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No. 640,825.

Patented Jan. 9, 1900.

E. F. SPAULDING.

CASH REGISTER.

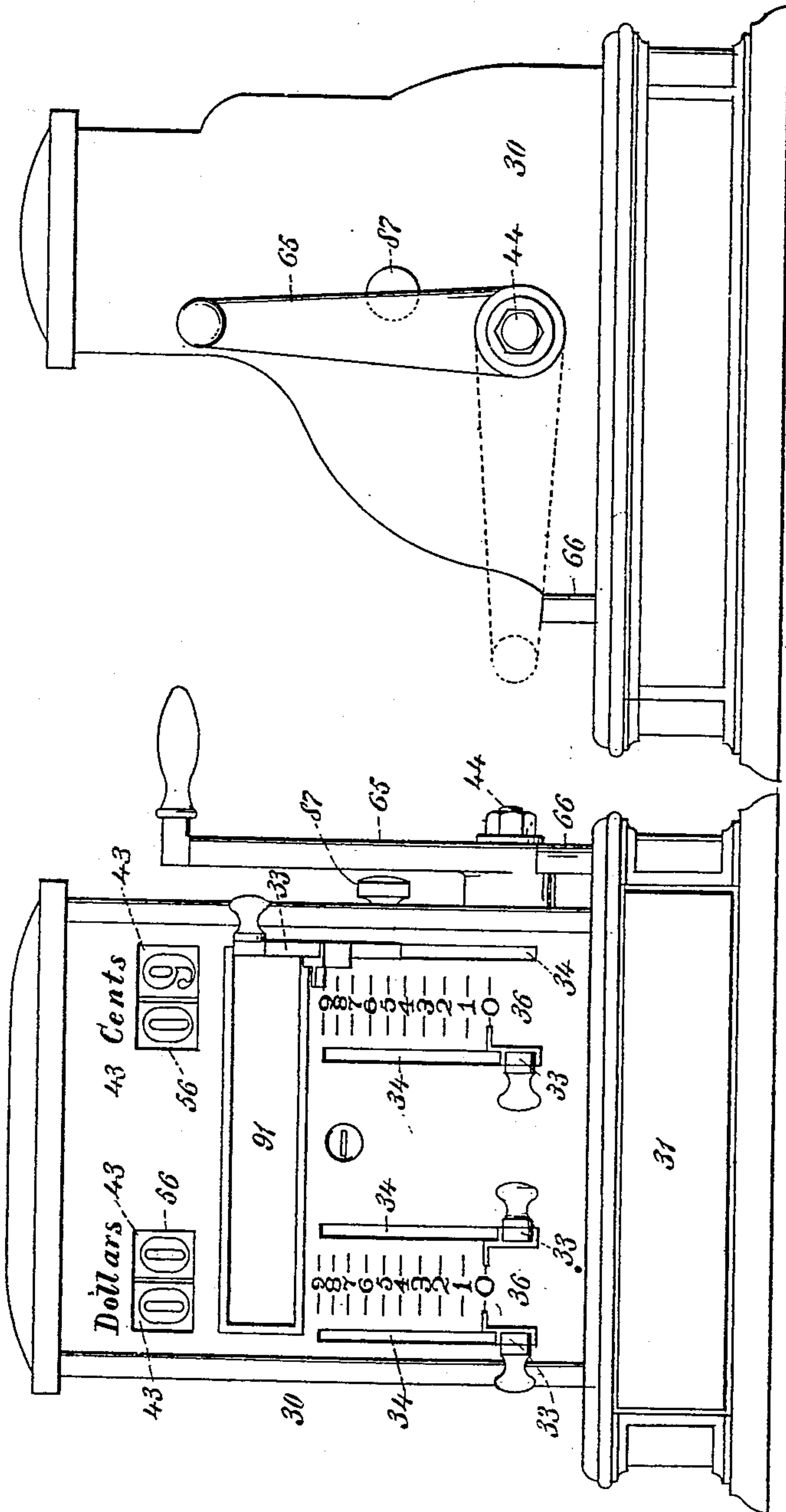
(Application filed Aug. 28, 1899.)

(No Model.)

11 Sheets—Sheet 1.

Fig. 2.

Fig. 1.



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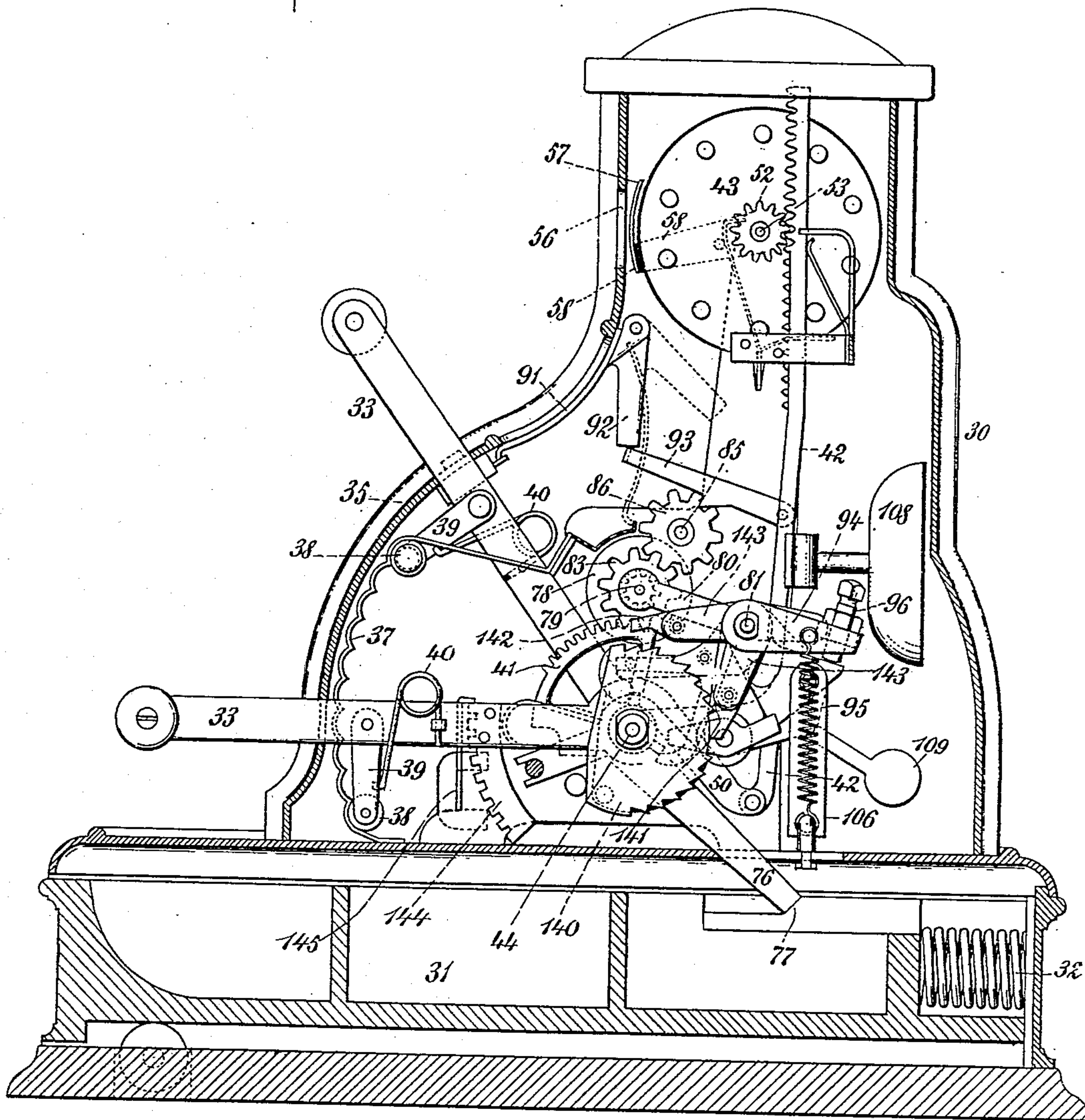
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(No Model.)

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Fig. 3.



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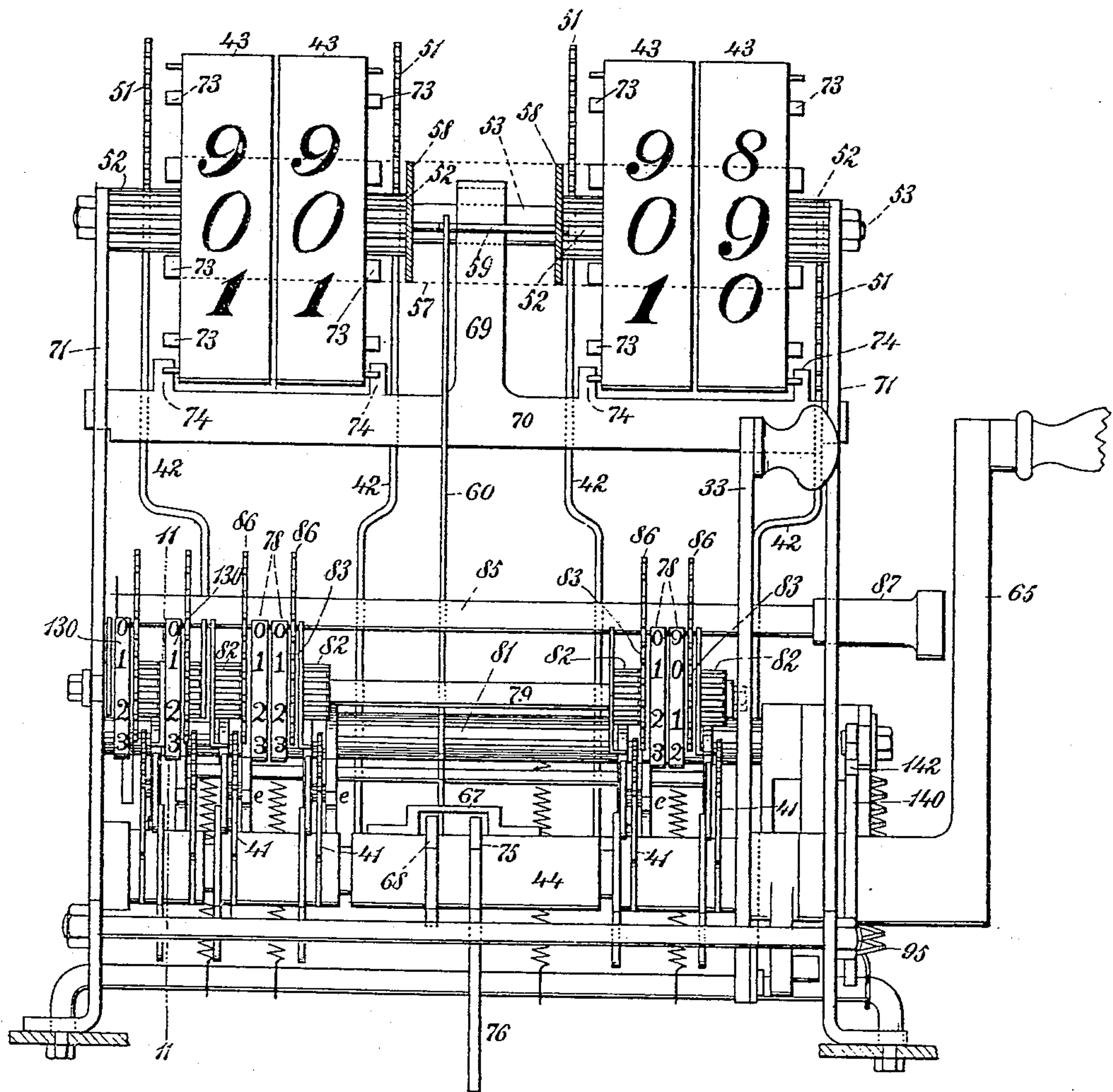
CASH REGISTER.

(Application filed Aug. 28, 1899.)

(No Model.)

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Fig. 4.



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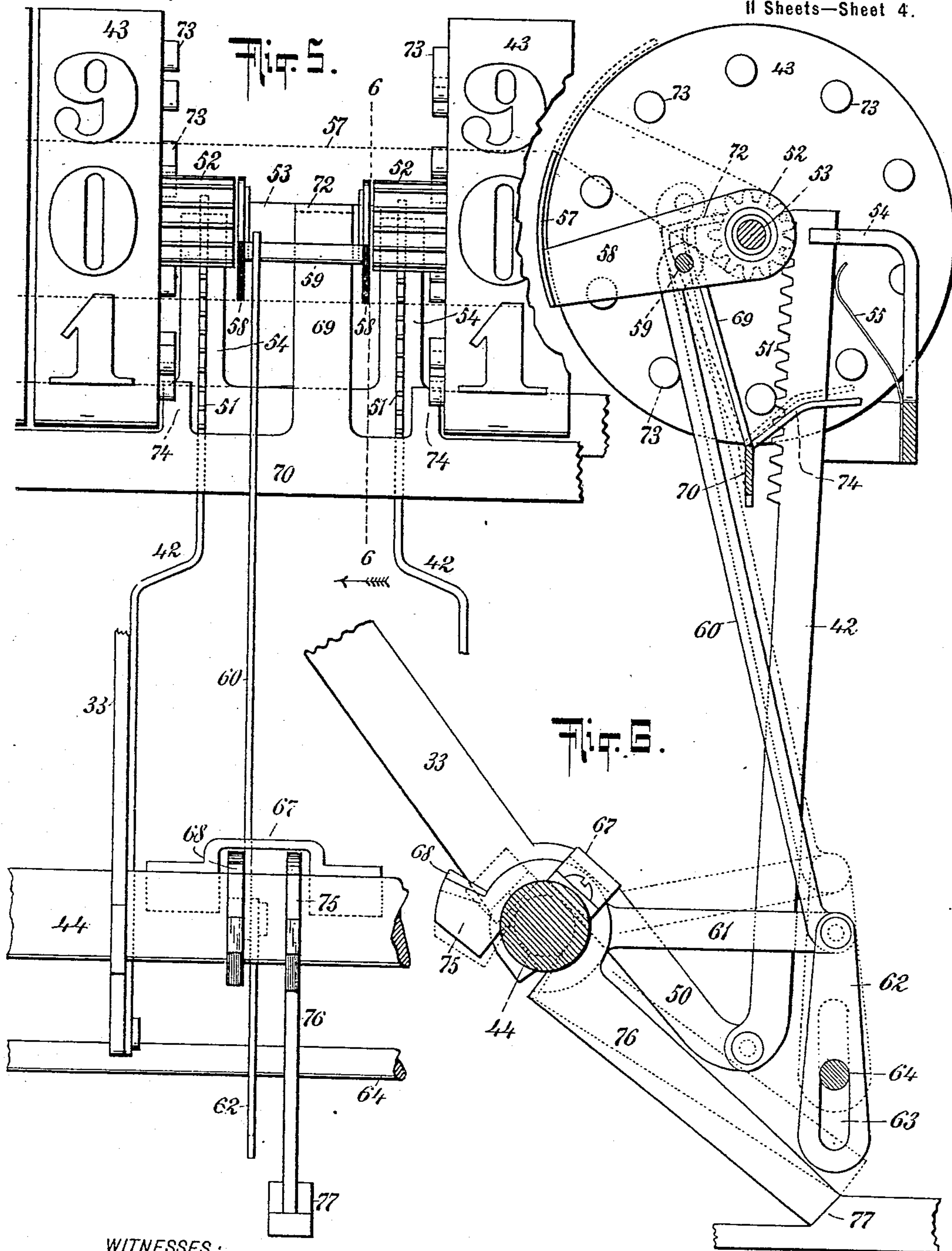
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(Application filed Aug. 28, 1899.)

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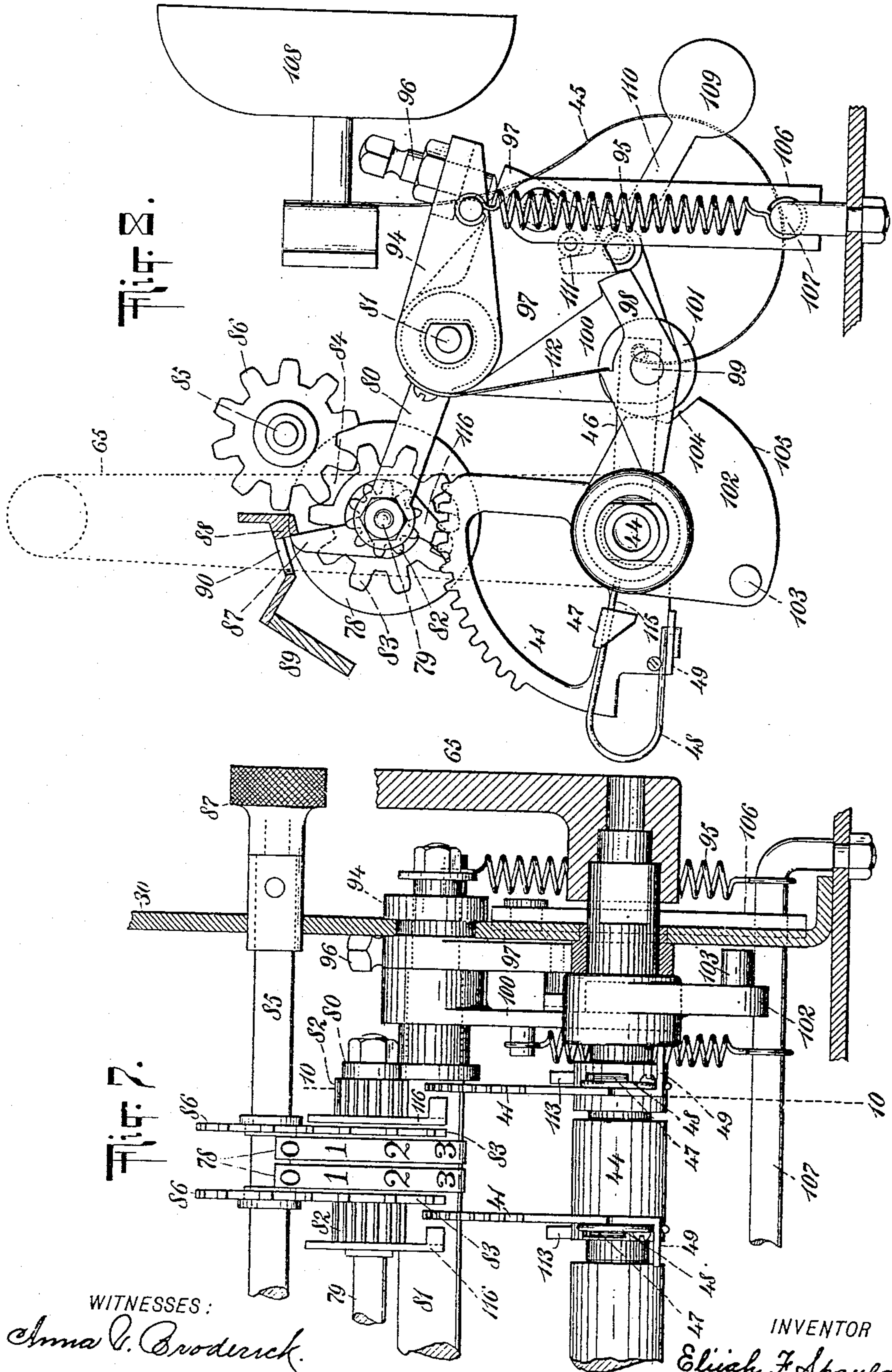
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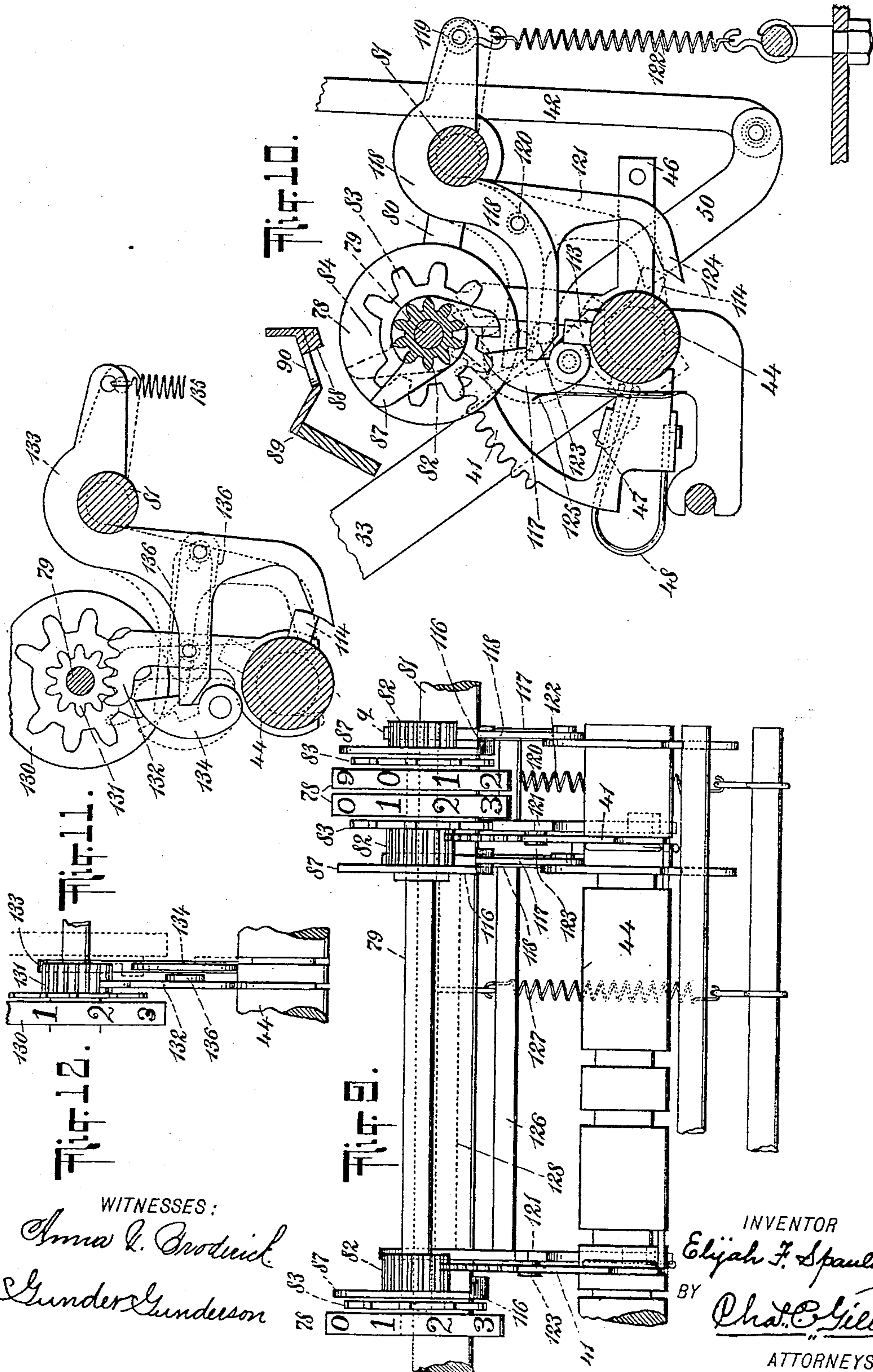
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(No Model.)

11 Sheets—Sheet 6.



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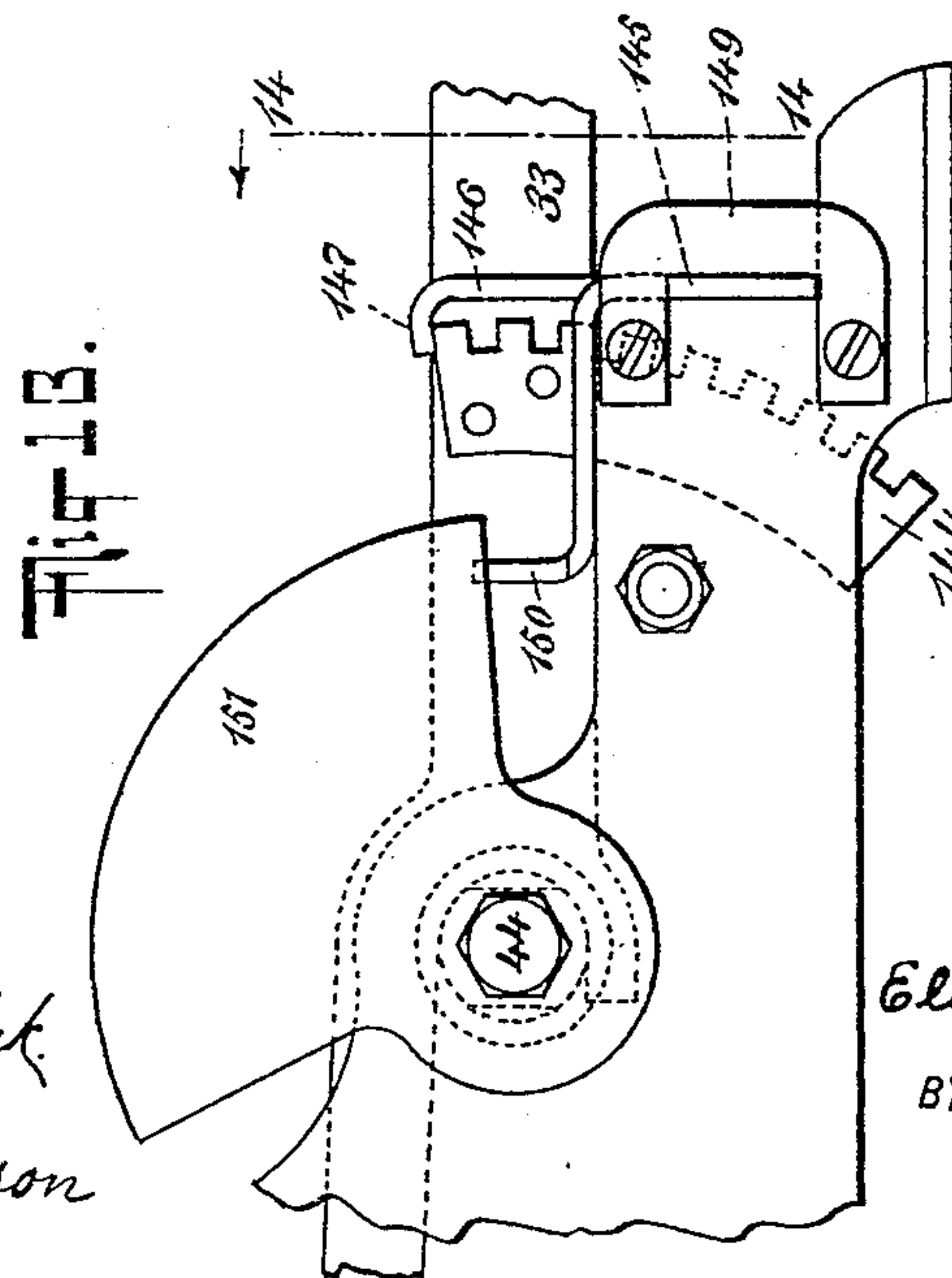
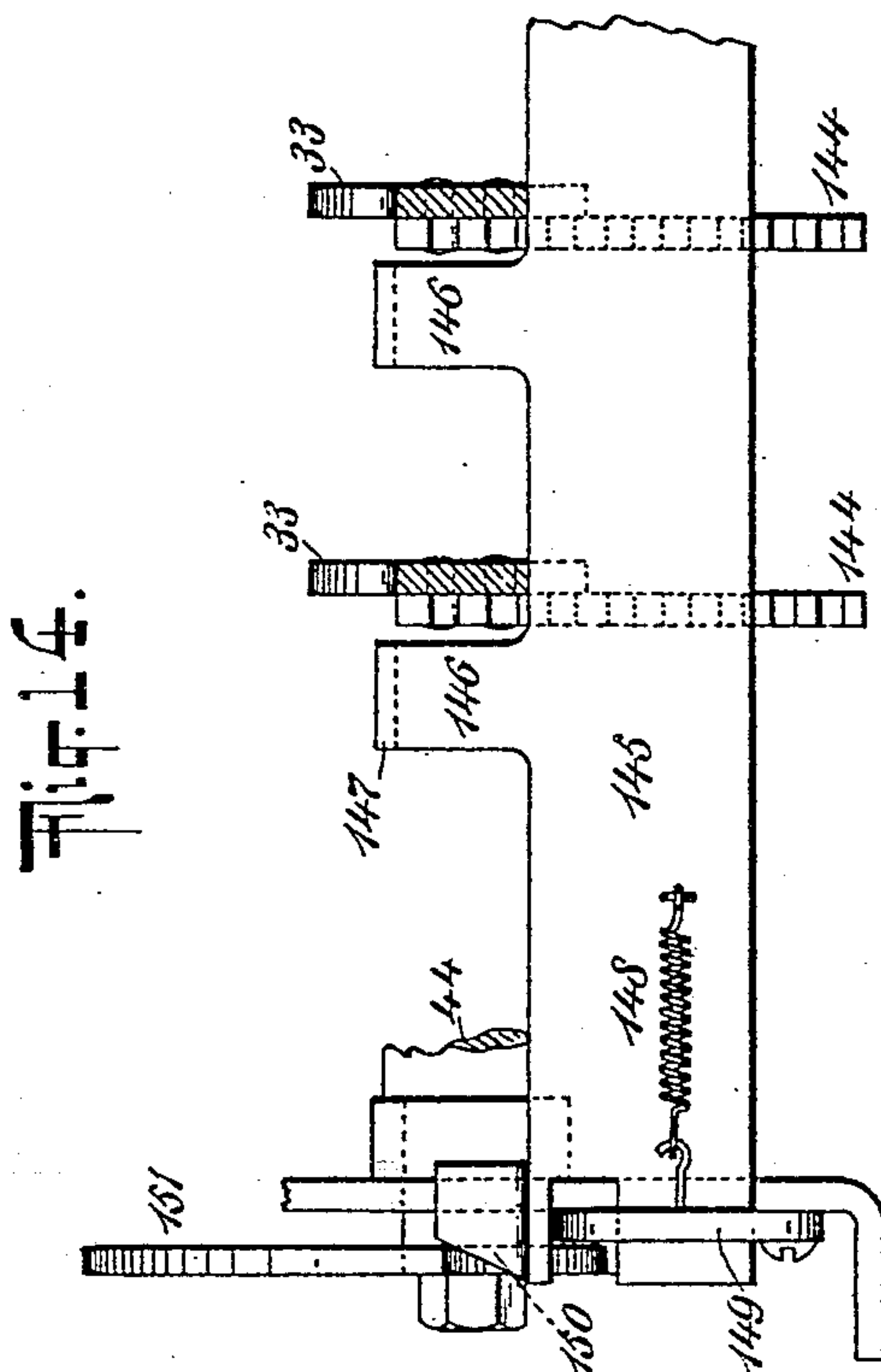
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11 Sheets—Sheet 7.



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E. F. SPAULDING.
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Fig. 15.

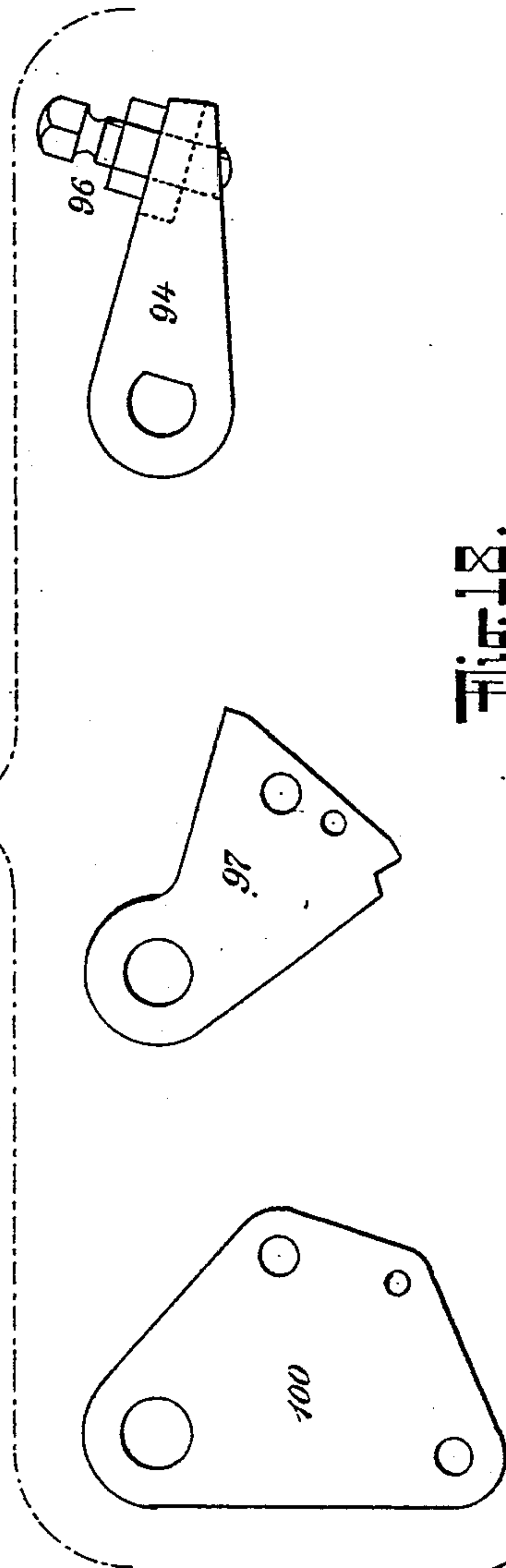


Fig. 18.

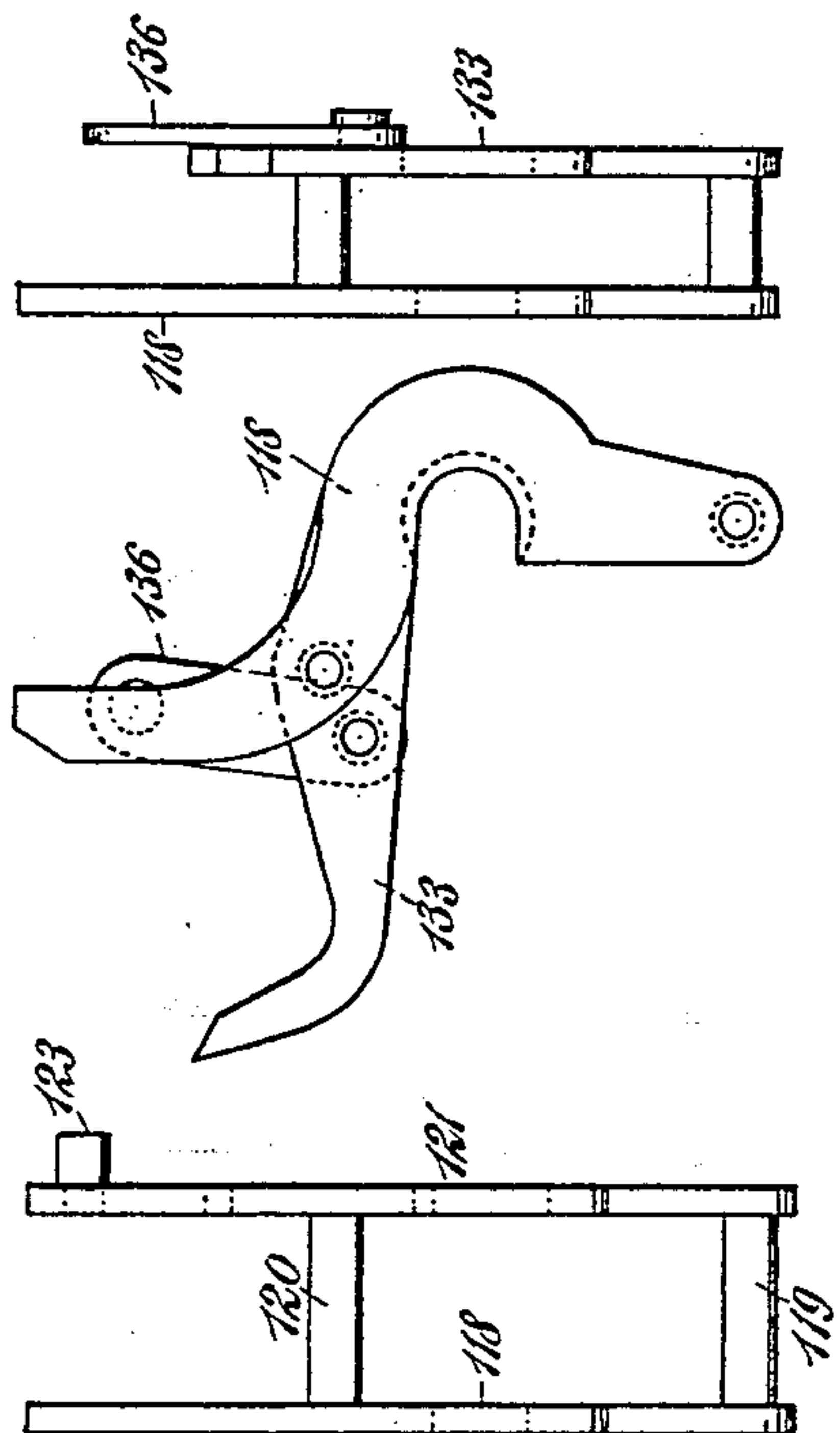


Fig. 16.

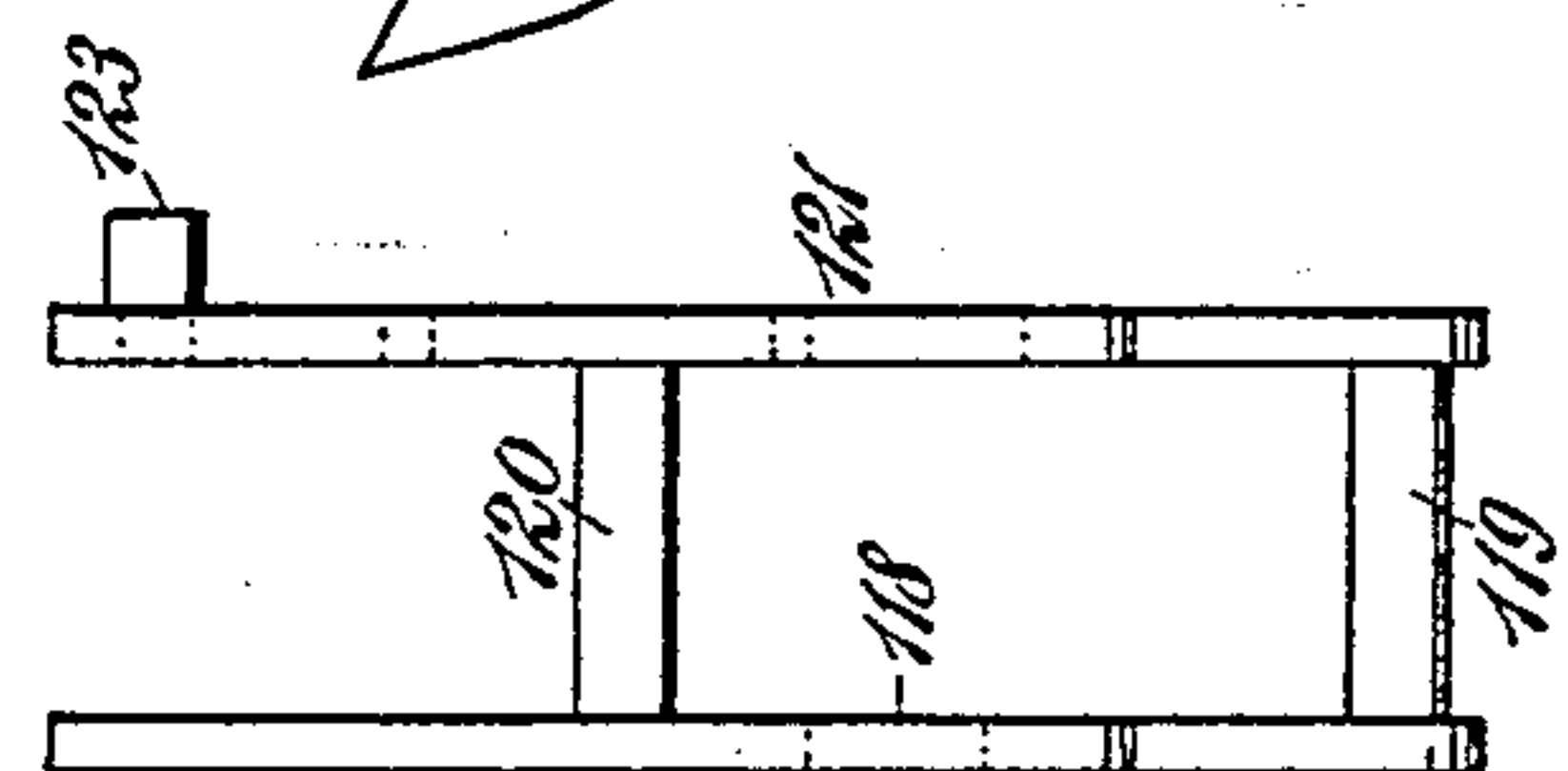


Fig. 17.

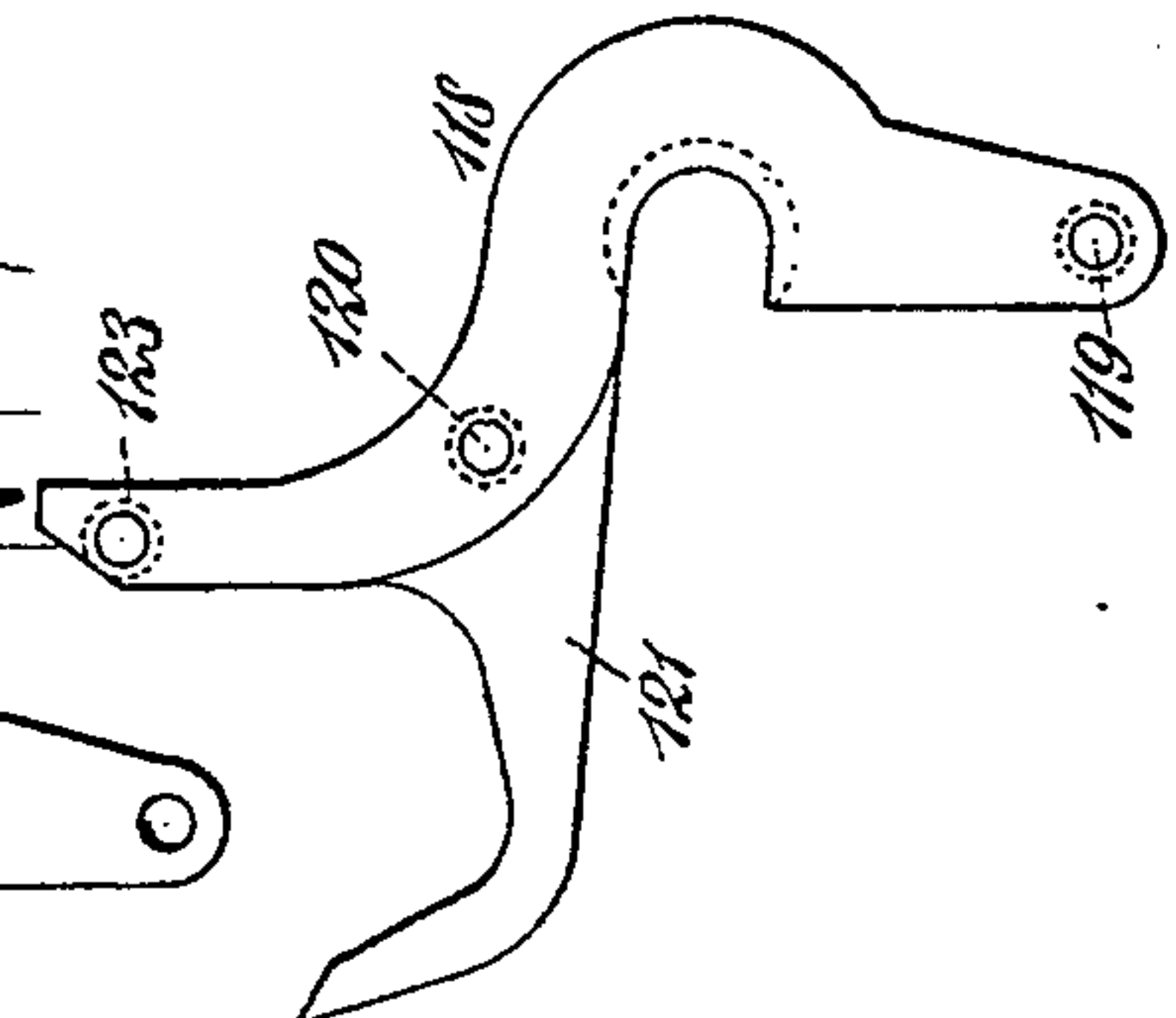


Fig. 19.

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Fig. 21.

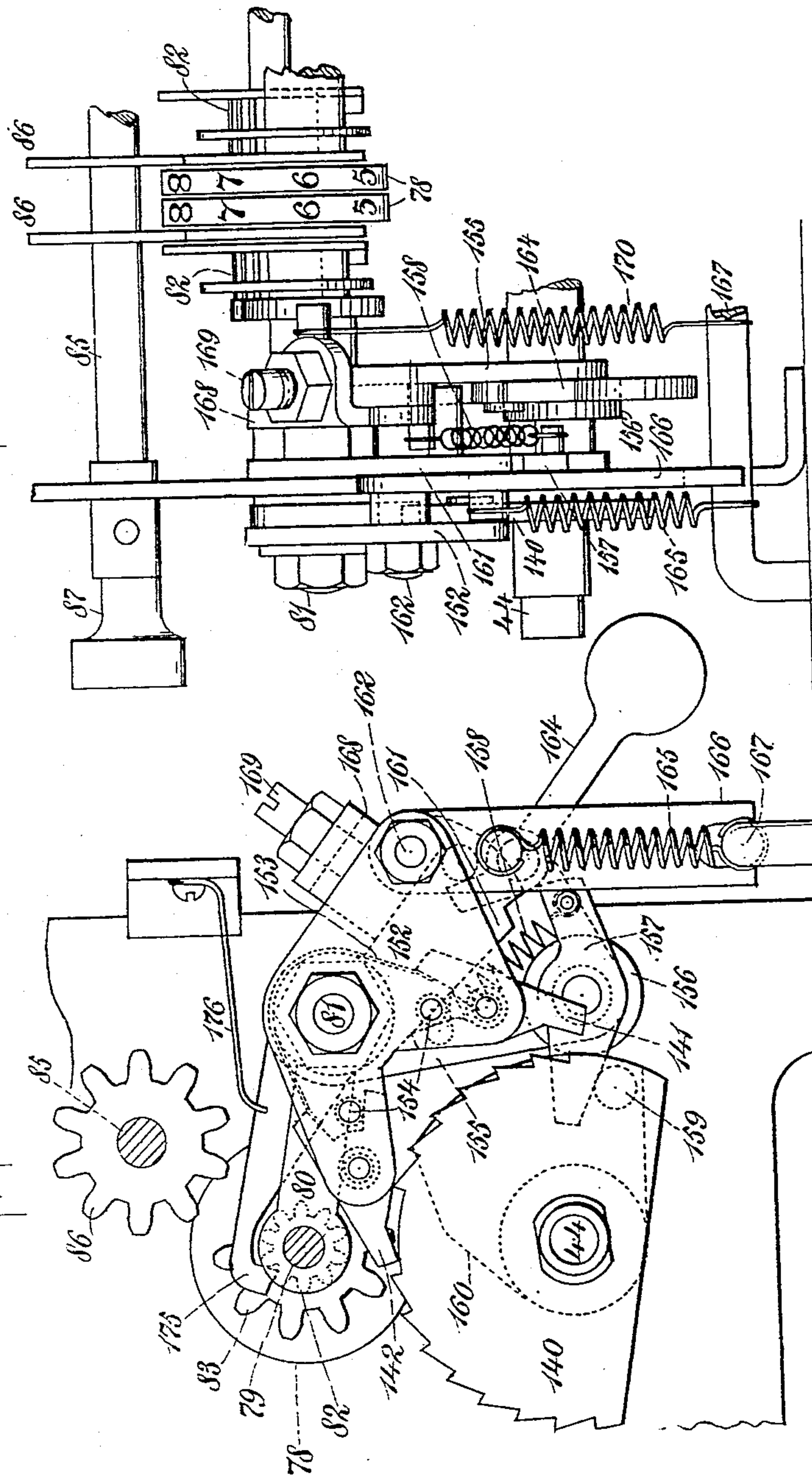


Fig. 20.

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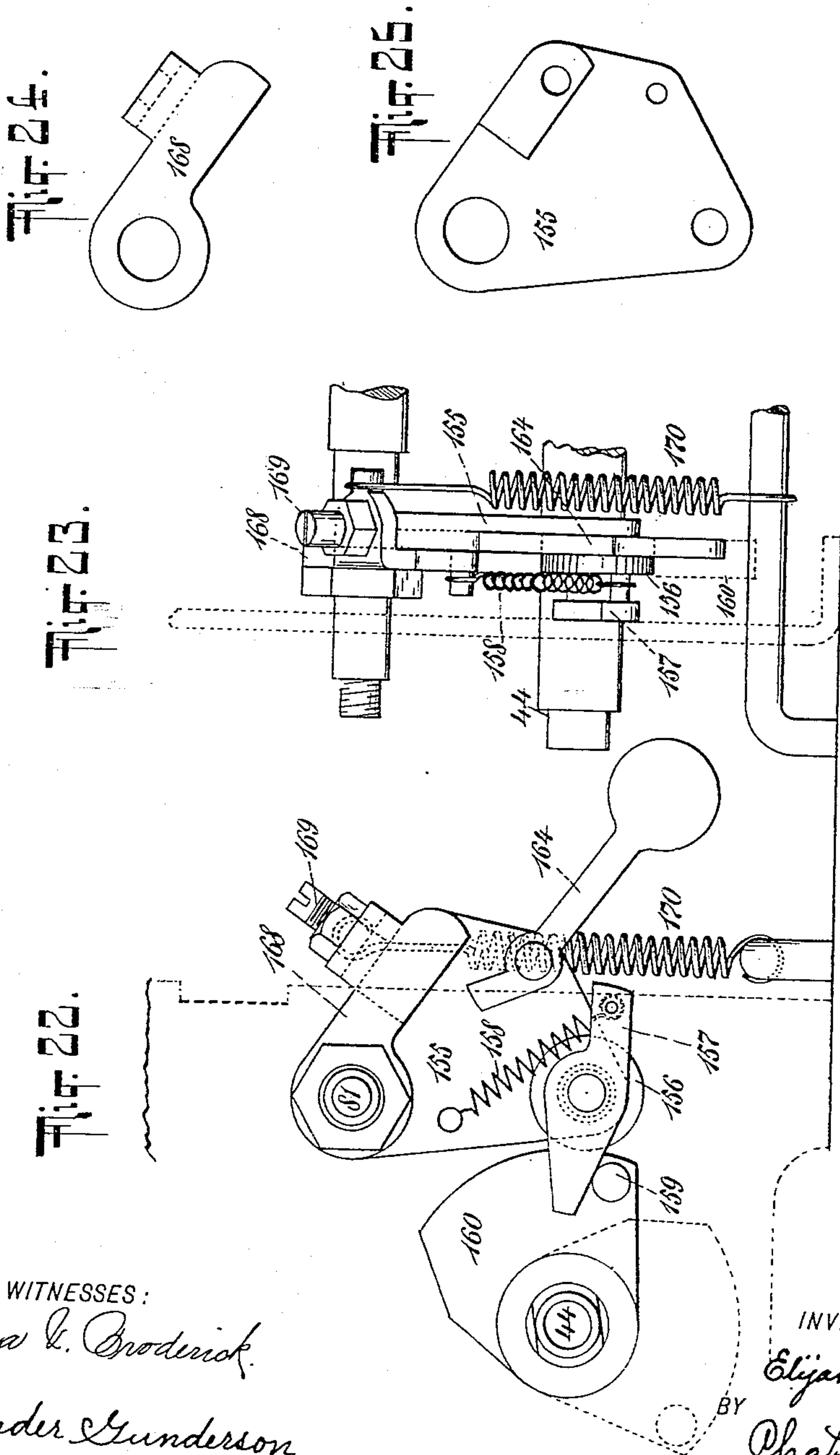
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11 Sheets—Sheet 10.



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(Application filed Aug. 28, 1899.)

(No Model.)

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Fig. 27.

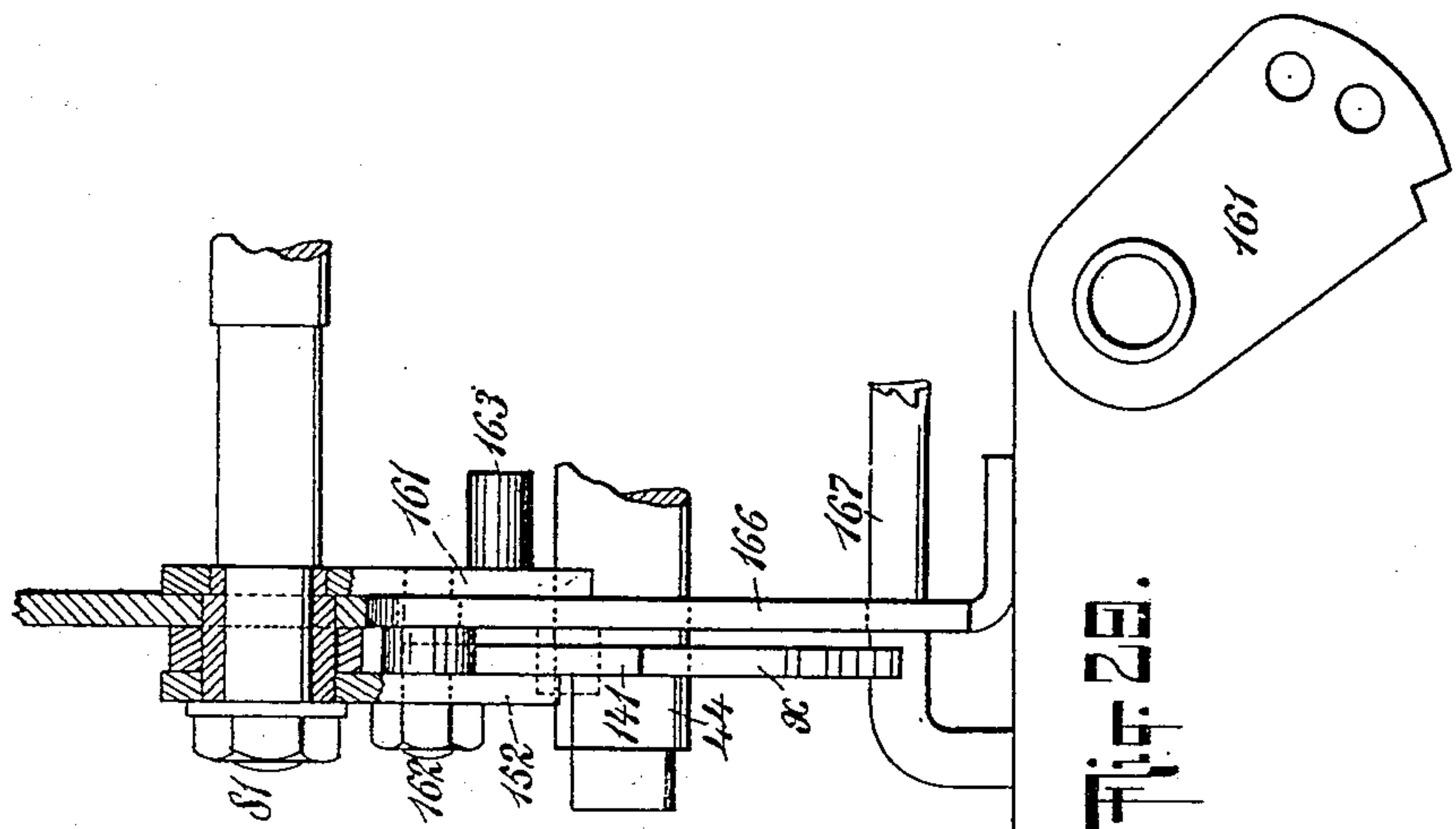


Fig. 28.

Fig. 29.

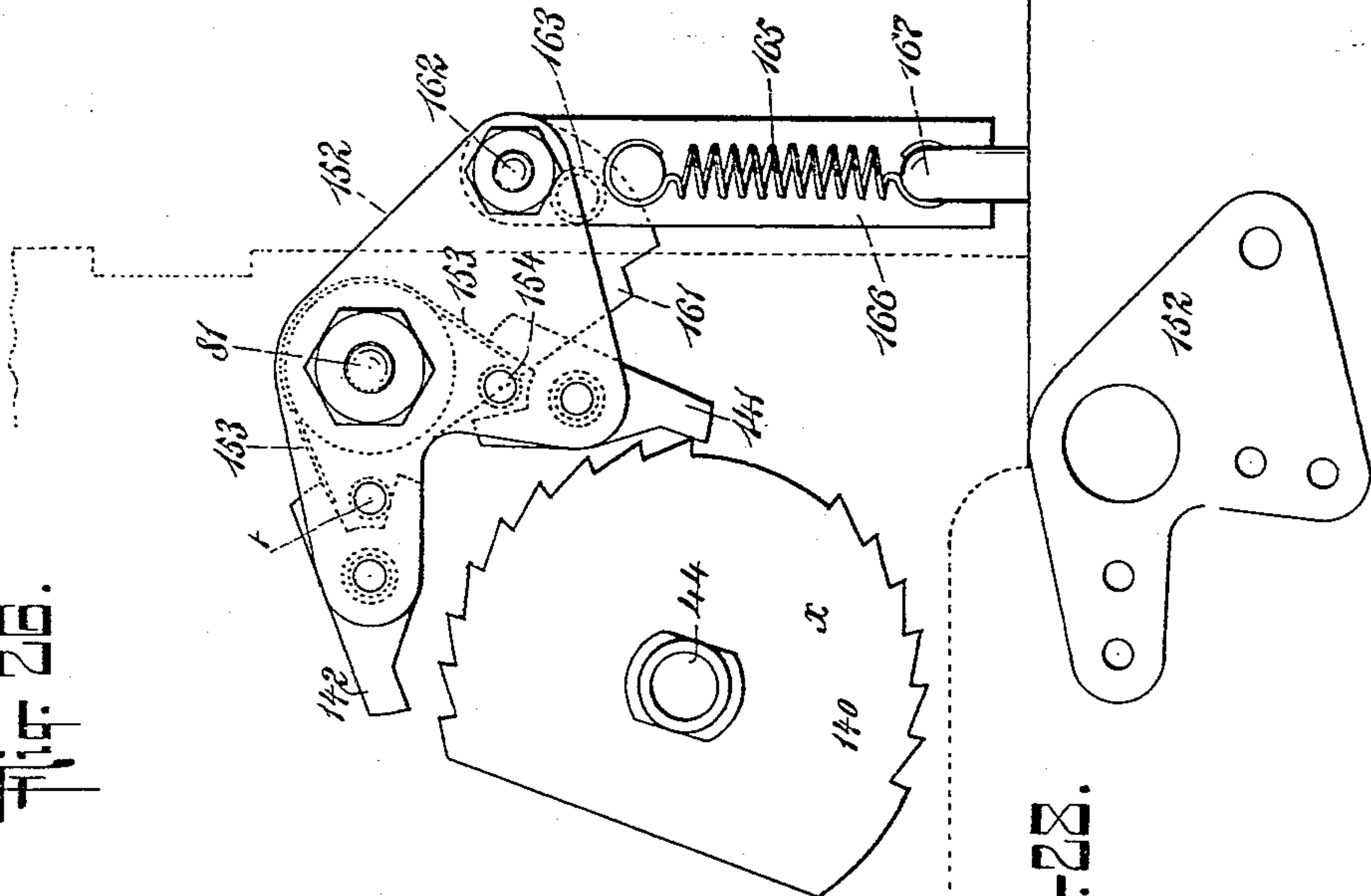


Fig. 30.

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UNITED STATES PATENT OFFICE.

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CASH-REGISTER.

SPECIFICATION forming part of Letters Patent No. 640,825, dated January 9, 1900.

Application filed August 28, 1899. Serial No. 728,789. (No model.)

To all whom it may concern:

Be it known that I, ELIJAH F. SPAULDING, a citizen of the United States, and a resident of Bound Brook, in the county of Somerset, and State of New Jersey, have invented certain new and useful Improvements in Cash-Registers, of which the following is a specification.

The invention relates to improvements in cash-registers; and it consists in the novel features, structure, and combinations of parts hereinafter described and claimed.

In accordance with my present invention the operator moves the exposed actuating or setting levers along the lines of numerals provided upon the front face of the register-casing for the purpose of setting certain interior segments into proper operative relation to the registering mechanism, and thereafter the operator, by moving an exposed crank or handle, places the gearing of the registering mechanism into direct engagement with said segments and effects the movement of said segments to their normal position, whereby said segments are caused to operate the registering mechanism to the extent desired and governed by the position given to said segments by the said actuating or setting levers. The aforesaid segments are free on their shaft and, under the influence of springs, automatically follow the said actuating or setting levers as the same are moved upward along the lines of numerals provided upon the front face of the register-casing. The upward motion of the actuating or setting levers not only sets the aforesaid segments, but also, through intermediate mechanism, sets the indicating cylinders or drums, the latter at such time being concealed behind a movable shutter. The downward pull on the crank or handle for effecting the operation of the registering mechanism sets in motion the means for elevating the shutter, whereby upon the registration having been effected the indicating cylinders or drums are exposed. The upward motion of the actuating or setting levers, while effecting the rotation of the indicating cylinders or drums, is incapable of moving the shutter which conceals said cylinders or drums, said cylinders or drums only having their indicating-numerals exposed upon registration being effected. The movement of

the exposed crank or handle whereby registration is effected and exposure of the indicating-drums is secured also through the intermediate mechanism effects the ringing of the bell or gong within the register-casing, said gong not sounding until registration has been effected. I provide within the register means for locking the actuating or setting levers in the position into which they may be moved until the registration has been effected and the exposed crank or handle has been returned to its initial normal position, and I also provide means to compel the operator to always give the said exposed crank or handle its full movement from its initial normal position to the stop limiting its throw and then back to its first or initial position.

The register-casing is provided with a suitable cash-drawer, a locking device for locking the drawer in its closed position, and a spring for driving said drawer into an open position upon the release of the said locking device.

The nature of the invention and satisfactory means for carrying the same into effect are described in full hereinafter and are illustrated in the accompanying drawings, in which—

Figure 1 is a front elevation of a cash-register constructed in accordance with and embodying the invention. Fig. 2 is an end view of same and illustrates the exposed crank or handle by which registration and indication are effected in its normal upright position by full lines and in its lower horizontal position by dotted lines, said crank or handle when registration and indication are desired being pulled from its normal upright position shown by full lines to its lower horizontal position indicated by the dotted lines. Fig. 3 is a central vertical longitudinal section through the casing and cash-drawer of the register and illustrates the interior mechanism of the register in an end view. Fig. 4 is a front elevation of the interior mechanism of the register, the register-casing being omitted and the shutter for the indicating drums or cylinders being indicated in its closed position by dotted lines. Fig. 5 is an enlarged front elevation, partly broken away and partly in section, of two of the indicating cylinders or

drums and the mechanism for operating the same, the shutter in this figure being also indicated in its closed position by dotted lines. Fig. 6 is a vertical longitudinal section of the same on the dotted line 6 6 of Fig. 5 and illustrates the shutter in its closed position by full lines and in its open position by dotted lines. Fig. 7 is an enlarged front elevation, partly broken away and partly in section, of a portion of the registering mechanism. Fig. 8 is an end view of same, the side of the casing being omitted and the exposed crank or handle being indicated by dotted lines. Fig. 9 is a detached front elevation of a portion of the registering mechanism. Fig. 10 is a vertical section of same on the dotted line 10 10 of Fig. 7. Fig. 11 is a vertical sectional view through a portion of the register on the dotted line 11 11 of Fig. 4 and shows more particularly the parts cooperating with the totalizing-wheels for carrying from one of said wheels to the other thereof. Fig. 12 is a front view of same, one of the totalizing-wheels being indicated by full lines and the other by dotted lines. Fig. 13 is an end elevation, partly broken away, of a portion of the interior mechanism of the register, this figure illustrating more particularly the means for locking the actuating or setting levers in any of their given positions and there maintaining them until the exposed crank or handle has made its full downward motion and then returned to its upper or initial position. Fig. 14 is a front view, partly broken away and partly in section, of same, the section being on the dotted line 14 14 of Fig. 13. Fig. 15 is a detached elevation of three cooperative plates which form a part of the register mechanism, and they are identified by reference-numerals hereinafter. Fig. 16 is a top view of a frame forming a part of the mechanism for carrying from one register-wheel to another—say from the units-of-cents wheel to the tens-of-cents wheel. Fig. 17 is a side elevation of same. Fig. 18 corresponds with Figs. 16 and 17 and shows a top view and side elevation of a frame forming a part of the mechanism for carrying from the tens-of-dollars-registering wheel to the first adjacent totalizing-wheel. Fig. 19 is a side elevation of a lever forming a part of the mechanism for carrying from the first to the second totalizing-wheel. Figs. 20 to 29, inclusive, illustrate a modified form of that portion of the register mechanism actuated by the exposed crank or handle for tripping the intermediate connections and restoring the registering-wheels and their shaft to their upper position, Fig. 20 being an end view, partly in section, of same; Fig. 21, a rear elevation of same; Fig. 22, an end view of same corresponding with Fig. 20, but having some of the parts omitted; Fig. 23, a rear elevation of same; Figs. 24 and 25, detached elevations of two cooperative parts of same and identified hereinafter by reference-numerals. Fig. 26 is another end view of same, certain parts be-

ing omitted. Fig. 27 is a rear elevation, partly in section, of same; and Figs. 28 and 29 are detached elevations of parts of same and identified hereinafter by reference-numerals.

In the drawings, 30 designates the exterior shell or casing of the register, 31 the cash-drawer, and 32 the spring, which is compressed during the closing of the cash-drawer and which when the cash-drawer is released from its locking devices drives said drawer to its open position.

The actuating or setting levers are designated by the numeral 33, and these levers extend frontward through slots 34, formed in the front plate 35 of the register, which plate is furnished with the columns of numerals 36, ranging from "0" to "9," inclusive, as illustrated in Fig. 1. The slots 34 are provided in the front face 35 of the register-casing to admit of the movement of the actuating-levers 33 along the sides of the columns of numerals 36, and at the inner side of the front face 35 are provided the rigidly-secured recessed bars 37, (see Fig. 3,) which coact with the rollers 38 and links 39 to create sufficient friction and resistance to enable the operator to properly control the actuating-levers 33 during the motion of the latter. The links 39 are pivoted to the actuating-levers 33 and carry the said rollers 38, and said links 39 and rollers 38 are given a constant pressure toward the bars 37 by means of the springs 40, (see Fig. 3,) flexed against said links 39. The recesses formed in the bars 37 are in line with the individual numerals of the columns of numerals 36 on the front face 35 of the register-casing, and said recesses are adapted to receive the said rollers 38 and to aid in retaining the levers 33 in any of their various positions along the line of the slots 34.

The spring-pressed rollers 38 and recessed bars 37 yieldingly resist the motion of the actuating-levers 33 and serve to retain said levers in any position along the slots 34 to which they may be moved. The initial position of the actuating-levers 33 is at the lower end of the slots 34, as indicated at the left-hand portion of Fig. 1, and when it is desired to register and indicate the amount of a sale the said levers (one or more, as may be necessary) will be moved upward to proper positions along the line of said slots under the guidance of the columns of numerals 36 on the front plate 35.

The actuating-levers 33 during their upward motion perform two main functions, the first being to "set" the segments 41 and the second being, through the vertical racks 42, to actuate or set the indicating cylinders or drums 43.

The segments 41 are loosely mounted upon the shaft 44 and automatically follow the actuating-levers 33 under the influence of the springs 45, (see Fig. 8,) whose lower forward end is secured to a rearwardly-extending arm 46, formed as a part of said segment 41. Each lever 33 is accompanied by a segment

41, and each segment 41 is adapted to have an independent motion and is equipped with the spring 45, and its force is normally exerted to pull downward on the rearwardly-extending arm 46, so as to keep the segment 41 in condition to automatically follow the lever 33 when the latter is elevated. The segments 41 are each formed with the laterally-extending lip 47, Fig. 8, which affords a surface for contact with the edge of the lever 33 and also as a housing for one end of the bent spring 48, which, as shown in Fig. 8, is rigidly secured at one end to a bracket 49, formed on said segment. The bent springs 48 are rather stout wire springs, and they perform no function during the turning upward of the segments 41 to follow the levers 33 under the influence of the springs 45; but said bent springs 48 do come into use during the turning downward to their initial position of said segments 41, as hereinafter explained.

The actuating-levers 33 turn freely upon the shaft 44, and likewise the segments 41 turn freely upon said shaft. The said segments 41 during their return to their frontward and downward position effect, through the means hereinafter to be described, the registration, and during such return motion said segments leave the actuating-levers 33 in their then upward position.

The actuating-levers 33 are each formed with the downwardly-extending arm 50, whose lower end is pivotally secured to a rack 42, Figs. 3, 5, and 6, having along its upper side edge the teeth 51 in mesh with the pinion-wheel 52, mounted upon the shaft 53 for the indicating cylinders or drums 43, each of the latter being furnished with the pinion-wheel 52 and, with this pinion-wheel, being free to revolve upon the said shaft 53 when actuated by a rack-bar 42, one of the latter being provided for each of said drums. The upward motion of each lever 33 thus effects the proper setting of its cooperating segment 41 and also, through a rack-bar 42, the proper turning of its cooperating indicating cylinder or drum 43. The rack-bar 42 has a substantially vertical movement and is guided at its upper portion by the bifurcated end of the guiding-bar 54, one guiding-bar 54 being provided for each rack-bar 42. The guiding-bar 54 is rigidly secured at its lower end and retains at its upper end the rack-bar 42 in proper alignment with and in near relation to its cooperating pinion-wheel 52 without binding unduly against the rear edges of said rack-bar. The teeth 51 of the rack-bar 42 are pressed into the teeth of the gear-wheel 52 by means of a flexed spring 55, Fig. 6, whose upper end is constantly against the rear edges of said rack-bar. Under gentle handling of the levers 33 to actuate the indicating cylinders or drums 43 the springs 55 might be sufficient to retain the teeth 51 of the rack-bars 42 in engagement with the pinion-wheels 52; but under rough handling of the register or under some impulsive motions given to the actuating-le-

vers 33 the springs 55, in the absence of the guiding and retaining bars 54, might yield sufficiently to let the teeth 51 of the rack-bars 42 pass outward from and slip over the teeth of the pinion-wheels 52; but with the employment of the guiding and retaining bar 54 in connection with the spring 55 the rack-bar 42 is yieldingly held against the pinion-wheel 52 and is prevented under any sudden or jerky motion imparted to the levers 33 from leaving engagement with the pinion-wheel 52.

The indicating cylinders or drums 43 will be numbered from "0" to "9," inclusive, to correspond with the columns of numbers 36 on the front plate 35 and also to correspond with the like numerals on the registering-wheels, said indicating cylinders or drums 43 being mounted upon the transverse shaft 53, extending transversely within the upper contracted portion of the register-casing 30 in line with the front openings or windows 56, formed in the register-casing and illustrated in Figs. 1 and 3. The initial upward motion of the levers 33 results in the turning of the indicating cylinders or drums 43 to bring the proper numerals in line with the openings 56; but said numerals are concealed by means of a shutter 57 until such time as the registering-wheels are set in motion to effect registration, at which time the shutter 57 is elevated to the position shown by dotted lines in Fig. 6, whereby the numerals on said cylinders or drums 43 and in line with the openings 56 are exposed to the purchaser.

The shutter 57 is a plain piece of metal of proper width to close the openings 56 and is secured to arms 58, mounted upon the shaft 53 and connected together by a rod 59, Fig. 5, whereby said arms 58 may have a simultaneous motion and move upward or bring downward the shutter 57. The rod 59 has connected with it the rod 60, Figs. 5 and 6, whose lower end is pivotally secured to the lever-arm 61, fulcrumed upon the shaft 44, but substantially free of said shaft. The lower end of the rod 60 carries the suspended stop-plate 62, which is formed with the vertical slot 63, Fig. 6, through which passes the rod or shaft 64. When the shutter 57 moves to its lower or concealing position, it will there be arrested by the contact of the stop-plate 62 (at the upper end of its slot 63) with the shaft 64, and when the shutter 57 is moved to its upper or exposing position (indicated by dotted lines in Fig. 6) it will be prevented from passing upward unduly by the contact of the stop-plate 62 (at the lower end of its slot 63) with the shaft 64, as denoted by dotted lines in Fig. 6. The plate 62 is thus a stop-plate to prevent any undue downward motion of the shutter 57 and also to prevent, under any undue application of force, any excessive upward motion of the shutter 57. The moving upward of the shutter 57 at the time of registration is effected by the rotation of the shaft 44 under the action of the exposed operating crank or handle 65 during

the turning of the latter downward from its normal vertical position (shown by full lines in Fig. 2) to its lower position, (shown by dotted lines in Fig. 2,) in which position said lever 65 reaches a permanent stop 66, provided to arrest it. The exposed crank or handle 65 is secured upon the exposed outer end of the shaft 44, and upon said shaft 44 is secured the loop or stirrup 67, as shown more clearly in Figs. 5 and 6, which when said shaft 44 is turned upward and toward the left (looking at Fig. 6) will come into contact with the front projecting short arm 68 of the lever-arm 61 and move the same downward, whereby the rear end of said arm 61 is positively turned upward to move the rod 60 and shutter 57 upward, the said shutter thus reaching its upper position and exposing the numerals on the cylinders or drums 43 in line with the windows or openings 56.

It will thus be understood that during the upward motion of the actuating-levers 33 the rack-bars 42 are moved downward to turn the indicating cylinders or drums 43 and that thereafter and during the registration the shaft 44 will carry its loop 67 against the short end or arm 68 of the lever-arm 61 and cause the latter, through the intermediate mechanism, to elevate the shutter 57, so as to expose at the openings or windows 56 the numerals brought in line with the said windows by the upward motion of the levers 33. After the shutter 57 has been moved to its upper open position (shown by dotted lines in Fig. 6) it will there be held until, under the motion of the cylinders or drums 43, the means supporting said shutter in its open position are acted upon and the shutter allowed to drop. The means which support the shutter 57 in its upper position is the arm 69, Figs. 4, 5, and 6, which extends upward from the transverse bar 70, the latter having its ends loosely mounted in rather free openings in the end frames 71, Fig. 4, supporting the interior mechanism of the register. The bar 70 and arm 69 are in one integral piece cut from a piece of sheet metal, and said bar 70, being freely mounted at its ends in the side frames 71, is permitted to have a limited axial or rocking motion. The upper end of the arm 69 of the bar 70 is formed with the lip 72, Fig. 5, which when said arm 69 tilts frontwardly will pass below the rod 59, connecting the arms 58 of said shutter 57, and then hold said shutter in its upper or open position. When the arms 58 and connecting-rod 59, with the shutter 57, are in their lower position, the arm 69 of the bar 70 will rest against said connecting-rod 59, and when the rod 59 moves upward the arm 69 will continue to rest against said rod 59 until the latter passes above the upper end of said arm, and thereupon the arm 69, not receiving any further support from the rod 59, will tilt frontward slightly, and the lip 72 of the said arm 69 will pass under the rod 59 and prevent said rod 59 and the shutter 57 from descending until

by the means hereinafter described said arm 69 is again tilted rearward to carry its upper end or lip 72 from beneath the said rod 59. The arm 69 will continue to support the rod 59 and shutter 57 in their upper position until the indicating cylinders or drums 43, under the action of the hand-levers 33, carry one of their pins 73 against one of the upturned lips 74, provided on the upper edge of the bar 70 in position to be met by the pins 73 during the turning of the cylinders or drums 43, as more clearly indicated in Figs. 4, 5, and 6. The pins 73 extend inward from the side faces of the cylinders or drums 43, and the lips 74 extend upward in line with said pins, and the said lips 74 are inclined, as illustrated in Fig. 6, so as to form surfaces against which the pins 73 may act whether the cylinders or drums 43 are turned in one direction or in the reverse direction. It may be assumed for purposes of explanation that the shutter 57 is in its upper position and that the upper end or lip 72 of the arm 69 is below the connecting-rod 59 of the shutter mechanism. Under these conditions the shutter 57 will be held in its upper position supported upon the said lip 72 of the arm 69. If any of the actuating-levers 33 are moved to indicate a further sale, the rack-bars 42, through the pinions 52, will set the indicating-cylinders or drums 43 in motion and in doing so cause said cylinders or drums to move one or more of the pins 73 against the upturned lip or lips 74 of the bar 70 and tilt said bar rearwardly, whereby the arm 69 is caused at its upper end to move rearwardly free of the connecting-rod 59, thus leaving the latter unsupported and permitting the shutter 57 to descend by gravity.

It will thus be apparent that upon a sale of goods having been effected the actuating-levers 33 will be moved upward and that the upward movement of the same will cause the rack-bars 42 to impart the proper motion to the indicating cylinders or drums 43; that thereafter the operation of registering under the action of the exposed crank or handle 65 will result in the upward motion of the arm 69 or rod 60 to elevate the shutter 57; that the shutter will remain in its upper exposed position until the arm 69 is removed as a support therefrom, and that the removal of the arm 69 as a support holding the shutter 57 in its open position only occurs when the levers 33 are again moved, and the cylinders or drums 43 thus caused to carry their pins 73 against the upturned lips 74 of the bar 70, whereby the arm 69 is tilted rearward and carried from below the connecting-rod 59 of the shutter mechanism, the shutter 57 at that time being allowed to fall of its own gravity.

The rotation of the shaft 44 by means of the exposed crank or handle 65 to effect registration and cause the loop 67 on the said shaft to contact with the short arm 68 of the lever 61 for the purpose of causing the rod 60 to ascend and elevate the shutter 57 to its open

position having been described, it may be well here to note that the said loop 67 also contacts with and drives downward the short arm 75 of the locking arm or latch 76, which is supported upon the said shaft 44 in near relation to the aforesaid lever 61, as illustrated more clearly in Figs. 5 and 6. The lower end of the lever or latch-arm 76 is adapted to engage the shoulder 77, formed on the cash-drawer 31, and to thereby lock said drawer in its closed position. When the loop 67 on the shaft 44 presses downward on the short arm 75 of the latch 76, the latter becomes elevated from the shoulder 77 of the cash-drawer 31, and the said cash-drawer will at that time, having become freed, be moved outward to its open position by the action of the coiled spring 32. Thus the forward-and-downward rotation of the shaft 44 by means of the exposed crank or handle 65 results not only in the registration being effected, as hereinafter explained, but also in the elevation of the shutter 57 and the unlocking of the cash-drawer. The lever 61 and latch-arm 76 are clearly illustrated as to their outline in Fig. 6, and at their shank end the said lever 61 and latch-arm 76 are formed with recesses, substantially in the shape of an inverted U, to freely pass upon the said shaft 44 and into grooves cut in said shaft to receive them, as indicated by dotted lines in Fig. 6. The loop 67 is applied upon the shaft 44 after the lever 61 and latch-arm 76 have been applied in position, and the said loop 67 thus operates to retain the lever 61 and latch-arm 76 in proper position and also at the proper time to actuate the same, as hereinabove explained. In the absence of the loop 67 the lever 61 and latch-arm 76 would have no motion during the rotation of the shaft 44.

Having described hereinbefore that the actuating or setting levers 33 when moved upward operate the indicating cylinders or drums 43 and that thereafter the rotation of the shaft 44 toward the front and downward by means of the exposed crank or handle 65 results in effecting the proper registration, the elevation of the shutter 57, and the unlocking of the cash-drawer 31, it will now be appropriate to explain the mechanism by which during said action of the shaft 44 the registration is accomplished. It has been hereinbefore described that upon the shaft 44 is freely mounted the series of segments 41, which under the action of the springs 45 are caused to automatically follow the levers 33 during the upward movement of the latter, the said segments contacting with the edges of the levers 33 during the upward movement of the latter. The upward motion of the levers 33 results in the setting of the segments 41 in the proper predetermined position in accordance with the amount to be registered, and the registration is effected during the return motion of the segments 41 to their lower or initial position, this return motion being

effected by the rotation of the shaft 44 under the action of the exposed crank or handle 65.

The registering-wheels are numbered 78 and are freely mounted upon the shaft 79, which is parallel with and substantially directly over the main actuating-shaft 44. The shaft 79 is mounted in the front ends of arms 80, Figs. 7 and 8, which extend forwardly from the rock-shaft 81, the said rock-shaft 81 carrying said arms 80 and the latter carrying the said shaft 79. The shaft 81 is adapted to have a rocking motion, as hereinafter explained, so that at the proper time the shaft 79 may be moved downward for the purpose of carrying the pinion-wheels 82 thereon into engagement with the segments 41. The pinions 82 are each connected with one of the registering-wheels 78 and also with a gear-wheel 83, the said wheels being arranged in sets, each set comprising a pinion-wheel 82, a gear-wheel 83, and a registering-wheel 78, the said three wheels of each set being connected together and freely revoluble upon the shaft 79, which has no rotation. Each of the gear-wheels 83 is minus one tooth, whereby, as shown in Fig. 8, a blank space 84 is formed in its periphery. Above and somewhat to the rear of the shaft 79 is mounted the shaft 85, upon which is rigidly mounted the series of gear-wheels 86, the latter being for engagement with the gear-wheels 83 on the shaft 79 and being utilized for the purpose of returning all of the registering-wheels 78 to their zero position. The wheels 86 are fast upon the shaft 85 and only rotate when the shaft 85 is operated by means of the exposed handle or knob 87, which, as illustrated in Figs. 1, 2, and 7, projects outward beyond the side of the register-casing 30. Thus the registering-wheels 78 are rotated to register by the engagement of the segments 41 with the pinions 82 and during the movement of said segments to their downward position, and said registering-wheels 78 may at the proper time be restored to their zero position by the engagement of the gear-wheels 83 with the gear-wheels 86, and during the rotation of said gear-wheels 86 by the manual rotation of the shaft 85 by means of the knob or handle 87. The segments 41 can only act upon the pinion-wheels 82 when the shaft 79 is lowered to bring said pinion-wheels 82 into engagement with said segments 41, and the gear-wheels 86 can only be utilized in connection with the gear-wheels 83 to restore the registering-wheels 78 to their zero position when the shaft 79 is in its upper position, (shown in Fig. 8,) in which position the gear-wheels 83 and 86 intermesh with one another. When the gear-wheels 83 are in their upper position, it will be seen that the rotation of the gear-wheels 86 will result in the turning of all of the registering-wheels 78 until the blank spaces 84 of the gear-wheels 83 come into alinement with the gear-wheels 86 and that at such time the continued motion of the gear-wheels 86 will have no influence

upon the gear-wheels 83 or the registering-wheels 78 connected therewith. In view of the fact that each of the gear-wheels 83 is possessed of the blank space 84 the said gear-wheels may come to a rest one after another as the registering-wheels 78 reach their zero position.

I have embodied the means just hereinbefore described for restoring the registering-wheels 78 to their zero position in an application for Letters Patent of the United States, Serial No. 721,410, filed June 22, 1899, and hence the said features are not separately claimed herein and will not require further description, except to point out the means provided in the register shown in this application for preventing any undue momentum of the registering-wheels 78 from carrying said wheels beyond their zero position, and these means are indicated in Fig. 8, in which it will be seen that each pinion-wheel 82 is accompanied by a dog 87, which brings up against a stop 88 when the registering-wheels 78 attain their initial or zero position.

The dogs 87 can only contact with the stops 88 when the shaft 79, carrying the registering-wheels 78, is in its upper position, (shown in Fig. 8,) since when said shaft 79 is in its lower position, as shown in Fig. 10, the dogs 87 will be below the stops 88. The dogs 87 revolve with the pinions 83 and registering-wheels 78, and the stops 88 are simply in the nature of lugs depending downward from the transverse frame 89, which extends transversely above the registering-wheels 78, as shown in Figs. 8 and 10, and is formed with the elongated slot 90, which constitutes a spy-hole through which the owner of the register at the proper time may "read" the registering-wheels 78. When the registering-wheels 78 are at their zero position, the ciphers on the registering-wheels will appear in line with and below the elongated slot 90. The frame 89 will cover all of the numerals on the registering-wheels 78, with the exception of those directly below the elongated slot or opening 90, and hence the said frame 89, having the elongated slot or opening 90, constitutes a convenient means for enabling the owner of the register to easily read the registering-wheels 78.

Since I have been describing the setting back of the registering-wheels 78 to their zero position and the "reading" of said registering-wheels by the owner of the register, it may be well here to call attention to the fact that in order to read the registering-wheels 78 the hinged door 91, provided in the front of the register-casing, must be unlocked and opened. It is my purpose that the owner of the register shall alone possess the key by which the lock securing the door 91 in its closed position may be operated. When the door 91 is opened to its inward position, (indicated by dotted lines in Fig. 3,) the owner of the register may inspect the registering-wheels 78 by looking through the elongated slot or opening 90. After reading the registering-wheels 78 the

owner of the register should return the registering-wheels 78 to their zero position, and this he will do by the rotation of the shaft 85 and pinion-wheels 86 in the manner hereinbefore described. The shaft 85 and pinion-wheels 86 can only be rotated when the door 91 is in its open position, since said door is provided with an arm 92, which when the door is in its closed position contacts with the front end of the dog 93, Fig. 3, and holds its detent down against one of the wheels 86, whereby the wheels 86 and their shaft 85 are locked in stationary position. Thus when the door 91 is open the owner of the register may inspect the registering-wheels and make a memorandum of the amount registered up to that time, and thereupon, the door 91 then being free of the dog 93, he may by operating the shaft 85 and pinions 86 restore the registering-wheels 78 to their zero position.

I have described hereinbefore that during the upward motion of the actuating or setting levers 83 the segments 41 follow said levers under the force of the springs 45, connected with the arms 46, extending rearward from said segments. When the actuating or setting levers 83 are moved upward to set or permit the setting of the segments 41, the shaft 79, carrying the pinion-wheels 82 and registering-wheels 78, is in its upward position, (shown in Fig. 8,) and the next step in the operation of the machine necessary to be performed will be the lowering of said shaft 79, so that its pinion-wheels 82 may pass into mesh with the said segments 41, as indicated in Fig. 10. The mechanism for thus lowering the shaft 79 is probably more clearly illustrated in Figs. 7, 8, and 15, and this mechanism is initially set in motion by the operator in pulling the crank or handle 65 from its vertical position (shown in Fig. 2) to its lower position. (Shown by dotted lines in Fig. 2.) Upon the end of the shaft 81, carrying the arms 80, which support the shaft 79, is provided the arm 94, which is normally under the tension of a spring 95, which tends to pull downward on the arm 94, and thereby turn the shaft 81 to move the registering-wheel shaft 79 to its upward position. The arm 94 carries the adjustable stop-screw 96, whose lower end bears upon the upper edge of a plate 97, which is loosely hung upon the shaft 81 and which is normally kept against the stop-screw 96 by means of a pivoted dog 98, which is mounted upon the pin 99, carried by a plate 100, which is also loosely hung upon the said shaft 81. The plate 100, through the dog 98, retains the plate 97 normally against the stop 96 of the arm 94, and said plate 100 is normally held in rigid position by the contact of a roller 101, mounted on said pin 99, with a segment-cam 102, rigidly secured upon the end of the main shaft 44, which shaft at its outer end receives the aforesaid crank or handle 65. The segment or cam 102 is provided with a pin 103, which at the proper time will contact with the pivoted dog

98 and trip the same from the plate 97, allowing the plate 97 to descend or turn downward and leaving the spring 95 free to draw the arm 94 downward, and thereby move the registering-wheel shaft 79 upward. The segment or cam 102 on the shaft 44, when the exposed crank or handle 65 is turned to its lower position, operates through the intermediate mechanism and against the stress of the spring 95 to elevate the rear end of the arm 94 and turn the arms 80, carrying the registering-wheel shaft 79, to their lower position, whereby the pinions 82, connected with the registering-wheels 78, are brought into engagement with the segments 41, as indicated in Fig. 10. When the crank or handle 65 is turned forward and downward toward its stop 66, Fig. 2, the segment or cam 102 on the shaft 44 will be carried upward and rearward and will press against the roller 101, carried by the plate 100, and cause said plate to be moved upward and rearward, which movement of said plate 100 causes the pivoted dog 98 to drive the plate 97 upward against the lower end of the stop-screw 96, with the effect of elevating the rear end of the arm 94 and causing the registering-wheel shaft 79 to descend to its lower position. The first part of the downward motion of the crank or handle 65 drives the segment 102 against the roller 101 of the plate 100, and hence the first action of the crank or handle 65 is to lower the pinions 82, connected with the registering-wheels, into engagement with the then elevated segments 41. The continued forward and downward motion of the crank or handle 65 results in the roller 101 leaving the recess 104 of the segment 102 and in the curved periphery 105 of said segment 102 riding against said roller 101 with a substantially uniform pressure. While the periphery 105 of the segment 102 is riding against the roller 101 the crank or handle 65 is operating, through the intermediate means to be hereinafter described, to return the segments 41 to their initial position, the said segments 41 turning downward and frontward and sweeping against the pinions 82 of the registering-wheels 78, whereby said registering-wheels 78 are turned a distance corresponding with the distance traveled by the segments 41. After the segments 41 have reached their lower position the registration will then have been effected and it will be desirable for the shaft 79, carrying the registering-wheels 78, to return to its upward position, and this result is accomplished at the time mentioned—that is, after the segments 41 have reached their lower position and registration has been effected—by the contact of the pin 103, carried by the segment 102, with the pivoted dog 98. The contact of the pin 103 with the front end of the dog 98 results in said dog being turned on its pin 99 and being thereby relieved from the plate 97, thus leaving said plate 97 unrestrained and free to descend under the pressure brought thereon by the

spring 95, acting through the arm 94 and stop-screw 96. When the dog 98 is thus relieved from the plate 97, the spring 95 will be left free to act and will pull downward on the rear end of the arm 94 and turn the arms 80, carried by the shaft 81, to their upward position. (Shown in Fig. 8.) The descent of the plate 97 under the action of the spring 95 (when the dog 98 releases said plate) is limited by means of a plate 106, which, as shown in Fig. 8, is pivotally secured to the plate 97 and at its lower end straddles a rod 107, the lower end of the plate 106 being slotted to pass upon said rod 107. In Fig. 8 the stop-plate 106 is shown in its lower position; but since the lower end of said plate is slotted it may ascend with the plate 97 when the registering-wheel shaft 79 is moved downward to its lower position. Thus after the registration has been effected the pin 103 of the segment 102 will free the dog 98 and allow the spring 95 to elevate the registering-wheel shaft 79 to its upward position, carrying the pinions 82 entirely free of the segments 41 and leaving said segments 41 free to be again elevated upon a subsequent sale being made. The downward motion of the plate 97 under the action of the spring 95 also results in the ringing of the gong or bell 108 by means of the hammer 109, whose rod 110 is pivoted upon the plate 100 in position to be acted upon by a pin 111, carried by the plate 97. When the plate 97 quickly descends under the impulse of the spring 95, its pin 111 will move against the short arm of the rod 110 and cause the hammer 109 to ascend and strike the bell or gong 108. After the pin 103 has tripped the dog 98 to allow the spring 95 to restore the registering-wheel shaft 79 to its upward position the exposed crank or handle 65 will be returned to its normal vertical position, and while moving to that position said crank or handle 65 will reverse the motion of the main shaft 44 and move the segment 102 to its lower normal position, (shown in Fig. 8,) at such time the pin 103 receding from the dog 98 and the roller 101, carried by the plate 100, riding on the periphery 105 of said segment or cam 102 until said roller 101 passes into the recess 104 of said segment or cam 102. When the roller 101 reaches and passes into the recess 104 of the segment or cam 102, the plate 100 will then have been restored to its normal lower position and the spring 112 will operate to turn the rear end of the dog 98 into the recess provided for it in the lower front edge of the plate 97, the parts being thus restored to their original normal position preparatory to being again acted upon during the subsequent registration of the amount of another sale.

The mechanism for normally holding the registering-wheel shaft 79 in its elevated position and the means for lowering said shaft 79, so as to carry its pinion-wheels 82 into engagement with the then elevated segments 41, having been described, I will now describe the means connected with the shaft 44 by

which during the forward and downward motion of the exposed crank or handle 65 the segments 41 receive their downward and forward motion to their initial normal position.

5 The main shaft 44 is furnished with the series of pins 113, Fig. 10, in alinement with one another and also with a series of pins 114, which are in alinement with one another, the pins 114 being utilized in connection with the carrying mechanism hereinafter described and the

10 pins 113 being provided for contact with the free ends 115, Fig. 8, of the flexed springs 48, hereinbefore referred to, carried by the segments 41. After the segments 41 have reached

15 their proper upward position and the registering-wheels 78 have been lowered the continued motion of the exposed crank or handle 65 to its lower horizontal position causes the shaft 44 to turn the pins 113 against the

20 said inner ends 115 of the springs 48 and by pressing on said springs return the segments 41 to their normal downward position, said segments 41 during this movement operating through the pinions 82 to rotate the register-

25 ing-wheels 78. The pins 113 constitute the element connected with the shaft 44, by which during the turning of said shaft the segments 41 are restored to their normal downward position. The springs 48 are of stout texture

30 and are strong enough when contacted with by the pins 113 to move the segments 41 to their normal downward position. The shaft 44 after the segments 41 reach their normal downward position has a slight further motion, and during this slight further motion of

35 this shaft 44 under the action of the crank or handle 65 the pins 113, continuing to press against the springs 48, drive the free ends 115 of said springs slightly downward, as indicated by dotted lines in Fig. 10. This slight

40 further motion of the pins 113 after the segments 41 have reached their normal downward position is utilized at the proper time for effecting the carrying from one register-wheel to another. The segments 41 are furnished with movable stops, hereinafter described, for checking them (when carrying is

45 not to be done) when they reach their normal downward position, and hence the further movement of the pins 113 against the springs 48 will under such condition press the springs 48 and not affect the segments 41; but in the construction hereinafter described I provide

50 means for freeing the said stops which check the motion of the segments 41 when they reach their normal downward position, so that when it is necessary to carry from one register-wheel to another the said segments 41

55 may move a distance of one tooth downward below their normal position, so as to effect the carrying. When the said segments 41 are freed from their stops, so as to make this slight extra movement below their normal position, the pressure of the pins 113 does not

60 then compress the springs 48, as indicated by the dotted lines in Fig. 10, but in lieu of such compression moves the spring and segment

41 the slight farther distance necessary to effect the carrying, this distance being equal to the space of one tooth of the segment.

I will now describe the means for checking the segments 41 when they reach their normal downward position and means for relieving said check and permitting said segments 41 to have a slight further downward motion when it is desired to carry from one registering-wheel 78 to another, and first I will refer to the dogs 116, which rotate with the registering-wheels. These dogs 116 are simply metallic arms, one being provided for each pinion 82, connected with the registering-wheels 78. The dogs 116 may for convenience, as they are here illustrated, be formed in one piece with the dogs 87, since both the dogs 116 and dogs 87 have a connection with the registering-wheels 78 and rotate with said wheels. The dogs 116 have but one purpose to accomplish, and that is to upon each complete rotation of a registering-wheel pass against and move outward a spring latch or pawl 117 from its normal position (shown by full lines in Fig. 10) to its inoperative position. (Illustrated by dotted lines in Fig. 10.) When the latch 117 is moved outward to its inoperative position, it becomes freed from the front end of a lever-arm 118, mounted upon the transverse rock-shaft 81. The lever 118 is connected by rods 119 and 120 with a lever 121, also mounted upon said shaft 81 and forming, with the lever 118, a connected frame. The rod 119 has connected with it a spring 122, which pulls downward and operates to normally throw the front ends of the levers 118 and 121 upward, said front ends of the levers 118 and 121 being only held in their downward position by the engagement of the latch 117 with the lever 118. The lever 121 substantially corresponds throughout its upper part with the lever 118, but at the front end of its upper portion possesses the pin 123, which passes within the outline of the segment 41, as indicated by dotted lines in Fig. 10, and serves as a stop for checking the segment 41 when the latter has reached its normal lower position. It will be observed upon reference to Fig. 10 that the pin 123 when the levers 118 and 121 are in their lower position occupies one relation to the segment 41 and that when the said pin is in said position it prevents the segment 41 when in its normal downward position from having any further movement downward, any further movement of the main shaft 44 and pins 113 at such time only resulting, so far as the segments 41 are concerned, in compressing the springs 48 in the manner indicated by dotted lines in Fig. 10. When, however, the latch 117 has been moved outward by the dog 116 from its engagement with the lever 118, the spring 122 turns the levers 118 and 121 upward, as shown by dotted lines in Fig. 10, and thereby the pin 123, carried by the lever 121, is moved forward in advance of its previous normal position, and when the pin 123 is in this po-

sition it will be apparent that it will permit the segment 41 to move a slight distance (equal to the space represented by one of its teeth) farther downward before becoming stopped by said pin. It will be observed by the dotted lines in Fig. 10 that when the pin 123 is in its lower normal position it will check the segment 41 when the latter reaches its normal downward position, but that when said pin 123 is elevated the segment 41 may then have a slight further downward motion. This slight further downward motion of the segment 41 is utilized in the carrying from one registering-wheel to the other, as will be hereinafter more fully explained. The latch 117 is only relieved from the lever 118 when the dog 116 contacts with the same, and hence it is only at each rotation of the registering-wheels that the dogs 116 strike the latches 117 and free the levers 118, so that the springs 122 may elevate the stop-pins 123 and permit the segments 41 to have the slight further downward motion below their normal position to effect the carrying from one registering-wheel to another. The upper portion of the levers 121 corresponds substantially in outline with the lever 118; but, as above mentioned, said lever 121 carries the pin 123, and in addition said lever 121 is formed with the downwardly-extending arm 124, which when the upper portion of the lever 121 moves upward and forward is carried inward toward the shaft 44 in position to be met by the aforesaid pins 114, carried by said shaft. The pins 114 during the forward-and-downward motion of the shaft 44 turn upward toward the registering-wheels 78; but during the return motion of said shaft 44 to its normal position said pins 114 are carried downward and during this motion will contact with the lower arms 124 of the levers 121 (provided said levers 121 are not already in their normal position) and return said levers 121 to their downward position, the downward motion of the levers 121 resulting in the levers 118 also being pulled downward to their normal position and in being locked in such position by the latches 117. When the front end of the lever 118 is pulled downward by the action of the pins 114 on the lever 121, the latch 117 is moved inward to automatically lock the lever 118 by the action of the spring 125, flexed against said latch. The levers 118 and 121 are arranged in pairs or sets, the first lever 118 being near the units-of-cents-registering wheel 78, Fig. 9, and this wheel 78 being equipped with a dog 116 to act upon the latch 117 for said first lever 118 and the first lever 121 being arranged adjacent to the second or tens-of-cents registering wheel 78 and being connected with the first lever 118 by means of the rod 120 and the like rod 119, the latter rod being indicated in Fig. 10. Since it will never be desired to carry to the first or units-of-cents registering wheel 78, the first or units-of-cents segment 41 will never have any but its usual predetermined normal

extent of motion, and consequently the first or units-of-cents segment 41 will not be equipped with the lever 121. Thus, as indicated in Fig. 9, the units-of-cents-registering wheel possesses the dog 116 for tripping the latch 117 from the lever 118; but said lever 118 is connected with the lever 121, adjacent to the second or tens-of-cents registering wheel 78, and its pin 123 is in position to cooperate with the tens-of-cents or second segment 41. Now if it be supposed that the first registering-wheel 78 has completed its revolution and that it is desired to carry to the tens-of-cents-registering wheel it will be understood that the dog 116, connected with the units-of-cents-registering wheel, will trip the first latch 117 and allow the spring 122 to move the levers 118 and 121 upward. This upward movement of the levers 118 and 121 can perform no effect upon the units-of-cents-registering wheel, but by elevating the pin 123 permits the second or tens-of-cents segment 41 to have the additional downward motion beyond its normal position, whereby said tens-of-cents or second segment 41 is enabled not only to move the tens-of-cents-registering wheel the proper distance, due to its normal action, but also an additional space, due to the fact that it will not become checked by the then elevated pin 123 until it is moved a distance of one tooth below its ordinary normal position. If the second or tens-of-cents segment 41 is in its ordinary lower normal position and at rest at the time the first dog 116 trips the latch 117 and relieves the levers 118 and 121, the carrying to the tens-of-cents-registering wheel would be effected, since the shaft 44 carries a pin 113 for each segment 41, and consequently, although the tens-of-cents segment 41 may at the time referred to be in its lower position, it would be acted upon by its pin 113 during the continued motion of the shaft 44 and be caused to move downward a distance equal to one its teeth, and thus be compelled through the pinion 82 then in engagement with it to move the tens-of-cents-registering wheel a distance equal to one space.

When it is necessary to carry from the tens-of-cents-registering wheel to the units-of-dollars-registering wheel, the devices hereinbefore described for effecting the carrying from the units-of-cents to the tens-of-cents registering wheel will be duplicated, and thus, as shown in Fig. 9, the pinion 82 for the tens-of-cents-registering wheel revolves with the dog 116 for tripping the latch 117 of the second lever 118, (corresponding with the lever shown in Fig. 10,) and this lever 118 is connected by a rod 126 (in this instance somewhat longer than the rod 120) with a lever 121, located adjacent to the pinion 82 for the units-of-dollars-registering wheel 78. The said lever 121, as shown at the left-hand portion of Fig. 9, has its stop-pin 123 within the outline of the segment 41 for the units-of-dollars-registering wheel, and hence when the

tens-of-cents-registering wheel 78 has completed its revolution and the dog 116, connected therewith, has tripped its latch 117, so as to release the second lever 118, the spring 127 will move upward the said lever 118 adjacent to the tens-of-cents-registering wheel 78 and the lever 121 adjacent to the units-of-dollars-registering wheel 78, and thus the units-of-dollars segment 41 will be enabled to move slightly below its normal lower position and carry from the tens-of-cents-registering wheel 78 to the units-of-dollars-registering wheel 78. The lever 118, adjacent to the tens-of-cents-registering wheel, and the lever 121, adjacent to the units-of-dollars-registering wheel, are, as above described, connected by the rod 126 and also by the corresponding rod 128, (shown by dotted lines in Fig. 9,) this rod 128 corresponding with, though longer than, the rod 119, which connects the first lever 118 with the first adjacent lever 121. The spring 127 pulls downward on the said rod 128 in the same manner that the spring 122 pulls downward on the rod 119.

The carrying mechanism thus consists of the lever 118, adjacent to the registering-wheel to be carried from, a dog 116, operating with said wheel, and a latch 117 to be contacted with by said dog for freeing said lever 118, combined with a lever 121, adjacent to the registering-wheel to be carried to, said lever 121 being connected with said lever 118 and carrying a stop-pin 123 to check the segment 41 at its normal downward position, except when the lever 121 is in its upward position, in which position it will permit the said segment 41 to have a limited further downward movement beyond its normal position to effect the carrying. This carrying mechanism will be duplicated for the various registering-wheels along the shaft 79, and since in the foregoing description I have described two sets of this carrying mechanism it will be unnecessary to repeat the same for the additional registering-wheels. The totalizing-wheels correspond with the registering-wheels 78; but for convenience I number the totalizing-wheels 130, and they are illustrated in Figs. 4, 11, and 12. The totalizing-wheels are mounted upon the shaft 79, as usual, and I refer to them particularly because of the fact that the mechanism for carrying from one totalizing-wheel to the other differs somewhat from the carrying mechanism hereinbefore described for carrying from one registering-wheel to the next adjacent registering-wheel. The carrying mechanism for the totalizing-wheels is sufficiently illustrated in Figs. 4, 11, 12, and 19, in which it will be seen that the pinion 131 for the totalizing-wheels (corresponding with the pinions 82 for the registering-wheels) is when the shaft 79 is in its lower position in engagement with the upper end of the lever-arm 132, which is swiveled on the shaft 44 and is engaged by a lever-arm 133, mounted upon the shaft 81. The lever-arm

133 substantially corresponds with the lever-arms 121, hereinbefore described with respect to the registering-wheels, except that said lever-arm 133 is directly engaged by the latch 134, (shown in Figs. 11 and 12 corresponding with the latch provided for use in connection with the registering-wheels,) which latch 134 is adapted to be thrown from the lever-arm 133 by means of one of the dogs 116, so as to release the lever-arm 133 and permit it to be moved upward by the spring 135, connected therewith. The lever-arm 133 is connected by a link 136 (indicated by dotted lines in Fig. 11) with the toothed lever-arm 132 for the last totalizing-wheel 130 or the one to be carried to. When the latch 134 is by means of a dog 116 relieved from the lever-arm 133, the spring 135 will move upward the forward part of said lever 133, and this will have the effect of driving the link 136 forward and causing the toothed lever-arm 132 to turn the totalizing-wheel a distance equal to one tooth of its pinion 131, thus by means of the spring 135 at each revolution of the first totalizing-wheel and the tripping by the dog 116 of the latch 134 driving the link 136 forward to move the toothed lever 132 to rotate the second totalizing-wheel a distance equal to one space. The levers 133 and levers 121 and 118 are reset in their normal position (after the shaft 79 has been elevated) by the pins 114 during the reverse motion of the shaft 44, which pins, as indicated in Fig. 11, will during such reverse motion come into contact with the lower ends of the levers 133 (exactly the same as has been described with respect to the levers 121) and restore said levers 133 to their normal downward position, in which position they will be automatically caught by the latches 134.

It is my purpose that the operator when he pulls the exposed crank or handle 65 downward to effect the registration shall be compelled to move said crank or handle 65 entirely downward to its stop 66 and then entirely upward to its normal position, (shown by full lines in Fig. 2,) and to this end I provide upon the shaft 44, adjacent to the end thereof, the ratchet-plate 140, as shown in Fig. 3, to be engaged by the pawls 141 and 142, respectively, carried by arms 143, mounted upon the rock-shaft 81. The ratchet-plate 140 is keyed upon the shaft 44 and turns with that shaft when the latter is actuated by the exposed crank or handle 65. During the first part of the motion of the crank or handle 65 frontward and downward toward its stop 66 the shaft 81 has, as hereinbefore described, an immediate motion imparted to it by the contact of the segmental cam 102 with the roller 101, fastened upon the plate 100, and this motion of the rock-shaft 81 will at once move the pawl 142 downward against the teeth of the ratchet-plate 140 and at the same time move the pawl 141 from the ratchet-plate 140, and thus as the ratchet-plate 140 turns with the shaft 44 the pawl 142 will be in

engagement with the same, while the pawl 141 will be relieved from such engagement. The inclination of those ratchet-teeth of the plate 140 which are engaged by the pawl 142 is such that said pawl will slide over said ratchet-teeth during the movement of the ratchet-plate in a proper direction, with the exposed crank or handle 65 moving toward its stop 66; but, as will be apparent, the said teeth of the ratchet-plate 140 will be engaged by said pawl 142 if it should be attempted to move the crank or handle 65 to its upper position before it shall have been moved down to its lower position. After the crank or handle 65 has been moved completely to its lower position the pin 103 on the segmental cam 102 trips the dog 98, Fig. 8, and allows the spring 95 to turn the shaft 81 and elevate the registering-wheels 78, and at this time, the exposed crank or handle 65 being in its lower position, the movement of the shaft 81 will free the pawl 142 from the ratchet-plate 140 and move the pawl 141 into engagement with said ratchet-plate. The purpose of the pawl 141, in connection with its portion of the ratchet-plate 140, is to compel the operator to return the crank or handle 65 to its complete upward position. As will be understood upon reference to Fig. 3, when the crank or handle 65 is being returned to its upward position the pawl 141 will slide over the teeth of the ratchet 140; but should it be attempted to move the crank or handle 65 downward before it shall have fully reached its upward position the pawl 141 by engaging the teeth of the ratchet 140 will lock the shaft 44 in stationary position in respect to any downward motion of the crank or handle 65. Thus the pawl 142, in connection with the ratchet-plate 140, prevents any upward motion of the crank or handle 65 until it has made a complete downward motion, and the pawl 141, in connection with the ratchet-plate 140, prevents the crank or handle 65 from being pulled downward until it has made a complete upward stroke. The purpose of the pawls 141 and 142, in connection with the ratchet-plate 140, is to prevent fraud in the use of the register.

In the preferred construction of my cash-register I provide means for locking the actuating-levers 33 in the position in which they may be set until the exposed crank or arm 65 has been returned to its elevated position, and these means are more clearly illustrated in Figs. 13 and 14, in which it will be seen that each actuating-lever 33 is provided with the segmental rack 144 and that in front of these racks 144 is provided a transverse sliding plate 145, having a series of arms 146, whose upper rearwardly-turned ends form lips 147. The arms 146 are normally adjacent to the sides of the segmental racks 144, being there held by a coiled spring 148, as shown in Fig. 14; but said arms 146 are capable of being moved into alignment with the racks 144, so that the lips 147 may engage

said racks and operate to lock the said levers 33 in stationary position. The ends of the plate 145 are free to move in guides 149, and at one end said plate 145 is formed with the cam 150 in position to be acted upon by the segment 151, mounted upon the main shaft 44. It may be assumed for purposes of explanation that the levers 33, or some of them, have been moved along their line of travel to some predetermined position or positions and that said levers 33 during said movement have carried the racks 144 with them. The next operation of the machine is the turning of the exposed crank or handle 65 to its lower position, and it has already been explained that this motion of the crank or handle 65 is imparted to the shaft 44. The movement of the shaft 44 will carry the segment 151 against the cam 150 on the plate 145 and force said plate to have a sliding motion sufficient to carry the lips 147 of the arms 146 into engagement with the racks 144 of the levers 33, and thereby said levers will be locked in their said position until the segmental cam 151 has passed entirely downward with the shaft 44 and then turned upward again under the action of the exposed crank or handle 65 to its full upward position, at which time it will have passed clear of the cam 150, and the springs 148 will withdraw the locking-lips 147 from the racks 144, leaving the levers 33 free to be operated when another sale shall have been made. In the absence of some locking means for securing the levers 33 the said levers might all be pulled down to their lower position, and while down the crank 65 could be turned to lower the pinions 82 of the registering-wheels into engagement with the segments 41 then in their lower position, under which condition the operator could then move the levers 33 to indicate any amount he might desire and then pull the crank or handle 65 the rest of the way down to open the shutter 57, ring the bell 108, open the cash-drawer, and do everything but register the amount indicated. When the levers 33 are, however, provided with the racks 144, they will be locked in position when the crank-handle 65 and shaft 44 are moved, and hence cannot after the crank-handle 65 is moved be utilized to indicate, the construction being such that the levers 33 must be moved to effect the indication before the crank-handle 65 is set in motion to perform its duty.

Operation: The operation of the cash-register made the subject hereof has been so fully explained in connection with the description of the construction of the various parts of the mechanism that it would seem only necessary to refer briefly to the operation of the register as a whole at this place. The actuating or setting levers 33 are moved upward to set the toothed segments 41, said segments 41 automatically following the levers 33 upward, due to the action of the springs 45. The upward motion of the actuating-levers 33, also through the rack-bars 42,

turns the indicating cylinders or drums 43. Thereafter the operator will take hold of the exposed crank or handle 65 and move the same downward to its stop 66, and thereby rotate the main shaft 44 and the parts rigidly connected therewith. The rotation of the shaft 44 effects several functions, one being that the segmental cam 102 at one end of the shaft is caused, through the roller 101, Fig. 8, dog 98, plate 100, plate 97, and arm 94, to turn the shaft 81, and thereby move the registering-wheel shaft 79 downward, so that the pinions 82 on the registering-wheels may pass into engagement with the toothed segments 41, and the continued downward motion of the exposed crank or handle 65 carries the pins 113 on the shaft 44 against the springs 48, carried by said segments 41, with the result that said segments 41 will be returned to their normal downward position, and while moving to such position rotate the registering-wheels 78. The latter part of the downward motion of the exposed crank or handle 65 results in the pin 103 of the segmental cam 102 coming into contact with and tripping the dog 98 from the plate 97, Fig. 9, and allowing the spring 95 to pull downward on the arm 94 and elevate the registering-wheel shaft to its upper position free from the segments 41. The bell 108 is sounded when the dog 98 releases the plate 97. The downward motion of the exposed crank or handle 65 also carries the loop 67 on the shaft 44 against the short arms of the lever 61 and latch 76, Fig. 6, and elevates thereby the shutter 57 to expose the numerals on the indicating cylinders or drums 43 and also frees the cash-drawer 31, so that the spring 32 may drive said drawer to its open position. The downward motion of the exposed crank or handle 65 also turns the cam 151 at the left-hand end of the shaft 44 to lock the actuating-levers 33, Figs. 13 and 14, until said crank or handle 65 has been returned to its upper normal position. Means are also provided, as shown in Fig. 3, for compelling the operator to move the exposed crank or handle 65 to its full downward position and then to its full upward position, the operator being thereby prevented from giving only a partial motion to said crank or handle. The means for carrying from one registering-wheel 78 to another and the means for returning the registering-wheels to their zero position have been, in respect of their construction and operation, sufficiently described hereinbefore.

In the description hereinbefore presented it has been explained that when the exposed crank or handle 65 has been moved to its full downward position the pin 103 on the segmental cam 102, Fig. 8, will trip the dog 98 and allow the spring 95 to elevate the registering-wheel shaft 79; but I desire it to be understood that the invention is not limited to that timing of the parts which results in the releasing of the registering-wheel shaft 79 when the exposed crank or handle 65 is at its lower posi-

tion, since the said shaft 79 may with perfect propriety be released to ascend to its elevated position at the time the exposed crank or handle 65 reaches its upward position, and hence I illustrate in Figs. 20 to 29, inclusive, such changes of the mechanism as would be desirable in instances in which the upward motion of the registering-wheel shaft 79 is to take place only after the exposed crank or handle 65 has been returned to its upper position.

Referring to Fig. 20, the main shaft 44 is shown as supplied with the toothed ratchet-plate 140 for the pawls 141 and 142, as hereinbefore described with respect to the construction shown in Fig. 31; but in Fig. 20 the illustration presents the ratchet-plate 140 as having been turned forward and downward under the forward and downward motion of the exposed crank or handle 65. The pawls 141 and 142 are, as more clearly illustrated in Fig. 26, carried by a plate 152, loosely hung upon the rock-shaft 81, and the said pawls have their engaging ends pressed toward one another by means of a bent spring 153, (indicated by dotted lines in Fig. 26,) the extent to which the spring 153 may move the said pawls toward one another being limited by the pins 154. Upon the rock-shaft 81, adjacent to the pawl-plate 152, is loosely hung the plate 155, (shown more clearly in Figs. 22, 23, and 24,) carrying the roller 156 and dog 157, this roller 156 and this dog 157 corresponding with the roller 101 and dog 98. (Shown in Fig. 8.) The engaging end of the dog 157 has a normal upward tension imparted to it by means of the spring 158, and the other end of the said dog 157 is adapted to be tripped by a pin 159, carried by a segmental cam 160, secured adjacent to the end of the main shaft 44, which segmental cam 16, is adapted during the motion of the exposed crank or handle 65 to travel from the position in which it is shown by dotted lines in Fig. 22 to that in which it is illustrated in full lines in said figure, and then back to its first position shown by said dotted lines. Upon the rock-shaft 81, adjacent to the pawl-plate 152, is also loosely hung the plate 161, (shown in detail in Figs. 26, 27, and 29,) and this plate 161 is connected with the pawl-plate 152 by a screw or bolt 162, so that said plate 161 and said plate 152 may move together, the plate 161 carrying the pin 163 for striking the bell-hammer arm 164. The plate 161 and plate 152 at their rear portions are normally pulled downward by means of a spring 165, (see Fig. 26,) which is connected with a stop-plate 166, hung upon the plate 162 and straddling the rod 167. The dog 157 is normally in engagement with the lower notched end of the plate 161 until said dog is tripped from said plate 161. When the ratchet-plate 140 on the main shaft 44 is in its normal at-rest position, the cam 160 will be in the position in which it is shown by dotted lines in Fig. 22, and at such time the dog 157 will be in engagement with the notched

plate 161 and hold said plate, together with the pawl-plate 152, in stationary position with respect to the plate 155, carrying said pawl.

Upon the rock-shaft 81 is rigidly mounted the lever-arm 168, (more clearly shown in Figs. 22 and 24,) which arm 168 is provided with a stop-screw 169, which has a bearing upon the rear edge of the plate 155. The arm 168 has a normal downward tension under the action of the spring 170, Fig. 23, this spring 170 keeping the arm 168 against the plate 155 and maintaining the plate 155 against the segmental cam 160 on the main shaft 44. The operation of the arm 168 and spring 170 is to move the arms 80, carrying the registering-wheel shaft 79 to its upward position.

When the exposed crank or handle 65 is started forward and downward, the segmental cam 160 on the main shaft 44 presses against the roller 156 and through said roller causes the plate 155 and arm 168 to move upward, thereby turning the rock-shaft 81 to lower the registering-wheel shaft 79. The registering-wheel shaft 79 will remain in its lower position during all of the time that the periphery of the cam 160 is moving against the roller 156 of the plate 155, and thus it will be apparent that the registering-wheel shaft 79 will be compelled to remain in its lower position during all of the time that the exposed crank or handle 65 is turning downward from its normal vertical position to its lower horizontal position and then back to its vertical position. Thus in the construction presented in Fig. 22 the registering-wheel shaft 79 is not released to return to its upper position when the exposed crank or handle 65 reaches its lower position, but is only released to ascend to its elevated position after the said crank or handle 65 has reached its upper position, the cam 160 at that time having carried its curved periphery from the roller 156 of the plate 165. When the exposed crank or handle 65 has reached its upper position and the curved periphery of the cam 160 has left the roller 156, the spring 170, pulling downward on the arm 168, will rock the shaft 81 and turn the registering-wheel shaft 79 to its upper position. The means for lowering and elevating the registering-wheel shaft 79 and for the release of the said registering-wheel shaft to elevate only when the crank or handle 65 has again reached its upper position are illustrated in Figs. 22 to 25, inclusive.

In the modified form of construction which I am now describing the dog 157 merely operates as an intermediate connection between the cam-plate 160 and the notched plate 161, to which the pawl-plate 152 is connected, and said pawl 152 is tripped by the pin 159, carried by the cam 160, at the time the exposed crank or handle 65 reaches its lower position, since at this time it is desired that the pawls 141 and 142 shall reverse their position in order that, as described with respect to the construction shown in Fig. 3, the operator may

be compelled to move the exposed crank or handle 65 to its full upward position. When the dog 157 is in engagement with the notched lower corner of the plate 161 and the cam 160 is pressing against the roller 156, the plate 155, arm 168, and plate 161 are all moved upward and kept upward until the pin 159 trips the pawl 152 from the plate 161, and at such time the plate 155 and arm 168 will remain upward, (with the registering-wheel shaft 79 in its lower position;) but the spring 165, Fig. 26, will pull downward on the notched plate 161 and throw the pawl 141 against the ratchet 140 and the pawl 142 upward from said ratchet, in which condition of the parts the pawl 141 will compel the operator to return the exposed crank or handle 65 to its full upward position. When the crank or handle 65 reaches its full upward position, the curved periphery of the cam 160 will leave the roller 156, and at this time the spring 170 will move the arm 168 and plate 155 downward, elevating the registering-wheel shaft 79. The pin 163 is moved against the hammer-arm 164 at the time the exposed crank or handle 65 has reached its lower position and the dog 157 has been tripped by the pin 159. The downward movement of the plate 161 by the spring 170 at the time the dog 157 is tripped causes said plate 161 to carry the pin 163 against the arm 164 of the bell-hammer and effects thereby the sounding of the gong.

With respect to the construction shown in Figs. 20 to 29, inclusive, it is to be said that the special means presented in these figures is to effect the release of the registering-wheel shaft 79, so that it may return to its upper position only when the exposed crank or handle 65 has been returned to its full upward position instead of, as in the construction shown in Fig. 8, permitting of the release of the registering-wheel shaft 79 at the time when the crank or handle 65 is at its lower position. In the construction shown in Figs. 20 to 29, inclusive, as in the construction shown in Figs. 3 and 8, the gong sounds when the crank or handle 65 reaches its lower position, and the operator is compelled by means of the ratchet-plate on the shaft 44 and the coacting pawls 141 and 142 to move the crank or handle 65 to its full downward position and then to its full upward position, all intermediate motions being prevented.

In view of the fact that in the construction presented in Figs. 20 to 29, inclusive, the registering-wheel shaft 79 is retained in its lower position until the crank or handle 65 has been returned to its upper position, it is necessary that some means be provided for locking the pinion-wheels 82 on said shaft 79 against rotation in the reverse direction, since otherwise the crank 65, after having been turned to its lower position, might there be allowed to remain and the operator permitted to move the actuating-levers 33 upward to cause the segments 41 to reverse the motion previously imparted to the registering-wheels by them

during the downward motion of the crank or handle 65. To prevent any such result, I provide each of the pinion-wheels 82 with a locking-pawl 175, (see Fig. 20,) which prevents any reverse rotation of the registering-wheels, but permits proper rotation of the said wheels under the action of the segments 41. The pawls 175 will be loosely hung from the rock-shaft 81 and will be kept in engagement with the pinion-wheels 82 by means of suitable springs 176.

It is not intended to limit this application to the details of construction further than said details may be specifically pointed out in the claims, and these details in their form and arrangement in the broader scope of this invention will be varied at will in accordance with the size of the register to be produced and the will of the manufacturer. The cash-register shown in the drawings is provided with four of the actuating or setting levers 33, but these in number will vary as occasion may require. When a less number than four of the levers 33 is used, the number of indicating cylinders or drums 43 and registering-wheels 78 will be reduced accordingly.

Without, therefore, limiting myself to details of construction or forms of parts, what I claim as my invention, and desire to secure by Letters Patent, is—

1. In a cash-register, the actuating hand-levers, the front plate having the series of numerals along which said levers may be moved in accordance with the values to be indicated, the movable segments substantially independent of but adapted to automatically follow said levers and to have their position controlled thereby, the registering-wheels, and the gear connected therewith, combined with means for bringing said gearing into engagement with said segments after the latter have reached their predetermined operative position, the exposed crank or handle for thereafter moving said segments against said gearing to rotate said registering-wheels and return said segments to their normal position, and means for thereafter returning said registering-wheels and their gear to their normal position free of said segments; substantially as set forth.

2. In a cash-register, the actuating hand-levers, the plate having the series of numerals along which said levers may be moved in accordance with the values to be indicated, the movable segments substantially independent of but adapted to automatically follow said levers and to have their position controlled by said levers, the registering-wheels, and the gear connected therewith, combined with the exposed operating crank or handle, means intermediate said crank or handle and the shaft of said registering-wheels for bringing said gearing into engagement with said segments after the latter have reached their predetermined operative position, means intermediate said crank or handle and said segments for thereafter moving said segments against said

gearing to rotate said registering-wheels and return said segments to their normal position, and means for thereafter elevating said registering-wheels and their gears from engagement with said segments; substantially as set forth.

3. In a cash-register, the hand-levers, the plate having the series of numerals along which said levers may be moved in accordance with the values to be indicated, the movable segments substantially independent of but adapted to automatically follow said levers and to have their position controlled thereby, the registering-wheels, the gear connected therewith, and the springs acting against said segments to compel them to follow said actuating-levers, combined with the exposed crank or handle, means intermediate said crank or handle and the shaft of said registering-wheels for bringing said gearing into engagement with said segments after the latter have reached their predetermined operative position, and means intermediate said crank or handle and said segments for thereafter moving said segments against said gearing to turn said registering-wheels and return said segments to their normal position; substantially as set forth.

4. In a cash-register, the actuating hand-levers, the plate having the series of numerals along which said levers may be moved in accordance with the values to be indicated, the movable segments substantially independent of but adapted to automatically follow said levers and to have their position controlled thereby, the registering-wheels, the gear connected therewith, movable stops for controlling the extent of motion toward their normal position of said segments, and means connected with the registering-wheels for effecting the movement of said stops so that after each revolution of a registering-wheel the stop for the next adjacent segment may be moved to permit of a more extended movement of said segment for carrying from one registering-wheel to another, combined with means for bringing said gearing into engagement with said segments after the latter have reached their predetermined operative position, and means for thereafter moving said segments against said gearing for turning said registering-wheels and restoring said segments to their downward position against said stops; substantially as set forth.

5. In a cash-register, the actuating hand-levers, the plate having the series of numerals along which said levers may be moved in accordance with the values to be indicated, the movable segments substantially independent of but adapted to automatically follow said levers and to have their position controlled thereby, the registering-wheels, the gear connected therewith, movable stops for controlling the extent of motion toward their normal position of said segments, and means connected with the registering-wheels for effecting the movement of said stops so that

after each revolution of a registering-wheel the stop for the next adjacent segment may be moved to permit of a more extended movement of said segment for carrying from one registering-wheel to another, combined with the exposed crank or handle, means intermediate said crank or handle and the shaft of said registering-wheels for bringing said gearing into engagement with said segments after the latter have reached their predetermined operative position, and means intermediate said crank or handle and said segments for moving said segments against said gearing to rotate said registering-wheels and return said segments to their downward position against said stops; substantially as set forth.

6. In a cash-register, the hand-lever, the plate having the series of numerals along which said lever may be moved in accordance with the value to be indicated, the movable segment substantially independent of but adapted to automatically follow said lever and to have its position controlled by said lever, the registering-wheel, and the gear connected therewith, combined with the exposed crank or handle for bringing said gear into engagement with said segment after the latter has reached its predetermined operative position and moving said segment against said gear for rotating said registering-wheel and returning said segment to its normal position; substantially as set forth.

7. In a cash-register, the hand-lever, the plate having the series of numerals along which said lever may be moved in accordance with the value to be indicated, the rocking segment substantially independent of but adapted to automatically follow said lever on the upward movement of the latter, the spring connected with said segment for causing said segment to follow said lever, the registering-wheel, and the gear connected therewith, combined with means for moving said segment against said gear during the return movement of said segment to its normal position without affecting the said hand-lever, whereby said segment is given its predetermined operative position by the upward movement of said hand-lever and is then returned to its normal position independently of said hand-lever and is at such time caused to operate said registering-wheel; substantially as set forth.

8. In a cash-register, the hand-lever, the plate having the series of numerals along which said lever may be moved in accordance with the value to be indicated, the movable segment substantially independent of but adapted to automatically follow said lever and to have its position controlled by said lever, the registering-wheel, and the gear connected therewith, combined with the exposed crank or handle for bringing said gear into engagement with said segment after the latter has reached its predetermined operative position and moving said segment against said gear to rotate said registering-wheel and

return said segment to its normal position, and means for preventing any return motion of said exposed crank or handle toward its normal position until it has made a complete motion from said position; substantially as set forth.

9. In a cash-register, the hand-lever, the plate having the series of numerals along which said lever may be moved in accordance with the value to be indicated, the movable segment substantially independent of but adapted to automatically follow said lever and to have its position controlled by said lever, the registering-wheel, and the gear connected therewith, combined with the exposed crank or handle for bringing said gear into engagement with said segment after the latter has reached its predetermined operative position and moving said segment against said gear to rotate said registering-wheel and return said segment to its normal position, and means for preventing any return motion of said exposed crank or handle toward its normal position until it has made a complete movement in the operation of said segment and also for preventing said exposed crank or handle from making any return motion after once having been started toward its normal position; substantially as set forth.

10. In a cash-register, the actuating hand-levers, the plate having the series of numerals along which said levers may be moved in accordance with the values to be indicated, the movable segments substantially independent of but adapted to automatically follow said levers to have their position controlled thereby, the registering-wheels, and the gear connected therewith, combined with the exposed crank or handle for bringing said gearing into engagement with said segments after the latter have reached their predetermined operative position and moving said segments against said gearing to rotate said registering-wheels and return said segments to their normal position, and means for locking said actuating hand-levers in rigid position until registration has been effected; substantially as set forth.

11. In a cash-register, the actuating hand-levers, the plate having the series of numerals along which said levers may be moved in accordance with the values to be indicated, the movable segments substantially independent of but adapted to automatically follow said levers and to have their position controlled by said levers, the registering-wheels, and the gear connected therewith, combined with the operating crank or handle for bringing said gearing into engagement with said segments after the latter have reached their predetermined operative position and moving said segments against said gearing to rotate said registering-wheels and return said segments to their normal position, means for thereafter returning said registering-wheels and their gear to their normal position free of said segments, and means for locking said hand-le-

vers in rigid position until said segments have been returned to their normal position and said registering-wheels and their gear have moved to their normal position free of said segments; substantially as set forth.

12. In a cash-register, the actuating hand-levers, the plate having the series of numerals along which said levers may be moved in accordance with the values to be indicated, the movable segments substantially independent of but adapted to automatically follow said levers and to have their position controlled by said levers, the registering-wheels, and the gear connected therewith, combined with the crank or handle for bringing said gearing into engagement with said segments after the latter have reached their predetermined operative position and moving said segments against said gearing to rotate said registering-wheels and return said segments to their normal position, means for thereafter returning said registering-wheels and their gear to their upper position free of said segments, and means actuated by said crank or handle for locking said hand-levers in their respective positions during the movement of said crank or handle from its normal position to operate said segments and then back to its normal position; substantially as set forth.

13. In a cash-register, the actuating hand-levers, the plate having the series of numerals along which said levers may be moved in accordance with the values to be indicated, the movable segments substantially independent of but adapted to automatically follow said levers and to have their position controlled by said levers, the registering-wheels, and the gear connected therewith, combined with the exposed crank or handle, the shaft upon which said crank or handle is mounted, means connected with said shaft for engaging said segments, means intermediate said shaft and the shaft of said registering-wheels for bringing said gearing into engagement with said segments after the latter have reached their predetermined operative position preparatory to being operated by said segments during the return of the latter to their normal position under the operation of said exposed crank or handle, a series of movable stops controlling the extent of return motion of said segments, means intermediate said registering-wheels and said stops whereby upon the rotation of a registering-wheel the next adjacent segment is permitted to have a more extended return motion so as to effect the carrying from one registering-wheel to another, and means for locking said actuating hand-levers in their several positions until the said crank or handle has completed its operation and said registering-wheels and their gear have been freed from said segments; substantially as set forth.

14. In a cash-register, the actuating hand-levers, the plate having the series of numerals along which said levers may be moved in accordance with the values to be indicated, the

movable segments substantially independent of but adapted to automatically follow said levers and to have their position controlled by said levers, the registering-wheels, and the gear connected therewith, combined with the exposed crank or handle for bringing said segments after the latter have reached their gearing into engagement with said predetermined operative position and thereafter moving said segments against said gearing to rotate said registering-wheels and return said segments to their normal position, means for thereafter returning said registering-wheels and their gear to their normal position free of said segments, the shaft upon which said exposed crank or handle is mounted, the plate 151 on said shaft, the toothed racks 144 carried by said actuating hand-levers, the plate 145 having the lips 147 to engage said racks 144 during the return motion of said segments but normally free of said racks, the cam 150 on said plate 145, and the spring 148 normally retaining said lips 147 free of said racks 144, said cam 150 being in operative relation to said plate 151 so as to be engaged by the same during the operation of said exposed crank or handle and during such period to maintain the lips 147 in locking engagement with said racks 144; substantially as set forth.

15. In a cash-register, the actuating hand-levers, the plate having the series of numerals along which said levers may be moved in accordance with the values to be indicated, the movable segments substantially independent of but adapted to automatically follow said levers and to have their position controlled by said levers, the registering-wheels, the gear connected therewith, the shaft upon which said segments are mounted, the springs carried by said segments, and the pins on said shaft for engaging said springs during the rotation of said shaft and thereby returning said segments to their normal position, said springs being yielding so as to allow said pins to have a slight further movement after said segments have reached their usual normal position, combined with the variable stops to limit the return motion of said segments so as to permit, when carrying from one registering-wheel to another is to be performed, a slight further motion beyond the ordinary normal position to said segments under the said continued motion of said pins, and the exposed crank or handle for bringing said gearing into engagement with said segments after the latter have reached their predetermined operative position and moving said segments against said gearing to rotate said registering-wheels and return said segments to their normal position; substantially as set forth.

16. In a cash-register, the actuating hand-levers, the movable segments substantially independent of but adapted to automatically follow said levers and to have their position controlled by said levers, the registering-

wheels, and the gear connected therewith, combined with means for bringing said gearing into engagement with said segments after the latter have reached their predetermined operative position, the variable stops operable from the registering-wheels for limiting the return motion of said segments, the shaft upon which said segments are mounted, and the crank on the said shaft for moving said segments against said gearing to rotate said registering-wheels and return said segments to their normal position, the said segments corresponding with one another and being of sufficient length for all of them to be engaged by the gear-wheels connected with said registering-wheels, whether said segments are in their normal position or in an elevated position, whereby proper registering may be effected by some of the segments and the carrying from one registering-wheel to another may be effected by other of the segments during the operation of the said crank; substantially as set forth.

17. In a cash-register, the actuating hand-levers, the movable segments substantially independent of but adapted to automatically follow said levers and to have their position controlled by said levers, the registering-wheels, the gear connected therewith and the movable stops for controlling the extent of return motion to be imparted to said segments and operable from said registering-wheels, combined with means for bringing said gearing into engagement with said segments after the latter or some of them have reached their predetermined operative position, the yielding springs carried by said segments, the shaft upon which said segments are mounted and which is provided with pins for engaging said springs carried by said segments, and means for rotating said shaft to move said pins against said springs and thereby return said segments to a position against said stops, said segments being of sufficient length for all of them to be engaged by the gear-wheels connected with the registering-wheels whether all or only a portion of said segments are in an elevated position; substantially as set forth.

18. In a cash-register, the actuating hand-levers, the movable segments substantially independent of but adapted to automatically follow said levers and to have their position controlled by said levers, the registering-wheels, the gear connected therewith, and the movable stops operable from the registering-wheels for controlling the extent of return motion that shall be imparted to said segments, combined with means for bringing said gearing into engagement with said segments after said segments have reached their predetermined operative position, the shaft upon which said segments are mounted, a yielding contact between said shaft and said segments whereby, during the rotation of said shaft, said segments while returning to their normal position, may have a variable extent

of motion, and means for rotating said shaft for moving said segments against said gearing to rotate said registering-wheels and return said segments to their normal position; substantially as set forth.

19. In a cash-register, the actuating hand-levers, the movable segments adapted to automatically follow said levers and to have their position controlled by said levers, the shaft on which said segments are mounted, the registering-wheels, and the gear connected therewith, combined with the operating crank or handle connected with said shaft, mechanism intermediate said shaft and said registering-wheels for bringing said registering-wheels into engagement with said segments after the latter have reached their predetermined operative position and operable during the first portion of the movement of said operating crank or handle from its normal position, and means for compelling the operator to move said operating crank or handle its full throw from its normal position and then back to its normal position; substantially as set forth.

20. In a cash-register, the actuating hand-levers, the movable segments adapted to automatically follow said levers and to have their position controlled by said levers, the driving-shaft upon which said segments are mounted, the operating crank or handle connected with said driving-shaft for operating the same, the movable shaft carrying the registering-wheels and their gearing, and the rock-shaft supporting said movable shaft and adapted to impart motion to the same, combined with mechanism intermediate said driving-shaft and said rock-shaft for turning said rock-shaft and thereby bringing said gearing into engagement with said segments during the first part of the motion of said operating crank or handle, and means intermediate said driving-shaft and said segments for moving said segments against said gearing to rotate said registering-wheels and return said segments to their normal position during the continued operation of said operating crank or handle; substantially as set forth.

21. In a cash-register, the actuating hand-levers, the movable segments adapted to automatically follow said levers and to have their position controlled by said levers, the driving-shaft upon which said segments are mounted, the operating crank or handle on said driving-shaft for operating the same, the movable shaft carrying the registering-wheels and their gearing, and the rock-shaft from which said movable shaft is supported and which is adapted to impart motion to said movable shaft, combined with mechanism intermediate said rock-shaft and said driving-shaft for actuating said rock-shaft to lower said gearing into engagement with said segments during the first part of the motion of said operating crank or handle, means intermediate said driving-shaft and said segments for moving said segments against said gearing to rotate said registering-wheels and re-

turn said segments to their normal position during the continued motion of said operating crank or handle, and means for compelling the operator to impart to said operating crank or handle the full throw from its normal position and then back to its normal position; substantially as set forth.

22. In a cash-register, the actuating hand-levers, the movable segments adapted to automatically follow said levers and to have their position controlled by said levers, the driving-shaft upon which said segments are mounted, the operating crank or handle connected with said driving-shaft for operating the same, the movable shaft carrying the registering-wheels and their gearing, and the rock-shaft supporting said movable shaft and adapted to communicate motion to the same, combined with means intermediate said driving-shaft and said rock-shaft for turning the latter, during the first part of the movement of said operating crank or handle, to lower said gearing into engagement with said segments, means intermediate said driving-shaft and said segments for moving said segments during the continued motion of said crank or handle against said gearing to rotate said registering-wheels and return said segments to their normal position, the ratchet-plate upon said driving-shaft and having at its opposite sides the oppositely-inclined teeth, the pawls for alternately engaging said ratchet-plate, and means for moving said pawls into alternate engagement with said ratchet-plate in order to compel the full movement of the said operating crank or handle from its normal position and then back to its normal position; substantially as set forth.

23. In a cash-register, the actuating hand-levers, the movable segments adapted to automatically follow said levers and to have their position controlled by said levers, the driving-shaft upon which said segments are mounted, the movable shaft carrying the registering-wheels and their gearing, and the rock-shaft supporting said movable shaft and adapted to impart motion to the same, combined with means intermediate said driving-shaft and said rock-shaft for turning the latter and thereby lowering said gearing into engagement with said segments, means intermediate said driving-shaft and said segments for moving said segments against said gearing to rotate the registering-wheels and return said segments to their normal position, the ratchet-plate upon said driving-shaft and having at its opposite sides the oppositely-inclined teeth, the pawl-arms mounted upon said rock-shaft and subject to the motion thereof, and the pawls carried by said arms and adapted to alternately engage said ratchet-plate under the action of said rock-shaft in order to prevent reverse motion in said operating crank or handle after the same has been started from its normal position or back to its normal position; substantially as set forth.

24. In a cash-register, the actuating hand-levers, the segments whose position is controlled by said levers, the movable shaft carrying the registering-wheels and their gears, and means for moving said gears into engagement with said segments, combined with the operating crank or handle for manually moving said segments against said gears for rotating said registering-wheels, means for holding said hand-levers stationary during the operation of said crank or handle, and spring-actuated means for moving said gears from said segments after said crank or handle has completed its operation; substantially as set forth.

25. In a cash-register, the actuating hand-levers, the indicating-cylinders, mechanism connecting said cylinders with said levers for effecting the rotation of said cylinders when said levers are moved, the shutter normally concealing said cylinders, the segments whose position is controlled by the movement of said levers, the registering-wheels, the gears connected therewith, and means for moving said gears into engagement with said segments, combined with the crank or handle for moving said segments against said gears for rotating said registering-wheels and returning said segments to their normal position, and means intermediate said crank or handle, and said shutter for moving the latter during and by the operation of said crank or handle to expose said cylinders; substantially as set forth.

26. In a cash-register, the actuating hand-levers, the indicating-cylinders, mechanism connecting said cylinders with said levers for effecting the rotation of said cylinders when said levers are moved, the shutter normally concealing said cylinders, the segments whose position is controlled by the movement of said levers, the registering-wheels, the gears connected therewith, and means for moving said gears into engagement with said segments, combined with the crank or handle for moving said segments against said gears for rotating said registering-wheels and returning said segments to their normal position, means intermediate said crank or handle and said shutter for moving the latter during and by the operation of said crank or handle to expose said cylinders, and means for locking said hand-levers in stationary position until after registration and indication have been effected and said segments and said gears have become disengaged from one another; substantially as set forth.

27. In a cash-register, the hand-levers, the indicating-cylinders having the gear-wheels, and the rack-bars engaging said gear-wheels and connected with said hand-levers for operating said indicating-cylinders from and simultaneously with the operation of said hand-levers, combined with the springs flexed against said rack-bars to maintain the engagement of said bars with said gear-wheels, and the rigid guiding-bars engaging

ing said rack-bars 42 to prevent any unduly sudden action of said hand-levers from causing said rack-bars to overcome the force of said springs and thereby lose their proper engagement with said gear-wheels 52; substantially as set forth.

28. In a cash-register, the hand-levers, the indicating-cylinders 43 having the gear-wheels 52, the rack-bars 42 engaging said gear-wheels and connected with said hand-levers for imparting motion to said cylinders from and simultaneously with the operation of said hand-levers, and the shutter 57 for said indicating-cylinders, combined with the rod for opening said shutter at the time of registration, the plate for supporting said shutter in its open position after said rod has elevated said shutter, and means intermediate said indicating-cylinders and said plate for removing the latter and permitting said shutter to descend when the operative parts of the register are placed in position for registering and indicating the amount of a subsequent sale; substantially as set forth.

29. In a cash-register, the hand-levers, the indicating cylinders or drums 43 having the gear-wheels 52, the rack-bars 42 engaging said gear-wheels and connected with said hand-levers for imparting motion to said cylinders from and simultaneously with the operation of said hand-levers, and the shutter for said indicating-cylinders, combined with the rod for elevating said shutter during the registration, the plate for supporting said shutter in its exposure position, the fingers upon said supporting-plate, and the pins 73 upon said cylinders and adapted upon any subsequent movement of said cylinders to contact with the said fingers upon said supporting-plate and withdraw the support of the latter from said shutter; substantially as set forth.

30. In a cash-register, the hand-levers, the indicating-cylinders having the gear-wheels 52, the rack-bars 42 engaging said gear-wheels and connected with said hand-levers for rotating said cylinders from and simultaneously with the operation of said hand-levers, and the shutter normally concealing said indicating-cylinders until registration has been effected, combined with the segments whose position is controlled by the said hand-levers, the movable shaft carrying the registering-wheels and their gears, means for moving said gears into engagement with said segments, the driving-shaft upon which said segments are mounted, the operating crank or handle on said shaft for manually moving said segments to rotate said registering-wheels, and means intermediate said shaft and said shutter for elevating the latter to its exposure position during the operation of said shaft to effect registration; substantially as set forth.

31. In a cash-register, the hand-levers, the indicating-cylinders 43 having the gear-wheels 52 and freely mounted upon their shaft 53, the rack-bars 42 engaging said gear-wheels and connected with said hand-levers for ro-

tating said cylinders from and simultaneously with the operation of said hand-levers, and the shutter for said indicating-cylinders and comprising the arms 58 freely swung from said shaft and connected by the rod 59, combined with the rod 60 connected with said rod 59 for opening said shutter to its exposure position at the time of registration, the plate 70 having the lip 72 for automatically passing below said rod 59 to maintain said shutter in its open position after said rod 60 has elevated said shutter, the fingers 74 on said plate 70, and the pins 73 on said cylinders for contacting with said fingers 74 and removing said plate to permit said shutter to close upon any subsequent movement of said indicating-cylinders; substantially as set forth.

32. In a cash-register, the hand-levers, the driving-shaft upon which said hand-levers are mounted, the indicating cylinders or drums operable from said hand-levers, the shutter normally concealing said indicating-cylinders, the rod 60 connected with said shutter for moving the same to its exposure position, the arm 61 connected with said rod 60 and mounted upon said driving-shaft, and the loop or contact-plate 67 secured upon said shaft for moving said arm 61 with the rod 60 and said shutter to their elevated position during the rotation of said shaft to effect registration, combined with the segments whose position is controlled by said hand-levers and which are mounted upon said shaft to be driven from the same, the registering-wheels and their gears, and the operating crank or handle for manually moving said segments to rotate said registering-wheels and effect through said driving-shaft the elevation of said shutter to its exposure position; substantially as set forth.

33. In a cash-register, the hand-levers, the indicating-cylinders operable therefrom and simultaneously therewith, the driving-shaft upon which said hand-levers are mounted, the shutter normally concealing said indicating-cylinders until registration, means intermediate said shutter and said driving-shaft for moving said shutter to its exposure position upon the rotation of said shaft to effect registration, the cash-drawer, and means intermediate said drawer and said driving-shaft for locking said drawer in its closed position and releasing said drawer to open upon the rotation of said driving-shaft to effect registration, combined with the segments loosely mounted upon said driving-shaft and whose position is controlled by said hand-levers, the registering-wheels and their gears, and the operating crank or handle connected with said driving-shaft for rotating the latter and thereby elevating said shutter to its exposure position, releasing said cash-drawer to open, and moving said segments to rotate said registering-wheels and return to their normal position; substantially as set forth.

34. In a cash-register, the hand-levers, the segments whose position is controlled by said

hand-levers, the driving-shaft upon which said segments are loosely mounted and which is adapted upon rotation to return said segments to their normal position free of said hand-levers, the registering-wheels and their gears, and means for moving said gears into engagement with said segments, combined with the lever-arm 76 also mounted upon said driving-shaft, the contact-plate or loop 67 for elevating said lever-arm 76 during rotation of said driving-shaft to effect registration, the cash-drawer having the shoulder 77 to be engaged by the lower end of said arm 76 and the operating crank or handle connected with said driving-shaft for rotating the latter to manually move said segments against said gears for rotating said registering-wheels and also to elevate said arm 76 from said shoulder 77 and permit the cash-drawer to open; substantially as set forth.

35. In a cash-register, the hand-levers, the movable segments whose position is controlled thereby, the registering-wheels and their gears, means for moving said gears into engagement with said segments and moving said segments against said gears to rotate said registering-wheels, the dog-arms 116 carried by said wheels, and the spring-catches 117 to be engaged by said arms 116 and tripped at each revolution of the registering-wheels, the movable frames carrying the stops for said segments to limit the operative throw of the latter and normally engaged and held by said catches 117, springs for moving said frames when released by said catches to carry said stops from their normal position to permit a more extended movement of said segments whereby the carrying from one registering-wheel to another is effected, and means for thereafter restoring said frames to their normal position where they are again engaged by said spring-catches; substantially as set forth.

36. In a cash-register, the hand-levers, the movable segments whose position is controlled thereby, the registering-wheels and their gears, means for moving said gears into engagement with said segments and moving said segments against said gears to rotate said registering-wheels, the dog-arm 116 carried by the units-registering wheel, and the spring-catch 117 to be tripped by said arm 116 at each revolution of said units-registering wheel, the lever 118 normally held by said spring-catch 117, the lever 121 connected with said lever 118 and carrying the stop 123 for the tens-of-units segment for limiting the operative throw of the latter, the spring 122 acting against said levers 118 and 121 to (when said catch is tripped) move said stop 123 from its normal position to permit a more extended throw of said tens-of-units segment thereby to carry from the units-registering wheel to the tens-of-units-registering wheel, and means for thereafter restoring said levers 118 and 121 to their normal position to be again engaged by said catch; substantially as set forth.

37. In a cash-register, the hand-levers, the movable segment whose position is controlled by said levers, the driving-shaft upon which said segments are freely mounted and which carries the pins 113 and 114, the registering-wheels and their gears to be rotated by said segments, and the operating crank or handle connected with said shaft for rotating the same and causing said pins 113 to engage and move said segments to effect registration, combined with the dog-arm 116 carried by the units-registering wheel, the spring-catch 117 to be tripped by said arm 116 at each revolution of said wheel, the lever 118 normally held by said spring-catch 117, the lever 121 connected with said lever 118 and having the lower arm 124 and also the stop 123 for the tens-of-units segment for limiting the operative throw of the latter, and the spring 122 acting against said levers 118 and 121 to, when said catch is tripped, move said stop 123 from its normal position to permit a more extended throw of said tens-of-units segment thereby to carry from the units-registering wheel to the tens-of-units-registering wheel, the said lower arm 124 being in such relation to said pin 114 that the latter may contact with it on the reverse motion of said driving-shaft and restore said levers 118 and 121 to their normal position to be again engaged by said catch; substantially as set forth.

38. In a cash-register, the movable segments whose position is controlled thereby, the registering-wheels and their gears freely mounted upon a movable shaft, means for moving said gears into engagement with said segments after the latter have been set, and means for moving said segments against said gears to rotate said wheels, combined with the inclosing casing 30 having the door 91, and the interior transverse frame 89 above said registering-wheels and provided with the elongated slot 90 in line with one row of numerals on said registering-wheels; substantially as set forth.

39. In a cash-register, the segments whose position is controlled by said levers, the driving-shaft on which said segments are freely mounted, and the crank or handle on said shaft for manually operating said shaft and moving said segments back to their normal position free of said hand-levers, combined with the movable shaft carrying the registering-wheels and their gears, the rock-shaft supporting said movable shaft and adapted to lower and elevate the same, the spring acting to normally hold said movable shaft in its elevated position, means intermediate said driving-shaft and said rock-shaft and operable from said driving-shaft for turning said rock-shaft to lower said movable shaft and place said gears into engagement with said segments, means connected with said driving-shaft for maintaining the engagement of said gears with said segments during the return motion of the latter to rotate said

registering-wheels, and means also connected with said driving-shaft for thereafter releasing said rock-shaft and placing the same under the influence of said spring for elevating said movable shaft; substantially as set forth.

40. In a cash-register, the hand-levers, the segments whose position is controlled by said levers, the driving-shaft on which said segments are freely mounted, and the crank or handle on said shaft for manually operating said shaft and moving said segments back to their normal position free of said hand-levers, combined with the movable shaft carrying the registering-wheels and their gears, the rock-shaft supporting said movable shaft and adapted to lower and elevate the same, the spring acting to normally hold said movable shaft in its elevated position, the plate hung from said rock-shaft and carrying the roller 101 and dog 98, the plate also on said rock-shaft and engaged by said dog and subject to the pressure of said spring, and the segment-plate 102 on said driving-shaft and having the pin 103, said plate 102 being adapted to move against said roller during the rotation of the driving-shaft to lower and maintain in their lower position said registering-wheels and their gears, and said pin 103 being adapted at the desired time to trip said dog and permit said spring to again elevate said registering-wheel shaft; substantially as set forth.

41. In a cash-register, the hand-levers, the segments whose position is controlled by said

levers, the driving-shaft on which said segments are freely mounted, and the crank or handle on said shaft for manually operating said shaft and moving said segments back to their normal position free of said hand-levers, combined with the movable shaft carrying the registering-wheels and their gears, the rock-shaft supporting said movable shaft and adapted to lower and elevate the same, the spring acting to normally hold said movable shaft in its elevated position, the plate 100 hung from said rock-shaft and carrying the roller 101 and dog 98, the plate 97 also hung from said rock-shaft and adapted to be engaged by said dog, the arm 94 on said rock-shaft and engaging said plate 97 and subject to the action of said spring, and the segment-plate 102 on said driving-shaft and having the pin 103, said plate 102 being adapted to move against said roller during the rotation of the driving-shaft to lower and maintain in their lower position said registering-wheels and their gears, and said pin 103 being adapted at the desired time to trip said dog and permit said spring to again elevate said registering-wheel shaft; substantially as set forth.

Signed at New York, in the county of New York and State of New York, this 26th day of August, A. D. 1899.

ELIJAH F. SPAULDING.

Witnesses:

CHAS. C. GILL,
GUNDER GUNDERSON.