dropping down out of the holders. The side edges of each plate 158 at the base of the holders are rabbeted to permit them to slide beneath shoulders formed on the side edges of triangular blocks 161 secured to the cover plate 8 between each pair of holders (see Fig. 2). This construction permits the ready removal and insertion of the lift holders. An adjustable pin 162 (Fig. 2) for each holder serves as a gage for positioning the holder on the machine.

The lifts are transferred from the compartments in the carrier 2 to the lift holders by a selecting mechanism comprising a series of plungers 163 (Fig. 3) carried by the plate 7, each plunger being located directly beneath a lift-holder. The plungers 163 work through the openings 67 in the lift carrying compartments to engage the face of the lifts and force them upwardly between the springs 160 and into the holders (see Fig. 3). Each plunger is mounted for reciprocation in the plate 7 and its lower end is connected, through a link 164, to a yoke lever 165 (Figs. 3, 11, 16), the arms of which are pivoted on a rod 166 carried by a bracket 167 depending from the plate 7. The arms of the yoke lever loosely embrace one end of a lever 168 pivoted on the rod 166. The other end of the lever 168 is formed as a rounded head 169 (Fig. 16) engaged in the annular groove 75 on the actua-

tor 76. The plunger is maintained normally depressed by a spring 170 (Fig. 3) mounted in a chamber in the plunger and interposed between a pin 171, carried by the plate 7 and passed through a slot 172 in the plunger, and a plug 173 threaded into the lower end of the chamber. As the carrier 2 rotates the nine levers 168 are rocked on the bracket 167 each time that the actuator 76 is depressed, but as the arms of the yoke levers 165 loosely embrace the levers 168 the plungers 163 are normally not actuated to force the lifts from the carrier into the holders.

In order to sort the lifts in accordance with their length and width, the operation of the plunger is controlled by the indicators 101 and 152 so that each lift is deposited only in its appropriate holder. To this end the plate 7 carries a series of levers 174 (Figs. 2, 3, 8, 9 and 10) pivoted on a series of vertical pins 175 carried by the plate. The end of each of the levers 174 is formed as a cam 176 which engages a roll 177 carried on the upper end of a lever 178, (Fig. 3) pivoted on the bracket 167. (Figs. 3 and 16). A spring 179 located in a chamber 180 formed in the bracket 167, and arranged to engage the lever 178, serves to hold the roll 177 pressed against the cam 176, the construction being such that the roll 177 is normally engaged with the low portion of the cam. The lower end of the lever 178 is formed as a yoke 181, the arms of which embrace the arms of the yoke lever 165. The arms of the yoke 181 carry a pin 182 upon which is mounted a block 183 arranged to be reciprocated in parallel slots 184 formed in the arms of the yoke lever 165. Associated with each lever 174 is an arm 185 (Figs. 9 and 10) which is pivoted on the same pin 175 and provided with a lug 188 arranged in the path of the indicator-pins 152. Each of the arms 185 is provided with a dog 189 (Fig. 10) which is normally held against a lug 190, formed on the arm 174, by a coiled spring 191 secured respectively to the dog and arm. Each of the arms 187 is normally held against a stop pin 192, carried by the plate 7, by a spring 193 coiled about the pin 175 and connected respectively to the pin 175 and arm 187. The arm 187 is provided with a cam 194 arranged to engage a horizontal pin 195 slidably mounted in the lug 186 and another lug 196 formed on the arm 185. The pin 195 is normally held pressed against a low portion of the cam 194 by a spring 197 coiled about the pin and interposed between the lug 186 and a collar 198 secured to the pin.

The lugs 186 and 188, which coöperate with the indicator-pins 101 and 152, respectively, are of different heights in the different selectors, so that they will be engaged by the indicator-pins only when these pins have been so set as to indicate the presence, in the corresponding receptacle, of a heel-lift having the length and width for which the particular selector is designed to operate. The construction of the selector-mechanism is such that it is responsive only to the joint operation of the indicator-pins 101 and 152. If, for example, the lug 186 is engaged by the pin 101, the arm 185 will be swung in a clockwise direction, but if the lug 188 is not also engaged at the same time by the pin 152, the swinging movement of the arm will be idle. On the other hand, if the lug 188 alone is engaged, this will cause a swinging movement of the arm 187, through which the cam 194 advances the pin 195 into position to coöperate with the lug 190, but since the arm 185 remains idle, no movement will be imparted to the lever 174. But if both lugs are engaged, the pin 195 will lock the arm 185 to the lever 174 and the movement of the arm 185 will be transmitted to the lever, which causes the cam surface 176 to force the roll 177 on the lever 178 outward and the yoked end of the said lever inward. This movement of the lever 178 reciprocates the block 183 in the slots 184 and places it upon a ledge 198 (Fig. 11) formed on the outer end of the lever 168. The plunger 163 is by this means operatively connected to the lever 168, so that when the actuator 76 is depressed the plunger 163 is advanced through the opening 67 in the compartment, and the lift is deposited in the holder. During the actuation of the plunger 163 the pin 182 travels in slots 199, formed in the yoke 181, which are struck about the pivotal axis of the lever 168 as a center. It will be obvious that with the construction and arrangement described lifts may be stored simultaneously at any two or more of the storage stations. The selectors may be arranged to select heel-lifts of any desired combinations of length and width. The necessary combinations are in practice determined, however, by the fact that the lifts are made by the use of a series of dies of standard sizes and that the irregular variations in length and width due to shrinkage of the lifts after they have been died out occur within comparatively small ranges determined by these standard sizes. The nine storage stations with which the machine as illustrated is provided, provide for a sufficient number of variations within any one of these ranges, and the storage stations are preferably divided into sets containing several stations, those of one set being designed for heel-lifts of the same width, but several different lengths. Thus, for example, four of the stations may be designed to receive lifts of a standard width but different lengths,

while the remaining stations may be designed to receive lifts of standard length, but different widths.

In order to reset the pins 101 and 152 after they have operatively connected a selector to the actuator, each bracket 167 carries a vertical rod 200 (Figs. 3 and 16) which operates through a hole 200^a formed in the plate 7. The rod 200 carries a horizontal pin 201 which projects through and is movable in a vertical slot formed in the bracket 167. The projecting end of the pin 201 is embraced by the forked end of an arm 202 projecting from one end of a rock shaft 203 journaled in the bracket 167. A second arm 204 projecting from the rock shaft 203 is connected through a link 205, to the longer arm of the lever 165. (Figs. 11 and 16.) Through the connections described the rod 200 is projected through the hole 200^a in the plate 7 when the arm 174 has been turned about its pivot which movement exposes the hole and operatively connects the selector to the actuator. When the rod 200 is projected through the hole it raises the indicator 101 out of range of the succeeding lugs 186.

In order to elevate the pin 152 the bracket 167 carries a vertical rod 206 which operates through a hole 207 formed in the plate 7 (Figs. 3 and 16). The rod 206 carries a horizontal pin 208 which projects through and is movable in a vertical slot formed in a depending plate 208^a on the base plate of the bracket 167. The projecting end of the pin is embraced by a forked end of a lever 209 pivoted on the bracket 167. The lever 209 is connected, through a link 210, to a third arm 211 projecting from the rock shaft 203. Through the connections described the rod 206 is actuated through the hole 207 in the plate 7 to elevate the pin 152 out of range of the succeeding lugs 188 simultaneously with the elevation of the pin 101.

In order to drive the machine from some suitable source of power, the cam shaft 36 carries a spur gear 212 (Fig. 12) which meshes with a similar gear 213 secured to one end of a short shaft 214 journaled in a bracket 215 carried by the base plate 22. A bevel gear 216 secured to the other end of the shaft 214 meshes with a bevel gear 217 secured to the lower end of a vertical shaft 218 journaled at one end in the bracket 215 and at its other end in a bracket 219 (Fig. 2) secured to the cover plate 8. The shaft 218 is driven from a shaft 220 (Fig. 2) journaled in the bracket 219, through bevel gears 221 secured to the ends of the shafts 218 and 220. The shaft 220 carries a bevel gear 222 which meshes with a bevel gear 223 carried by one end of a short shaft 224 (Fig. 2) journaled in bearings formed in a bracket 225 bolted to the cover plate 8. The shaft 224 carries a worm gear 226 which is driven by a worm 227 on a driving shaft 228 (Fig. 1) journaled in bearings formed on the bracket 225 and provided with fast and loose pulleys 229 and 230 (Fig. 2).

The operation of the various individual mechanisms has already been described and it remains merely to indicate the sequence in which the various controlling cams come into action. As described, the cam shaft 36 is driven continuously from the belt pulley 229 through the vertical shaft 218, its connecting bevel gears and the spur gears 212 and 213. After a lift has been placed on the carrier 2 through the opening 18 (Fig. 2) of the cover plate, *i. e.*, at the loading station, the cam 35 (Fig. 12) operates to release the locking rack 25 from the gear 23 and immediately the cam 46 (Fig. 12) operates to reciprocate the feeding rack 24 in a direction to rotate the carrier 2 and bring the lift to the length-measuring station. The carrier is then again locked against movement. On arriving at the length-measuring station the cam 86 (Fig. 12) operates the plunger 66 to place the lift in position to be operated upon by the fingers 48. As soon as it is positioned the lift is engaged by the fingers which are actuated at this time from the cam 100 (Fig. 12). This sets an indicating pin 101 (see Fig. 3). The cam 100 now retracts the fingers 48, the plunger 66 retreats and the stripper 120 returns the lift to the carrier 2. The cams 35 and 46 now operate to actuate the carrier and feed the lift forward to the width-measuring station (see Fig. 2) where the operations of the cams 86 and 100 are repeated setting an indicating pin 152 (see Figs. 3 and 7). In the meantime another lift has been fed into the machine at the loading station and is having its length determined and indicated while the preceding lift is having its width determined and indicated. The position to which the pins 101 and 152 for a particular lift, have been set controls the ultimate destination of such lift, in the manner hereinbefore described, the lift stackers 163 being operated simultaneously with the lift positioning plunger by the cam 86. It is thus seen that so long as the loading station is kept supplied, lifts are continually being stored in their proper holders.

In the following claims the term "lift" is not to be understood as limiting the scope of the claims, to a machine for operating on heel lifts alone, as it will be apparent to those skilled in the art that a machine having the features and combinations of parts hereinbefore described is well adapted to successfully operate on other articles which it is desired to sort in accordance with two dimensions at an angle to each other.

It will be apparent to those skilled in this class of machines and with the general ob-

jects of the present invention in view, that changes may be made in the details of structure, the described and illustrated embodiment thereof being intended as an exploitation of its underlying essentials, the features of which are definitely stated in their true scope in the claims herewith.

What is claimed as new is:—

1. A sorting-machine having, in combination, means for making a plurality of corresponding measurements on each of a series of articles; and means for dividing the articles so measured into groups, each containing only articles having substantially like corresponding measurements.

2. A sorting-machine having, in combination, means for making a plurality of corresponding measurements on each of a quantity of pieces of sheet-material, in directions at an angle to each other in the plane of the piece; and means for dividing the pieces so measured into groups each containing only pieces having substantially like corresponding measurements.

3. A sorting-machine having, in combination, means for measuring the length and the width of each of a series of heel-lifts; and means for dividing the lifts so measured into a series of grades each containing only lifts substantially equal to each other in both length and width.

4. A sorting-machine having, in combination, means for making two different measurements of each of a quantity of articles; a plurality of sets of receptacles for the articles; and means, for sorting the articles into said receptacles, constructed and arranged to distribute the articles among the sets of receptacles in accordance with one of said measurements, and among the individual receptacles of each set in accordance with the other of said measurements, so that articles equal as to one measurement only are received in different receptacles, while each receptacle contains only articles equal as to both measurements.

5. A sorting-machine having, in combination, a measuring device; a carrier adapted to support a series of articles to be measured; means for advancing the carrier step-by-step; means for elevating each article on the carrier into position for operation by the measuring device, and for restoring the article to the carrier, during a dwell in the movement of the carrier; and means for discharging the measured articles from the carrier at different points in accordance with their measurements.

6. A sorting-machine having, in combination, a plurality of measuring-devices for making a plurality of measurements on each of the articles to be sorted; an indicator, associated with each measuring-device, for indicating the measurement ascertained thereby; and a selector adapted, under the control of the indicators, to select articles having certain predetermined dimensions, the selector being responsive only to the joint action of indicators set by each of the measuring-devices, so as to select only articles which are similar to each other in all of the said dimensions.

7. A sorting-machine having, in combination, a rotary carrier provided with a series of receptacles in which flat articles are supported upon their faces; means for rotating the carrier intermittently; measuring means located adjacent to the carrier and comprising devices for measuring the articles by engagement with their opposite edges; means for moving each article, during a dwell in the movement of the carrier, from the receptacle in which it is supported into a parallel position removed from the carrier and interposed between the measuring-devices, and for thereafter restoring the article to the carrier; and means for removing the articles from the carrier and sorting them in accordance with the measurement so made.

8. A sorting-machine having, in combination, a rotary carrier provided with a series of receptacles in which articles to be sorted may be supported; means for rotating the carrier; a plurality of measuring devices, operable upon the articles supported by the carrier, for making measurements on each article; a plurality of indicators associated with each receptacle and supported by the carrier, said indicators being arranged to coöperate with said measuring-devices respectively and to be set thereby in accordance with the measurements of the article in the corresponding receptacle; and a series of selectors, for discharging the articles from the carrier at different points, each selector being responsive only to the joint action of the indicators associated with one or another of the receptacles, and the several selectors being responsive to differently-set indicators.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

Correction in Letters ..... No. 1,234,434.

It is hereby certified that in Letters Patent No. 1,234,434, granted July 24, 1917, upon the application of Erastus E. Winkley, of Lynn, Massachusetts, for an improvement in "Machines for Sorting Heel-Lifts," an error appears in the printed specification requiring correction as follows: Page 6, line 42, after the word "provided" insert the following words and reference-numerals: *with a lug 186 arranged in the path of the indicator-pins 101. Associated with each arm 185 is an arm 187 pivoted on the same pin 175 and provided;* and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 4th day of September, A. D., 1917.

[SEAL.]

R. F. WHITEHEAD,

Acting Commissioner of Patents.

Cl. 83—92.