

June 12, 1928.

1,672,882

C. H. DUDLEY

CALCULATING MACHINE

Filed Feb. 20, 1925

5 Sheets-Sheet 1

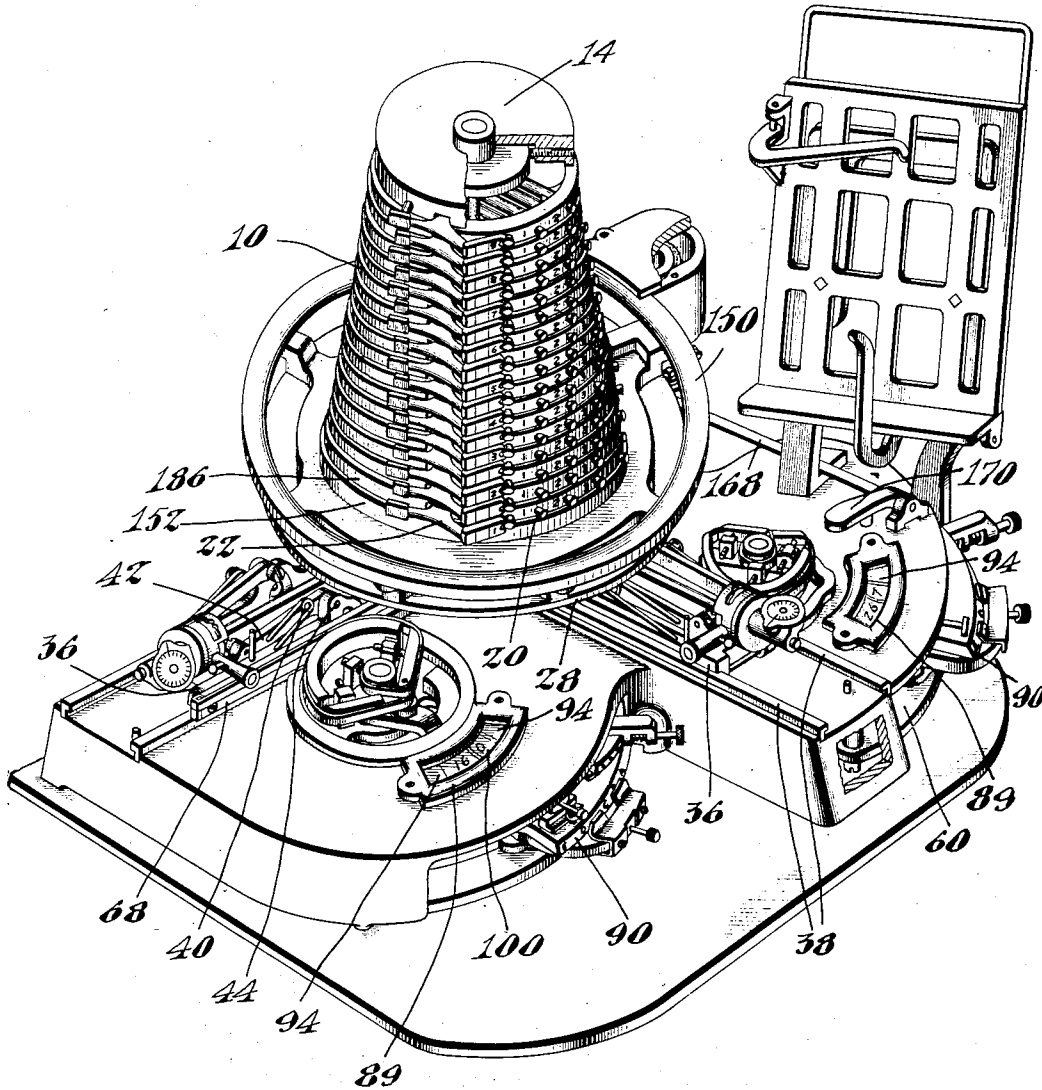


Fig.1.

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5 Sheets-Sheet 2

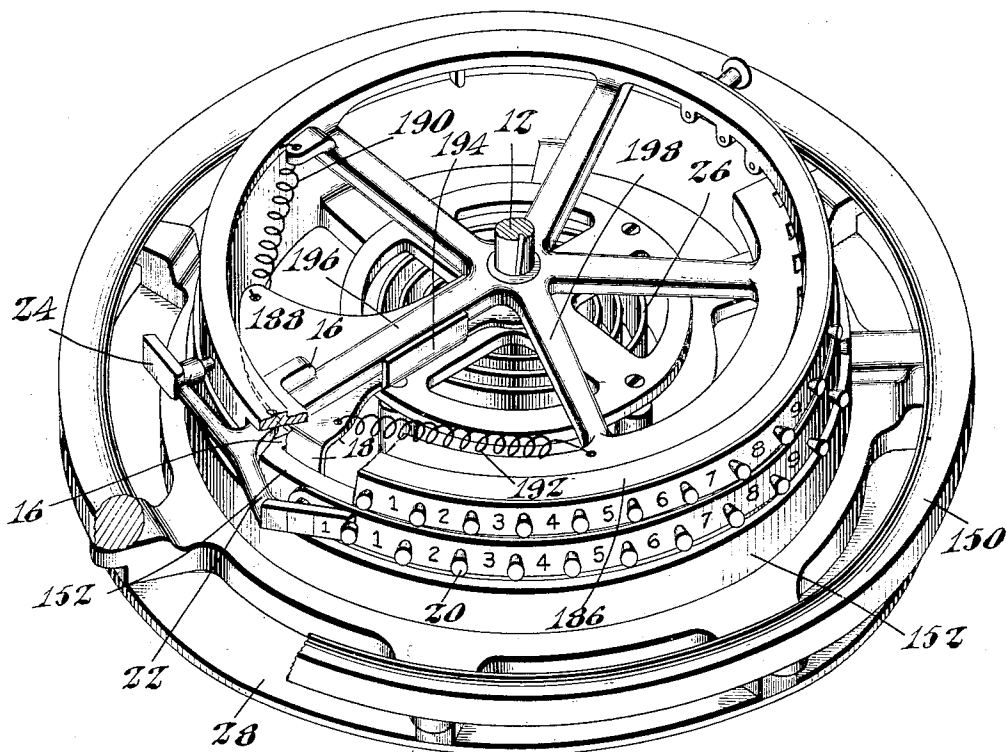


Fig. 2.

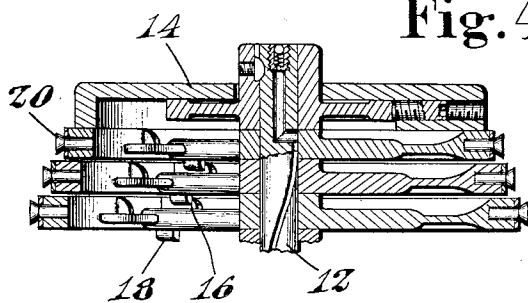
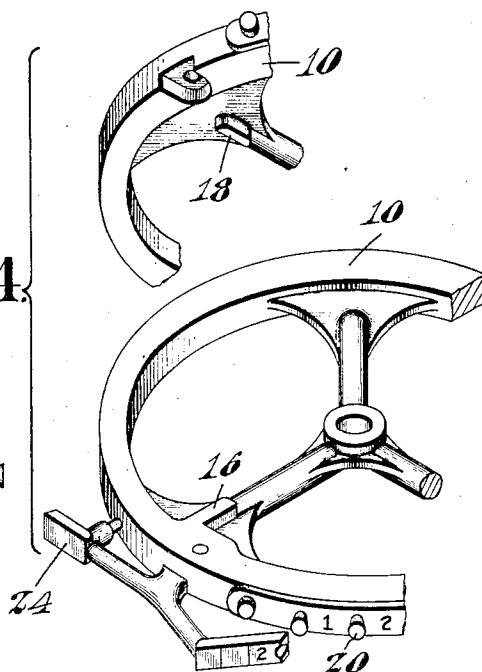


Fig. 3.

Fig. 4.



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5 Sheets-Sheet 3

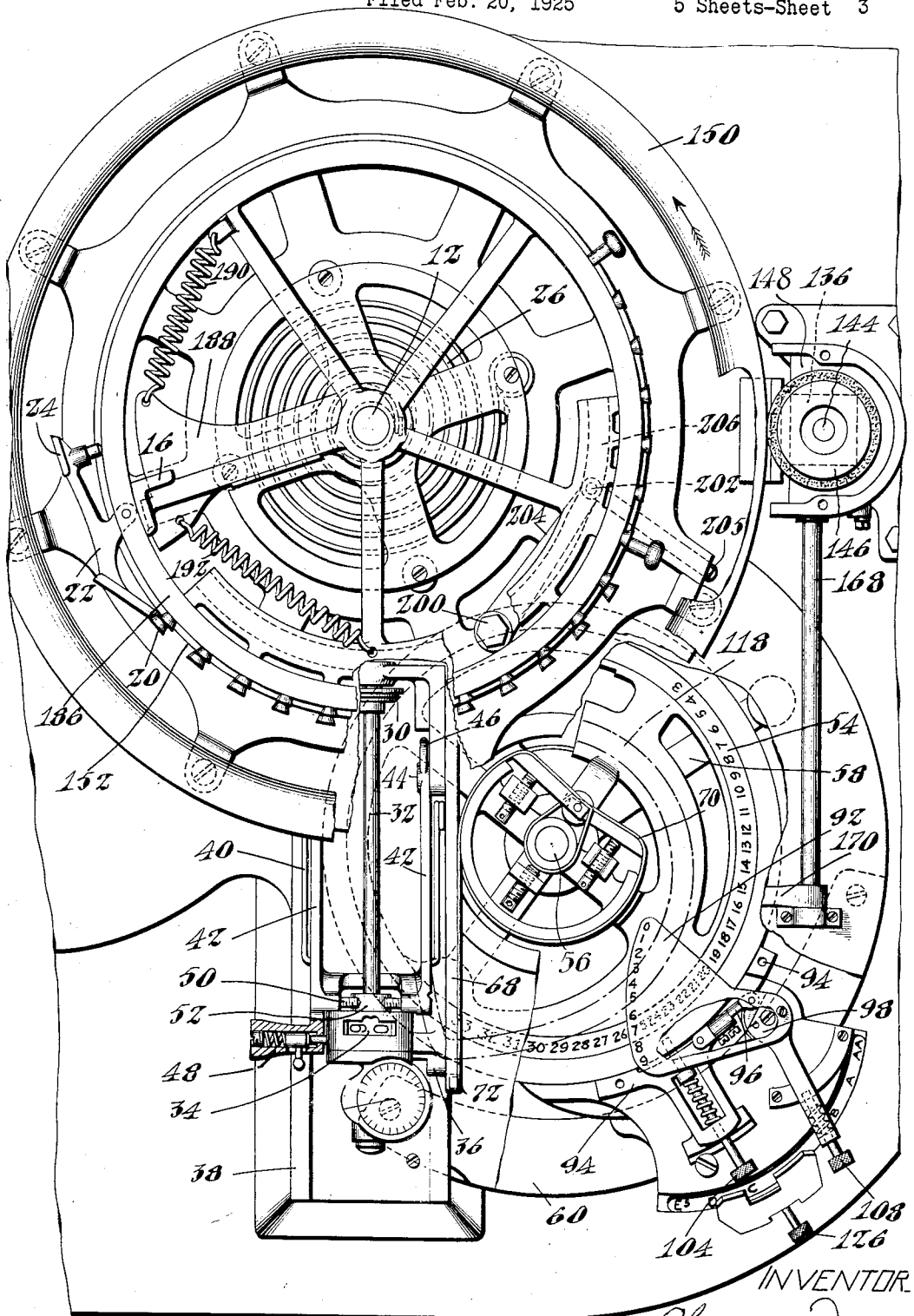


Fig. 5.

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CALCULATING MACHINE

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5 Sheets-Sheet 4

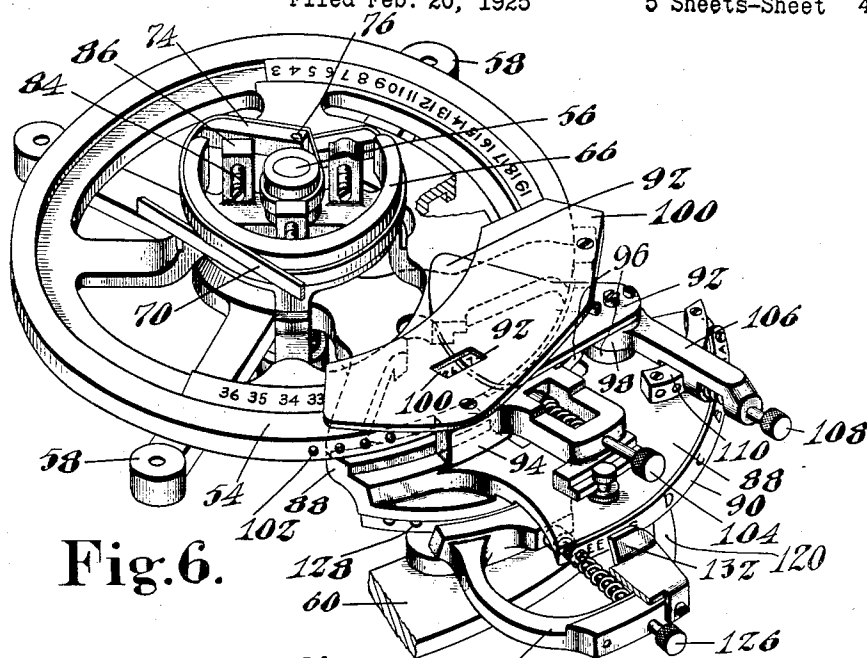


Fig.6.

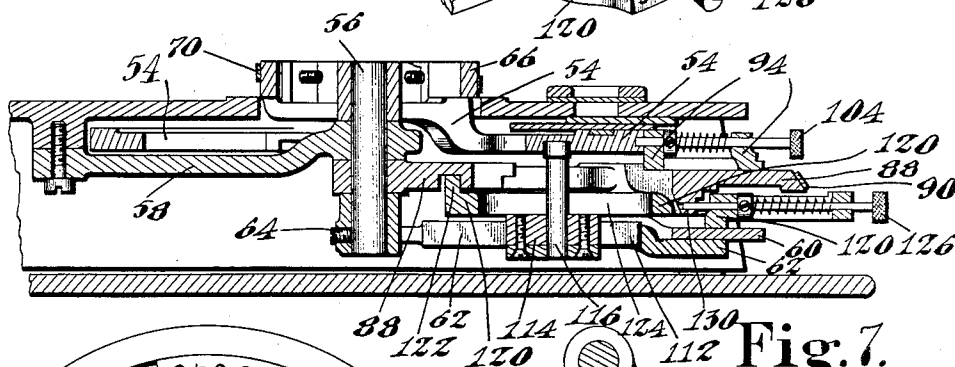


Fig. 7.

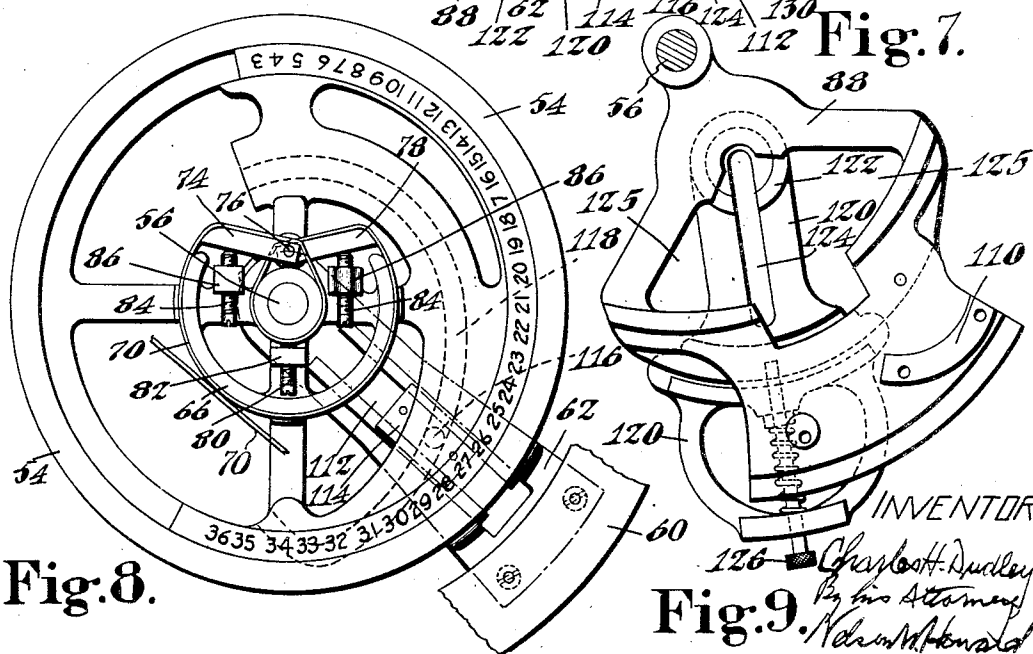


Fig.8.

Fig.9

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CALCULATING MACHINE

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5 Sheets-Sheet 5

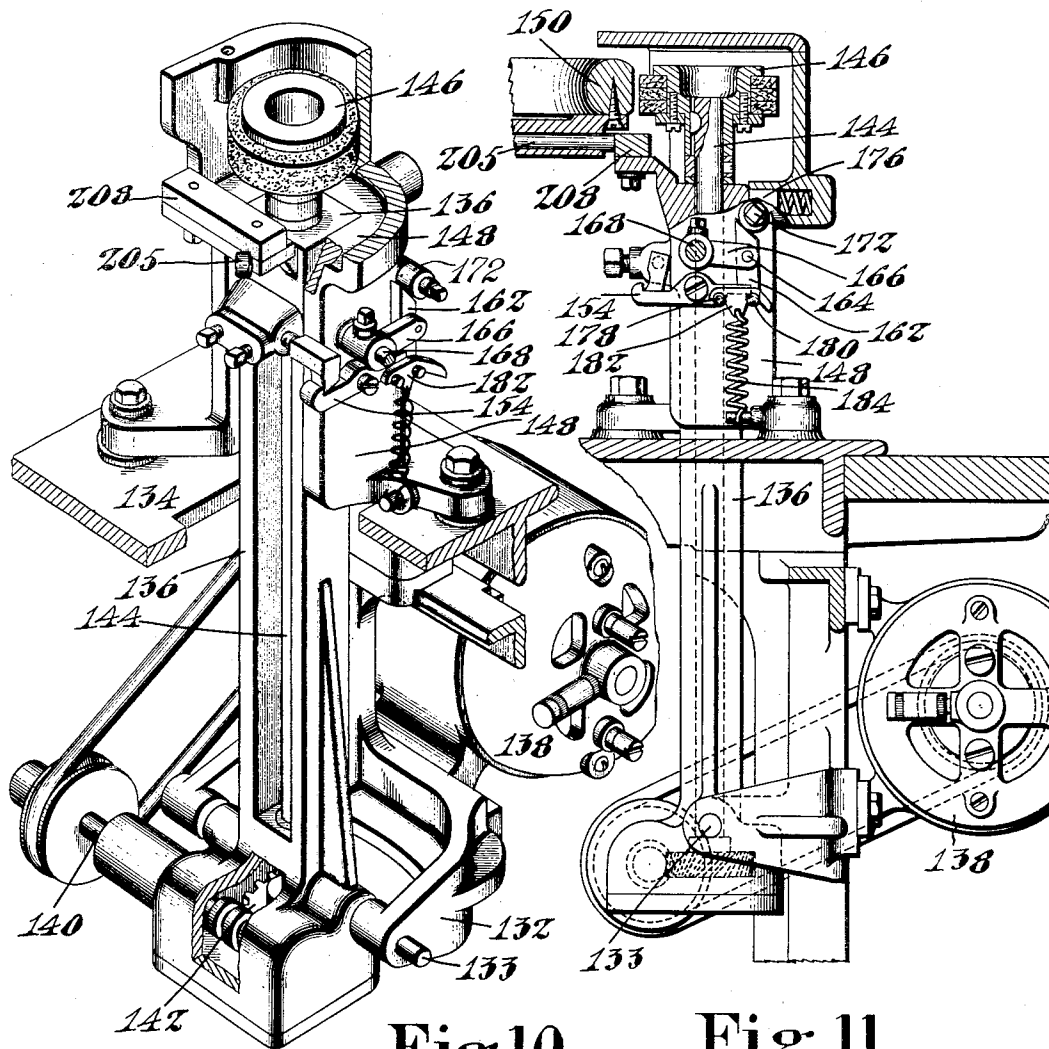


Fig.10.

Fig. 11.

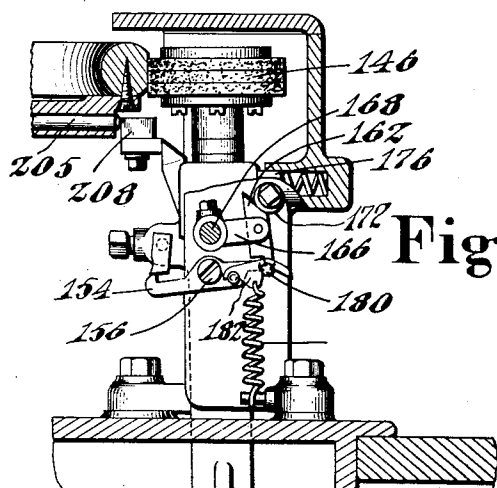


Fig.12.

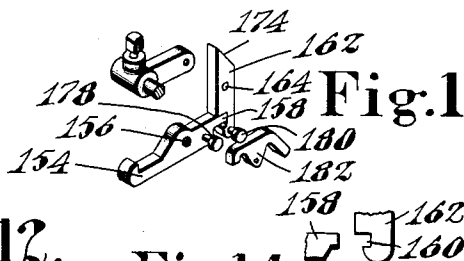


Fig14.

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UNITED STATES PATENT OFFICE.

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CALCULATING MACHINE.

Application filed February 20, 1925. Serial No. 10,630.

This invention relates to calculating machines and is illustrated as embodied in a machine of the type shown, for example, in United States Letters Patent No. 1,212,231, granted Jan. 16, 1917, on application of Paul F. W. C. Krippendorf for calculating the areas of lots of shoe upper parts.

Machines of this type comprise a series of concentric pivoted disks so connected that the terminal disk of the series registers the total movement of all in effecting a desired registration. The disks are also so connected that each drives the next so that the machine is set back to a zero position by manually turning the terminal disk backward through the distance it has traveled in effecting the registration.

In view of the foregoing, it is an object of the present invention to provide improved mechanism applicable to a machine of the type referred to by means of which the time and labor necessary to reset the machine after a registering or similar operation will be minimized. To this end, the invention provides a power operated driving mechanism for a member such as a registering member to restore it to its zero position which is automatically rendered inoperative after the zero position has been reached preferably through an over-throwing movement between the above-mentioned registering member and an adjacent member. Conveniently, and in the disclosed machine, a plunger is provided, operated preferably by a cam, to effect the disconnection of the power drive from the registering member. As disclosed, the cam and plunger are mounted one in each of two adjacent members, and the cam is caused to move relatively to the plunger to move it by the over-throwing movement.

In accordance with another feature of the invention, as herein exemplified, the power driving member is resiliently and pivotally mounted for engagement and disengagement with the registering member, and a latch is provided, releasable by the operator, to effect the engagement and the means for automatically disconnecting the power driving

member from the registering member effects a relatching of the power driving member out of engagement with the registering member.

These and other features of the invention comprising certain combinations and arrangements of parts will be understood from the following description of a preferred embodiment thereof selected for purposes of illustration and shown in the accompanying drawings, in which,

Fig. 1 is a perspective view of the machine;

Fig. 2 is a detail of the two terminal registering disks;

Fig. 3 is a cross-section illustrating the driving relations of the disks;

Fig. 4 is a detail illustrating the same thing;

Fig. 5 is an assembly plan view of the setting mechanism;

Fig. 6 is a perspective of part of the mechanism shown in Fig. 5;

Fig. 7 is a cross-section of the parts shown in Fig. 6;

Fig. 8 is a detail of the setting wheel;

Fig. 9 is an enlarged detail of the setting mechanism for varying widths;

Fig. 10 is a perspective of the power drive;

Fig. 11 is an elevation of the same;

Fig. 12 is another elevation showing the drive in operating position;

Fig. 13 is a detail of the latch; and

Fig. 14 is a detail of two of the latching members.

The machine comprises a series of indicator or registration wheels or disks mounted on a central axis under a cap plate. The wheels increase progressively in size from top to bottom, and are numbered in order to correspond with the sizes and half sizes of shoes. Each wheel (Figs. 2, 3 and 4) has a lug on its top surface and (except the lower wheel) a lug on its bottom surface. The lugs on each two adjacent wheels interfere so as to limit relative movement of a lower wheel counter-clockwise on an upper one. The upper lug on the upper wheel engages a lug (not shown) under the

cap plate 14, in the same way. It is clear that if the lower wheel be rotated counter-clockwise, it will pick up all the others in turn and wind up the series until the upper wheel locks against the cap plate, when no further movement will be possible.

Each wheel has on its periphery a series of pins 20, which are equally peripherally spaced on all the wheels. Each wheel is normally locked against clockwise rotation relatively to the wheel above by a lever 22 mounted on the upper wheel and engaging a pin 20 on the lower. This lever can be raised by a spring-pressed finger piece 24 to release the pin and permit relative clockwise rotation of the lower wheel. A heavy coil spring 26 is attached to the axis 12 and to the lower wheel and tends to turn it clockwise. The levers 22 all being in position, and the machine wound up, as described, the spring will set all the left-hand pins 20 against the levers and release the lugs 16, 18, slightly from one another.

The lower wheel has a smooth disk-shaped bottom 28 which runs on a wheel 30 on a spindle 32. The wheel 30 will then measure by its rotation the total movement of the lower wheel from a zero position. The pins 20 are spaced peripherally equally around the wheels, and the diameters of the wheels are so related to the areas of similar shoe pieces of successive half sizes that the slipping of a lever 22 from one pin to the next will permit angular rotation of the corresponding wheel and all the wheels below it under the spring pull, down to the disk 28, proportioned to the area of that upper piece of the size corresponding to the wheel. The wheel corresponding to the largest size 9 is at the top, since a certain peripheral movement of a smaller wheel will cause a greater angular movement of that wheel and consequently a greater movement of the counter wheel 30.

An order for a lot of vamps, for example, is set up by slipping past the corresponding lever a number of pins on each wheel corresponding to the number of pairs required of the size corresponding to each wheel. The bottom disk 28 will add all the rotations corresponding to the items of the order and the result will be indicated on a dial 34 operated by the shaft 32.

In order to make the readings of the dial show the actual areas involved, irrespective of the style and shoe part being considered, the wheel 30 is set in or out radially relatively to the axis 12 of the disk 28, the setting depending upon the areal characteristics of the shoe part under consideration. For example, the vamps and quarters corresponding to a certain order will have different total areas, and different settings of the wheel 30 are necessary for them. The total area required is, however, for any type of

shoe part, always dependent in the same way upon the number of pairs and sizes desired, so that with the proper setting of the wheel 30, the areas corresponding to varying case lots of the same shoe part can be obtained accurately by suitable manipulation of the pins and levers and wheels corresponding to the size and pair data of the lots. In other words, the areas of a set of similar shoe parts (vamps, quarters, or the like) throughout the range of sizes are always proportional to the same set of numbers, irrespective of style or type of shoe part, and these numbers are proportional to the diameters of the wheels 10.

The shaft 32 is mounted in a carriage 36 which slides along ways 38 on the machine frame. The carriage is so constructed that the inner end of it carrying the wheel 30 can be lifted slightly from the ways without losing the guiding relation, to bring the wheel 30 against the disk 28, and when it drops to the ways 38 it is out of contact with the disk and may be adjusted along the disk without rubbing or damage. A grasshopper spring 40 engages the carriage 36 and a lever 42 pivoted at 44 on the carriage has a down-turned terminal foot 46 (Fig. 5) which rests on the way 38. The lifting of the outer end of the lever by the spring 40 thus lifts the inner end of the carriage 36 and wheel 30. Depression of the lever by the operator drops the carriage. The lever can be held down by the latch 48 which engages the carriage 36. The lever 42 carries two studs 50 which engage an inverted V-shaped protuberance 52 on the shaft 32 when the lever is depressed. The centering of this protuberance by the studs sets the indicator 34 on the shaft 32 to zero in case there has been any lost motion or slipping in the last use of the machine, or in setting it back to the zero position, in which the levers 22 all engage the left hand pins 20.

The setting mechanism for the wheel 30 will now be described. This mechanism comprises a graduated wheel 54 mounted to turn on a fixed stud 56 and connected by a metal band to the carriage 36 so that any movement of rotation imparted to the wheel 54 causes directly and positively a longitudinal movement of the carriage 36 upon its ways. The construction is as follows:—

As shown, (Figs. 6 and 7) brackets 58 and 60 are rigidly secured to the frame work or base of the machine, and the latter is also rigidly connected to a radially disposed brace member 62 carrying the stud 56 which is held therein by a set screw 64. The stud 56 projects upwardly through the bracket 58 and upon this stud the graduated wheel 54 is mounted to rotate. The wheel 54 is skeletonized as shown in the drawings, and carries rigid therewith a segment 66. The carriage 36 has pivotally connected there-

with at its outer end a bar 68 sliding upon the way 38 and, consequently, moving longitudinally with the carriage but not partaking of the tilting movement of the carriage. This bar 68 is of substantially the same length as the segment 66. A metal band 70, preferably in one continuous piece as shown, is attached at one end 72 to the bar 68, passes thence along the segment 66, along the bar 74 pivoted at 76 to the wheel 54, thence around the hub of the wheel, along a second bar 78, pivoted at 76, thence along the segment 66 beneath the end 72 to the opposite end of the bar 68 where it is made fast. A set screw 80 carried by a projection 82 bears against the center of the band and secures it to the hub of the wheel, while other set screws 84 carried by the projections 86 bear against the pivoted arms 74 and 78, thus tightening the band and enabling a very delicate adjustment of the longitudinal position of the carriage 36 with respect to the wheel 54 to be made.

The wheel 54 is provided on its upper face and near its periphery with a series of graduations shown in that part of the apparatus now being described as running from 3 to 36; these numbers referring to the number of square feet required to cut 100 pairs of a shoe part of the model size, a number found by experiment on that part. These graduations appear through an opening 89 in the base of the machine, as shown in Fig. 1. When the number 16 appears in the opening 89, the wheel 54 will have moved the carriage 36 and wheel 30 so that 100 pairs of the model size of that part, when turned out by the proper wheel 10, will run up 16 square feet on the dial 34.

A radial plate 88 is mounted to pivot or swing about the stud 56, but for the present will be regarded as fixed on the machine, and it carries at its forward edge a scale 90 which, in the case of an apparatus such as that illustrated for use in connection with shoe parts, bears the designations of the different shoe widths and, as shown, running from AA to EE, the use of which will be described below. A fractional scale plate 92, graduated from 1 to 9, is connected to a segmental plate 94 by a metal band 96 attached at its ends to the segmental plate 94 and passing around the hub 98 of the plate 92. There is also similar provision for the adjustment of the band to that described for the band 70. The segmental plate 94 rests and slides upon the radial plate 88 in a circular guide, and it carries rigidly connected therewith by the pins 55 a thin plate 100 containing an aperture of just sufficient size to allow the figures appearing upon the wheel 54 and fractional scale 92 to appear therethrough and indicate the desired reading. The plate 100 partakes,

therefore, of any movement given to the segmental plate 94 but the aperture 89 in the base is made sufficiently large so that whatever position the segmental plate 94 may take the reading through the aperture in the plate 100 will always be visible.

The wheel 54 is provided on its periphery with a series of holes 102 spaced to correspond with the numbers appearing on the face of the wheel and the segmental plate 94 carries a spring-pressed plunger 104 which locks the wheel and segmental plate together by entering one of the said holes 102. It will thus be seen that by withdrawing the plunger 104 the carriage 36 is left free to be slid longitudinally until, through its connection with the wheel 54, the desired figure on the wheel 54 appears through the aperture 100 when the plunger is allowed to spring in and lock the wheel 54 to the segmental plate 94. The fractional movement of the wheel 54 is secured by swinging the fractional scale plate 92 about its hub and thus through the metal band 96, moving relatively to the radial plate 88 the segmental plate 94 which is now rigidly connected to the wheel 54 by the plunger 104, and the fractional amount moved is indicated by the figure on the fractional scale plate 92 appearing in the aperture 100. A change of 1 unit on the plate 92 will turn the wheel $54\frac{1}{16}$ of a unit. A projecting arm 106 on the hub 98 carries a spring-pressed plunger 108 adapted to enter one of a series of holes in the periphery of the segment block 110 fastened to the radial plate 88. The holes in the periphery of the segment block 110 correspond with the graduations on the scale plate 92 and in the construction illustrated represent tenth parts of the graduations on the wheel 54.

So far nothing has been said about varying widths of the shoe parts whose areas are being determined. The description so far has been of a machine for determining the areas of a lot of shoe parts of the model width only, all the constants of the machine having been computed on that basis. Now the standard figure (read on the wheel 54) for 100 pairs of shoe parts is determined experimentally from the model size and width, and it is necessary, for the same reading in the aperture 89, to secure different settings of the wheel 54 for the different widths. This is accomplished by moving the radial plate 88, which has heretofore been regarded as fixed, and is connected to the wheel 54 through the parts 110, 108, 106, 98, 96, 94, 104, 102 in order. The mechanism for shifting this whole system for widths will now be described.

The brace member 62 is slotted radially from the axis 56 as indicated at 112, and a

block 114 is mounted to slide in said slot and carries rigidly connected therewith and extending vertically upward a post 116 entering a cam groove 118 in the lower face of the wheel 54. This cam groove extends in a course progressively diverging from the axis of the wheel 54. An auxiliary radial plate 120 slides at its forward end upon the bracket 60 and is pivoted between the said bracket and the stud 56 to the radial plate 88 by means of an annular flange 122 (Fig. 9) extending into a corresponding annular groove in the plate 88. This auxiliary radial plate 120 has formed therein a radial slot 124 through which the post 116 passes and which fits the post, while the radial plate 88 is entirely cut away in the vicinity of the post 116 as shown at 125 so as not to contact therewith at any time. The plate 88 rests near its forward end upon the plate 120 and the two are secured together by a spring-pressed plunger 126 (Fig. 9) sliding in the plate 120 and entering one of a series of holes 128 (Fig. 6) in the depending segmental flange 130 of the plate 88.

Any relative adjustment of the plates 88 and 120 by the plunger 126 turns the plate 88 bodily about the axis 56, because of the fixed location of the post 116 in the slot 124, and the holes 128 are so spaced that by moving the plunger 126 from one to the next, as indicated by the pointer 132 on the plate 120 and the scale 90 on the plate 88, the wheel 54 will be shifted with the plate 88 just enough to compensate for the percentage excess in area of shoe parts of one width over those of another. The cam groove 118 is so formed as to effect the proper compensation for the particular standard number appearing in the aperture 79 by a proper adjustment of the post 116 along the slot 112.

In using the machine the operator will set up in the aperture 89-100 the standard number, found by experiment, representing the area of 100 pairs of the shoe part he is interested in, of model size and width by means of the plungers 104 and 108, and will put the plunger 126 into the desired hole 128. He will then run off on the wheels 10 the number of pairs of the size corresponding to each wheel by letting that number of pins slip by the corresponding locking lever. The disk 28 turns under the tension of the spring 26, with the release of each lever, and the total area adds up on the wheel 34 and is registered.

Prior to the present invention the operator has been obliged to wind the machine up again against the spring 26 by hand to set it back to zero. Automatic mechanical means for effecting this operation will now be described.

Pivoted at 133 to a bracket 132 on the main frame 134 is a vertical standard 136.

A motor 138 is mounted on the bracket 132 and is belted to a shaft 140 which drives, by worm gearing 142, a shaft 144 in the standard 136, and on the upper end of this shaft is mounted a friction wheel 146 faced, in the illustrated machine, with a well-known composition material known in the trade as "Uskide". The standard 136 fits slidably in a housing 148 and can swing in and out of the housing on its pivot 133. When it swings out the wheel 146 will run against the rim 150 of the lower wheel of the series 10, numbered 152 on the drawing. The friction wheel 146 will then wind up the wheels 10 and spring 26 automatically.

The standard 136 is latched against swinging out by a latch 154 (Figs. 10-14) pivotally mounted on the housing 148 at 156, and having a backwardly extending tail 158 which normally rests in a notch 160 in a dog 162 pivoted at 164 to an arm 166 fast on a rockshaft 168 which may be rocked by a finger lever 170 (Figs. 1 and 5). When so rocked it lifts the dog 162 against the stud 172 which contacts with a beveled surface 174 (Fig. 13) on its upper end. This operation lifts the tail 158 of the latch 154 and unhooks it from the standard, which is then pushed out by a spring plunger 176 and the dog 162 also rotates sufficiently to unhook itself from the tail 158 just after the unlatching. Pins 178, 180 mounted on the latch 154 and the dog 162 carry a little double hook 182 pulled down by a spring 184. This double hook pulls the latch 154 and the dog 162 back into operative position when the standard is thrown back into the housing and the finger lever 170 is released. It should be noticed that the latch 154 returns to operative position when the standard goes back, whether or not the finger lever 170 has been released. Whenever the dog 162 drops, a bevel at the bottom of its notch 160 enables it to latch over the tail 158 whether this happens before or after the relatching.

The automatic mechanism for throwing the standard back will now be described. The second lowest wheel of the series 10, (now numbered 186 Fig. 2), has its lower dog 18 mounted on the bottom of a plate 188 (Figs. 2 and 5) pivoted on the shaft 12 and held in a normal position by two opposed springs 190, 192 and a flange 194 resting against a spoke 196 of the wheel 186. When the motor winds up the machine, the lower wheel can therefore overthrow until the flange 194 strikes the spoke 198.

Pivoted on the lower wheel 152, at 200, is an arm 204 having pivoted at its end 202, a rod 205 arranged to slide through a hole in the rim of the wheel 152. The pivot 202 is extended upwardly in a cam roll which rides in a cam slot 206 in the rim of the wheel 186. The machine in the position shown in Fig. 5 has just reached the zero position, with the

wheel 146 still running on the rim 150. Further movement of the wheel 152 will move the cam roll 202 to the out-lying upper end of the track 206, as seen in Fig. 5, which will force out the pin 205. When the wheel 152 has turned enough the pin 205 strikes a contact plate 208 on the standard 186 and forces it back into latched and inoperative position. The wheel 146 having thus ceased to drive the rim 150, the spring 190 pulls back the plate 188, wheel 152, and rod 205, to the Fig. 5 position, and the machine is ready for a new operation.

As seen from Fig. 1, the machine is a twin so that two sets of shoe parts can be totaled simultaneously. The two machines differ only in the proportion of their parts, one being adapted for small shoe parts and the other for large ones.

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

1. In a calculating machine, a member constructed and arranged to effect a registration by movement from a zero position, an electric motor for driving the member to the zero position, and means for automatically disconnecting the motor from the member after the zero position is reached.

2. In a calculating machine, a member constructed and arranged to effect a registration by a movement in one direction from a zero position, an electric motor arranged to drive the member to the zero position, and means for automatically rendering the motor inoperative upon the member, said means acting after the member has reached the zero position.

3. In a calculating machine, a member constructed and arranged to effect a registration by a movement in one direction from a zero position, power operated means for restoring the member to the zero position, and means for automatically rendering inoperative the power operated restoring means operated by over-throwing the member past the zero position by the restoring means.

4. A calculating machine having a series of members constructed and arranged to effect a registration by their combined movement and to be set back to a zero position by a uni-directional movement of one member of the series, a lost motion connection between said member and its adjacent member whereby said first-named member may be overthrown beyond its zero position relatively to the adjacent member, and an automatic driving means for the said first-named member for restoring the series to zero position, constructed and arranged to become inoperative by virtue of the said over-throwing movement.

5. A calculating machine having a series of members constructed and arranged to effect a registration by their combined move-

ment and to be set back to a zero position by a uni-directional movement of one member of the series, a resilient lost motion connection between said member and its adjacent member whereby said first-named member may be overthrown beyond its zero position relatively to the adjacent member, an automatic driving means for the said first-named member for restoring the series to zero position, and means operated by the said over-throwing movement for rendering said restoring means inoperative.

6. A calculating machine having a series of members constructed and arranged to effect a registration by their combined movement and to be set back to a zero position by a uni-directional movement of one member of the series, a resilient lost motion connection between said member and its adjacent member whereby said first-named member may be overthrown beyond its zero position relatively to the adjacent member, an automatic driving means for the said first-named member for restoring the series to zero position, and means comprising a cam operated by the said over-throwing movement for rendering said restoring means inoperative.

7. A calculating machine having a series of members constructed and arranged to effect a registration by their combined movement and to be set back to a zero position by a uni-directional movement of one member of the series, a lost motion connection between said member and its adjacent member whereby said first-named member may be overthrown beyond its zero position relatively to the adjacent member, an automatic driving means having resilient frictional engagement with the first-named member for restoring the series to zero position, and a plunger operated by the said over-throwing movement to break the said frictional engagement.

8. A calculating machine having a series of members constructed and arranged to effect a registration by their combined movement and to be set back to a zero position by a uni-directional movement of one member of the series, a resilient lost motion connection between said member and its adjacent member whereby said first-named member may be overthrown beyond its zero position relatively to the adjacent member, an automatic driving means having resilient frictional engagement with the first-named member for restoring the series to zero position, and a plunger on one of said adjacent members and a cam on the other relatively moved by the said over-throwing movement to break the said frictional engagement.

9. A calculating machine having a series of members constructed and arranged to effect a registration by their combined movement and to be set back to a zero position by a uni-directional movement of one mem-

ber of the series, a resilient connection between said member and its adjacent member whereby said first-named member may be over-thrown beyond its zero position relatively to the adjacent member, an automatic driving means for the said first-named member for restoring the series to zero position, and means operated by the said over-throwing movement for rendering said restoring means inoperative.

10. A calculating machine having a series of members constructed and arranged to effect a registration by their combined movement and to be set back to a zero position by a uni-directional movement of one member of the series, a resilient connection between said member and its adjacent member whereby said first-named member may be over-thrown beyond its zero position relatively to the adjacent member, an automatic driving means having resilient frictional engagement with the first-named member for restoring the series to zero position, and a plunger operated by the said overthrowing movement to break the said frictional engagement.

11. A calculating machine comprising a series of concentrically pivoted disks, each arranged to drive its neighbor to effect a total registration measured by the movement of the terminal member of the series, the driving connection between said terminal member and its neighbor being resilient to permit an over-throwing movement of the terminal disk relatively to the said neighboring disk when restoring the series to a zero position, a power driving means engaging said terminal disk to effect said restoring movement, a plunger sliding in the terminal disk, and a cam on the neighboring disk co-operating with the plunger to break the engagement of the power driving means with the terminal disk during the over-throwing movement.

12. A calculating machine comprising a series of concentrically pivoted disks, each arranged to drive its neighbor to effect a total registration measured by the movement of the terminal member of the series, the driving connection between said terminal member and its neighbor being resilient to permit and over-throwing movement of the terminal disk relatively to the said neighboring disk when restoring the series to a zero position, a power driving means pivotally mounted adjacent said terminal disk and engaging said terminal disk to effect said restoring movement, a plunger sliding in the terminal disk, and a cam on the neighboring disk co-operating with the plunger to break the engagement of the power driving means with the terminal disk during the over-throwing movement.

13. A calculating machine having a member constructed and arranged to effect a

registration by movement from a zero position, and power operated means normally latched out of engagement with the member but engageable with it at will for restoring the member to zero position and automatically relatched out of engagement after the zero position is reached.

14. A calculating machine having a series of members constructed and arranged to effect a registration by their combined movement and to be set back to a zero position by a unidirectional movement of one member of the series, a resilient lost-motion connection between said member and its adjacent member whereby said first-named member may be over-thrown beyond its zero position relatively to the adjacent member, and an automatic driving means normally latched out of engagement with the member but engageable with it at will for restoring the member to zero position and automatically relatched out of engagement after the zero position is reached.

15. A calculating machine comprising a series of concentrically pivoted disks, each arranged to drive its neighbor to effect a total registration measured by the movement of the terminal member of the series, the driving connection between said terminal member and its neighbor being resilient to permit an over-throwing movement of the terminal disk relatively to the said neighboring disk when restoring the series to a zero position, a power driving means engaging said terminal disk to effect the restoring movement, and means operated by the over-throwing movement to disengage the power driving means from the terminal disk.

16. In a calculating machine, a member constructed and arranged to effect a registration by movement from a zero position, means operating to restore the member to the zero position, and means operated by over-throwing the member past the zero position to render the restoring means inoperative.

17. A calculating machine having a series of members constructed and arranged to effect a registration by combined movement and to be set back to a zero position by movement of one member of the series, a lost motion connection between said member and an adjacent member whereby said first-named member may be over-thrown beyond its zero position relatively to said adjacent member, and means for operating the first-named member to restore the series to zero position constructed and arranged to be rendered inoperative by virtue of said over-throwing movement.

18. In a calculating machine, a member constructed and arranged to effect a registration by a movement from a zero position, a motor operating to restore the member to the zero position, and cam-controlled means

for rendering the motor inoperative upon the member constructed and arranged to act after the member has reached the zero position.

- 5 19. In a calculating machine, a member constructed and arranged to effect a registration by a movement from a zero position, a motor for restoring the member to the zero

position, and means for rendering the motor inoperative upon the member constructed 10 and arranged to act after the member has reached the zero position.

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

CHARLES H. DUDLEY.