(No Model.) 7 Sheets—Sheet 1.

J. PFEIFER.

CASH REGISTER, INDICATOR, RECORDER, AND CHECK PRINTER.

No. 502,317. Patented Aug. 1, 1893.

Fig. 1.

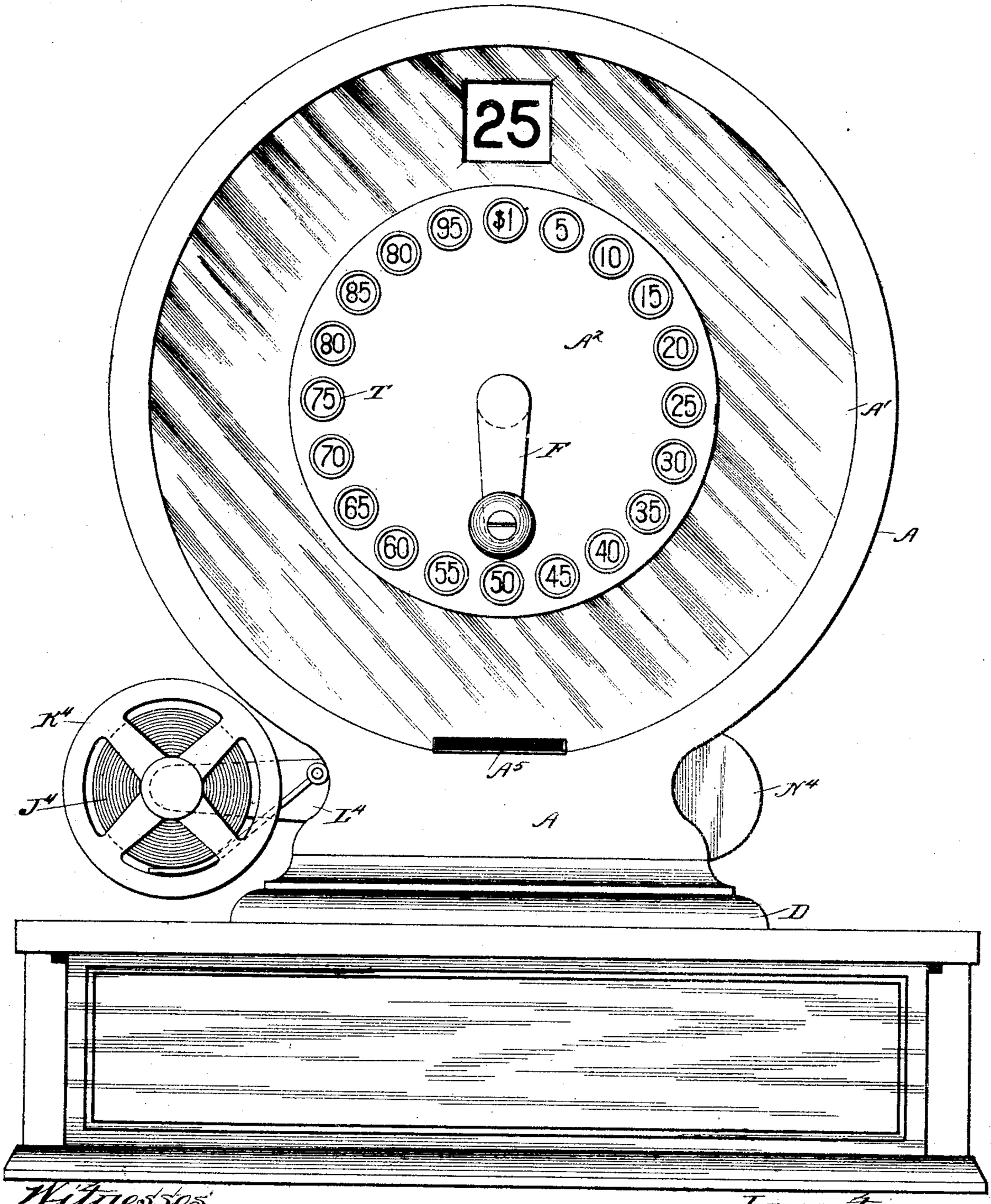

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Fig. 2.

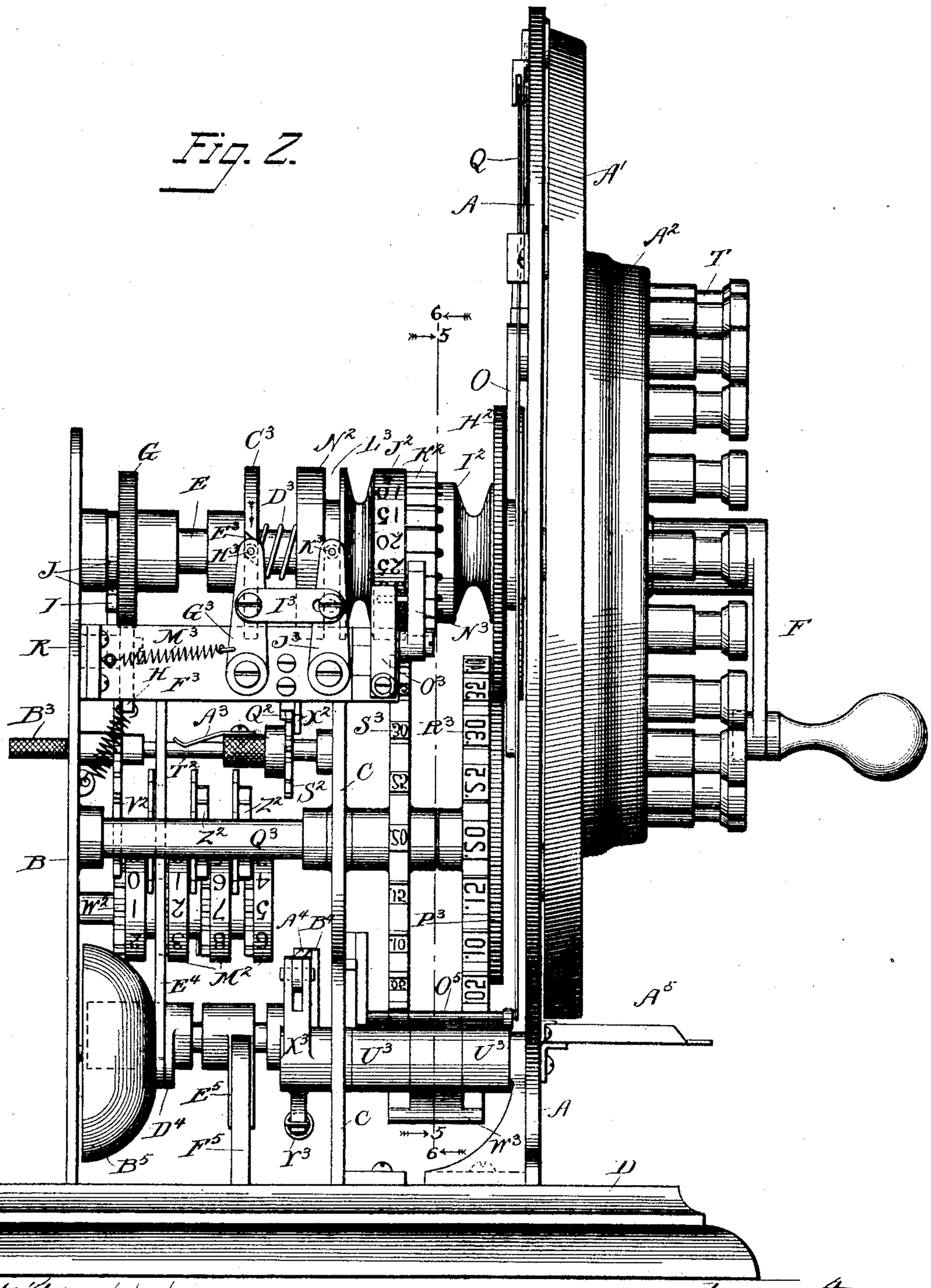

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Fig. 3.

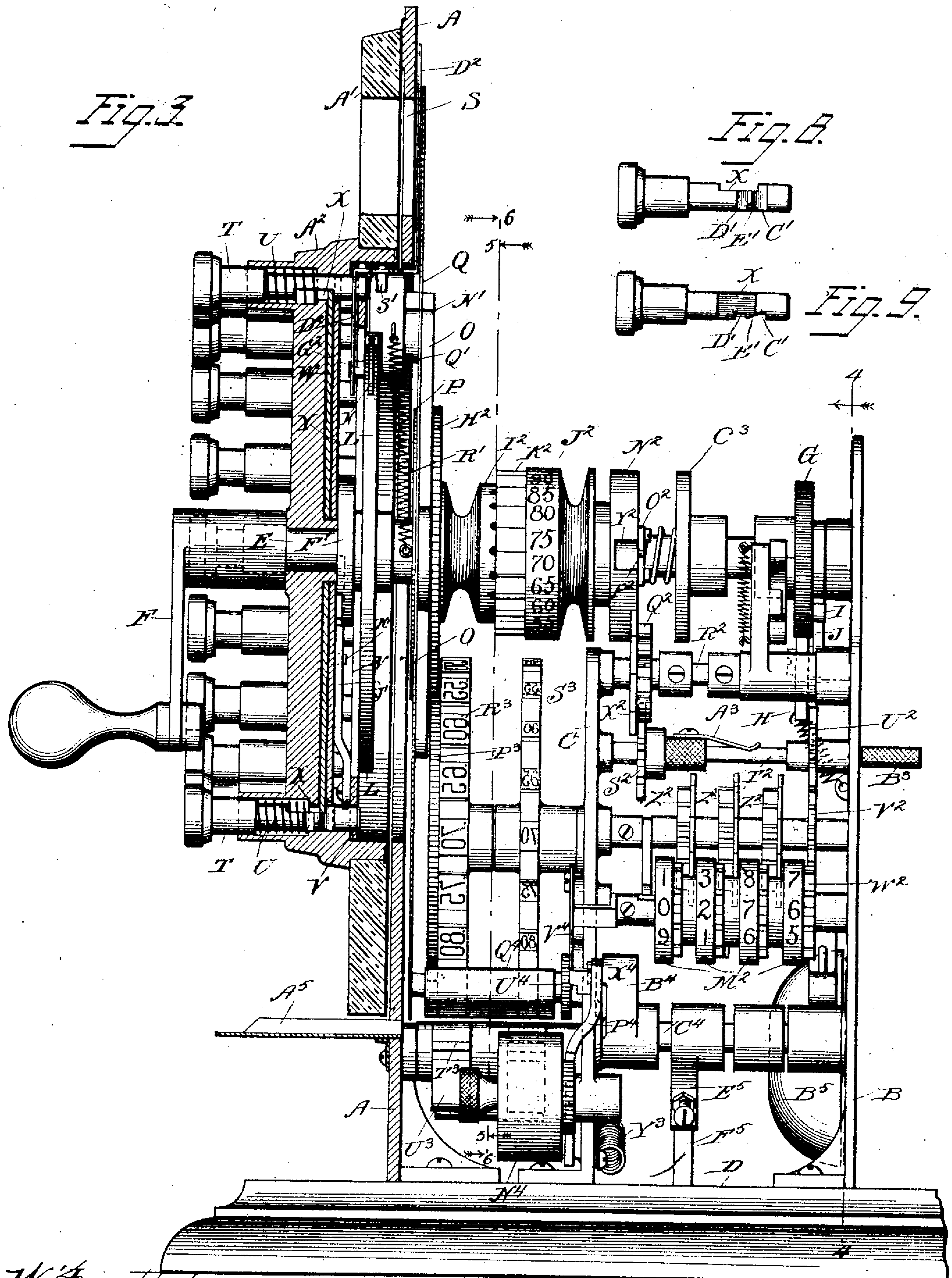

Fig. 8.

Fig. 9.

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CASH REGISTER, INDICATOR, RECORDER, AND CHECK PRINTER.

No. 502,317. Patented Aug. 1, 1893.

Fig. 4.

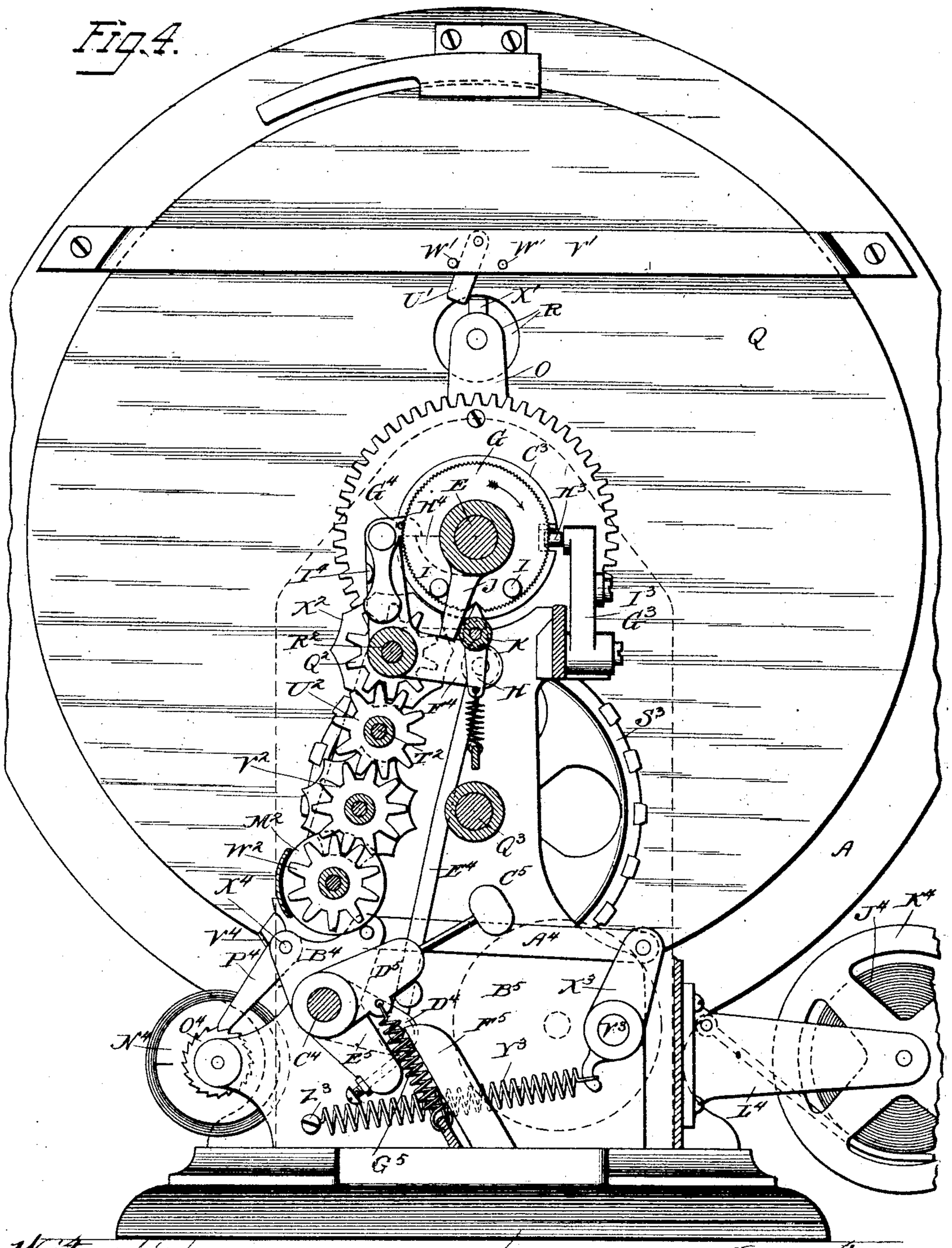

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Fig. 5.

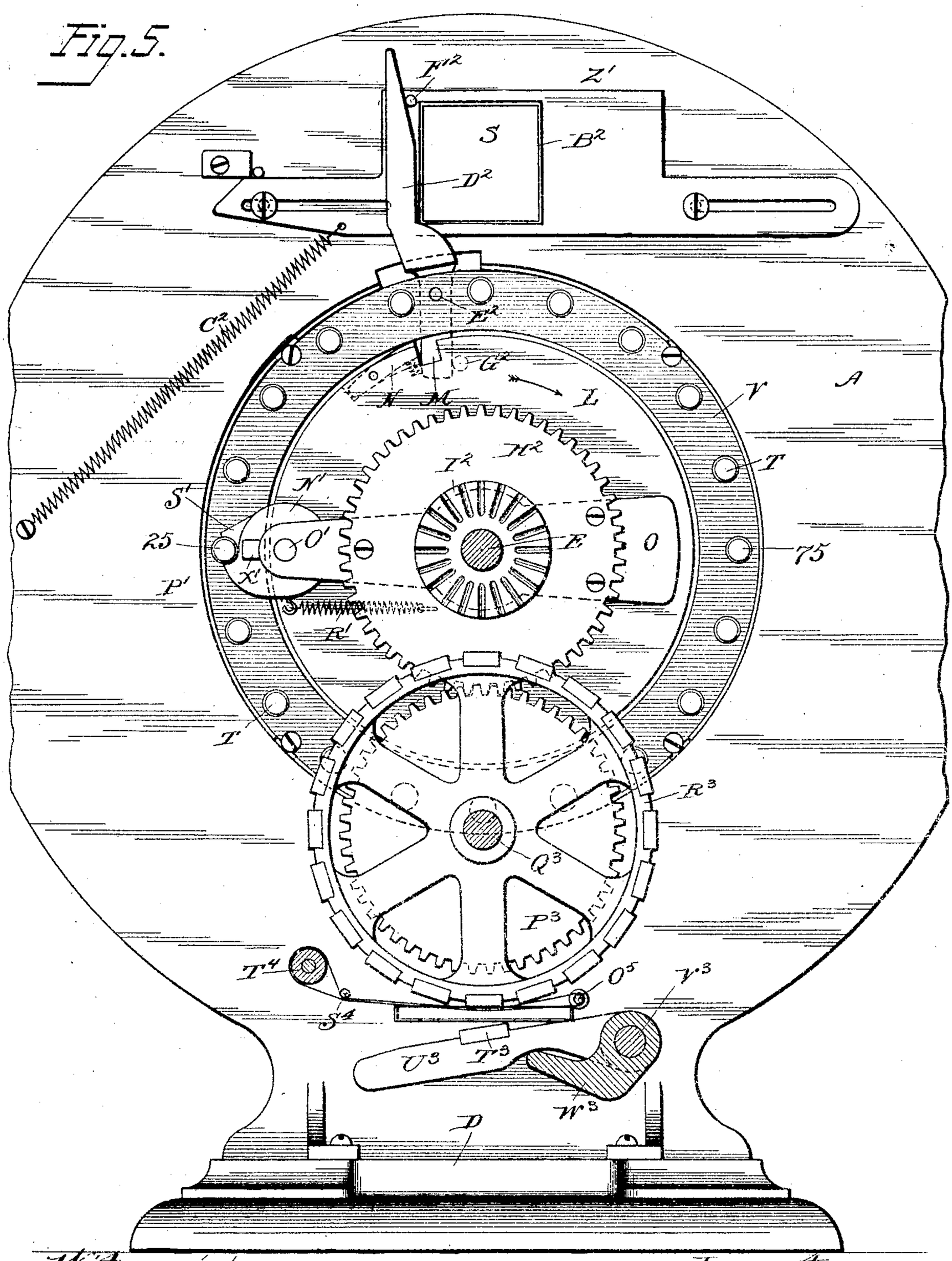

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Fig. 6.

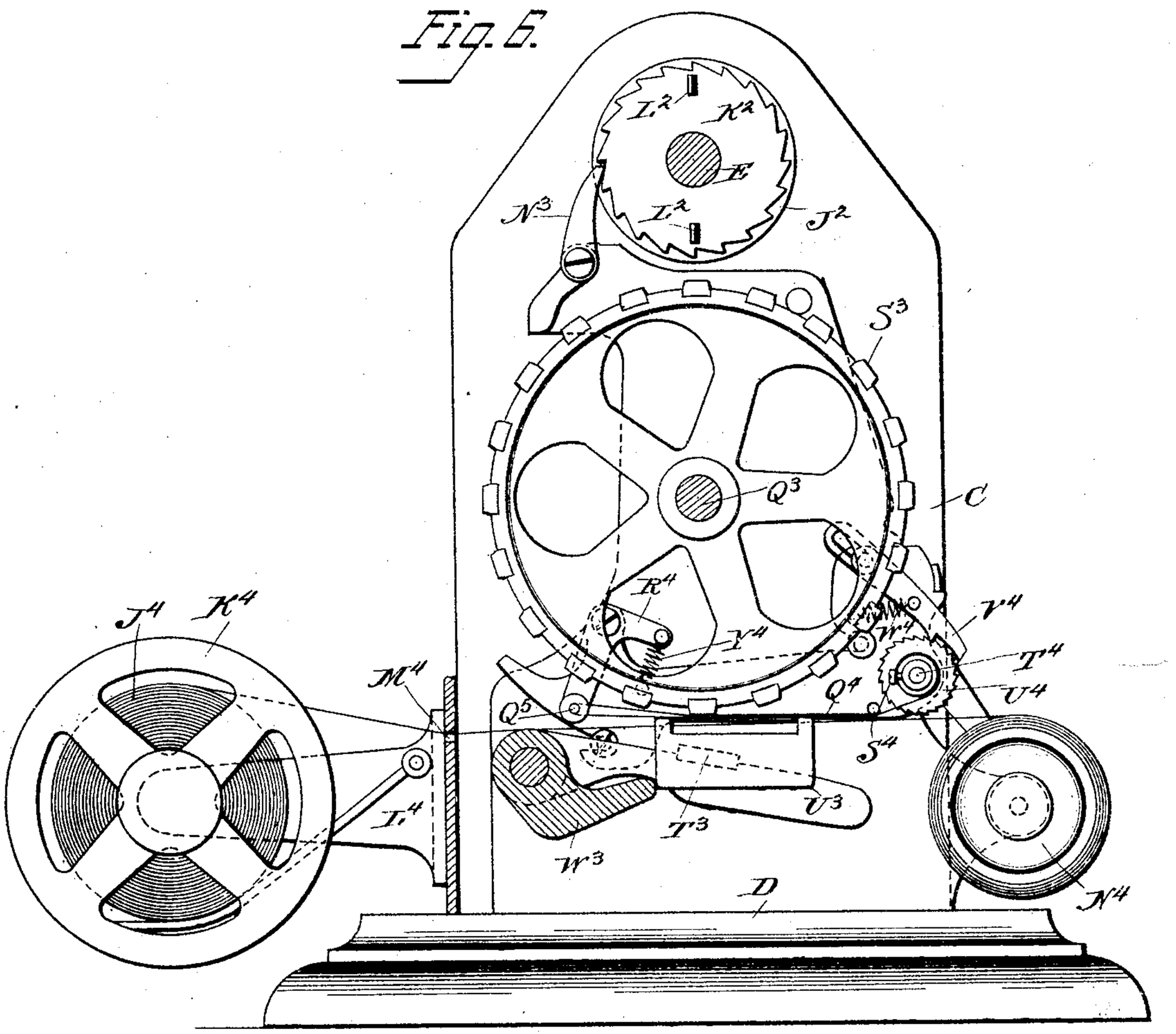

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Fig. 1.

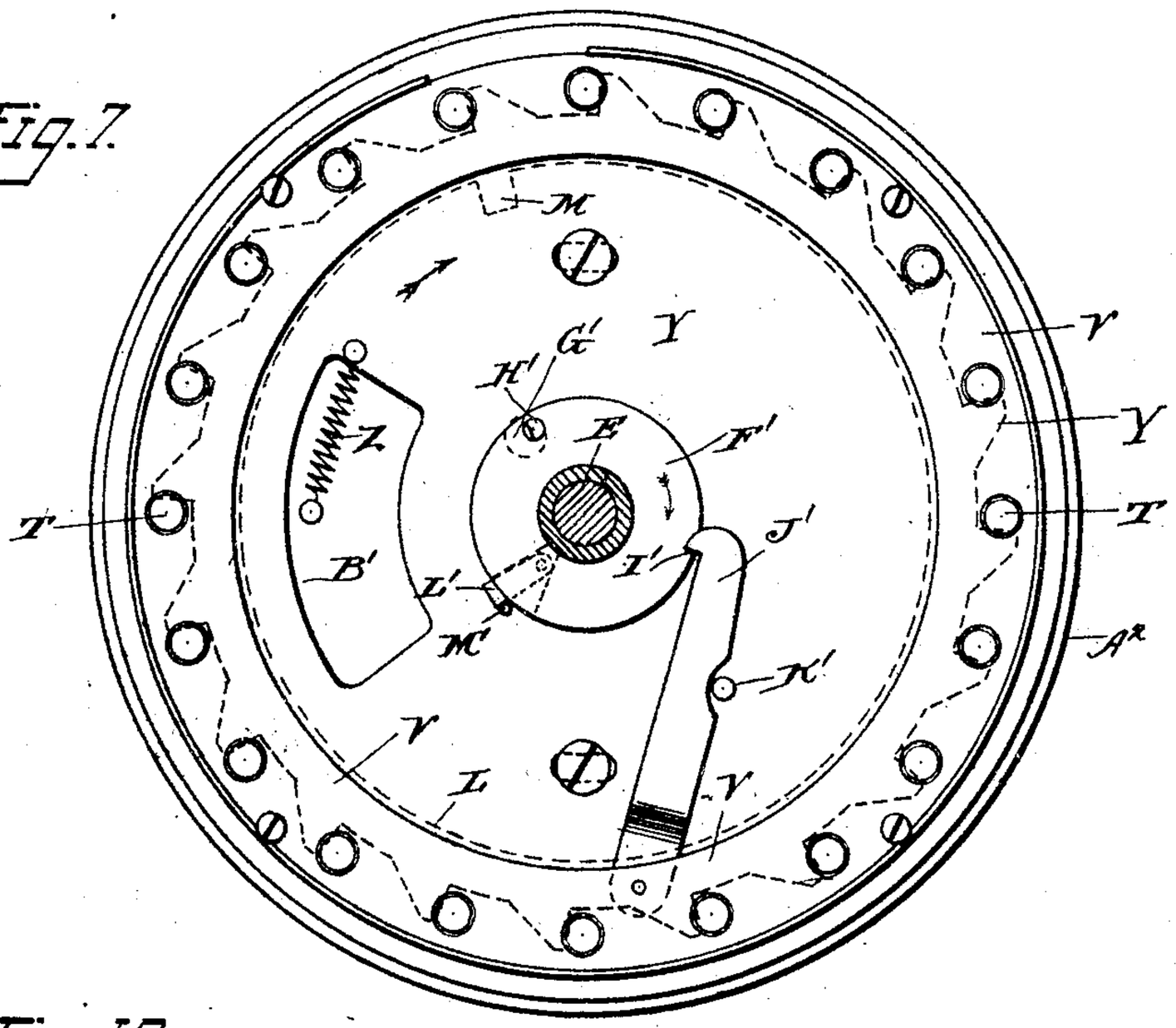


Fig. 10.

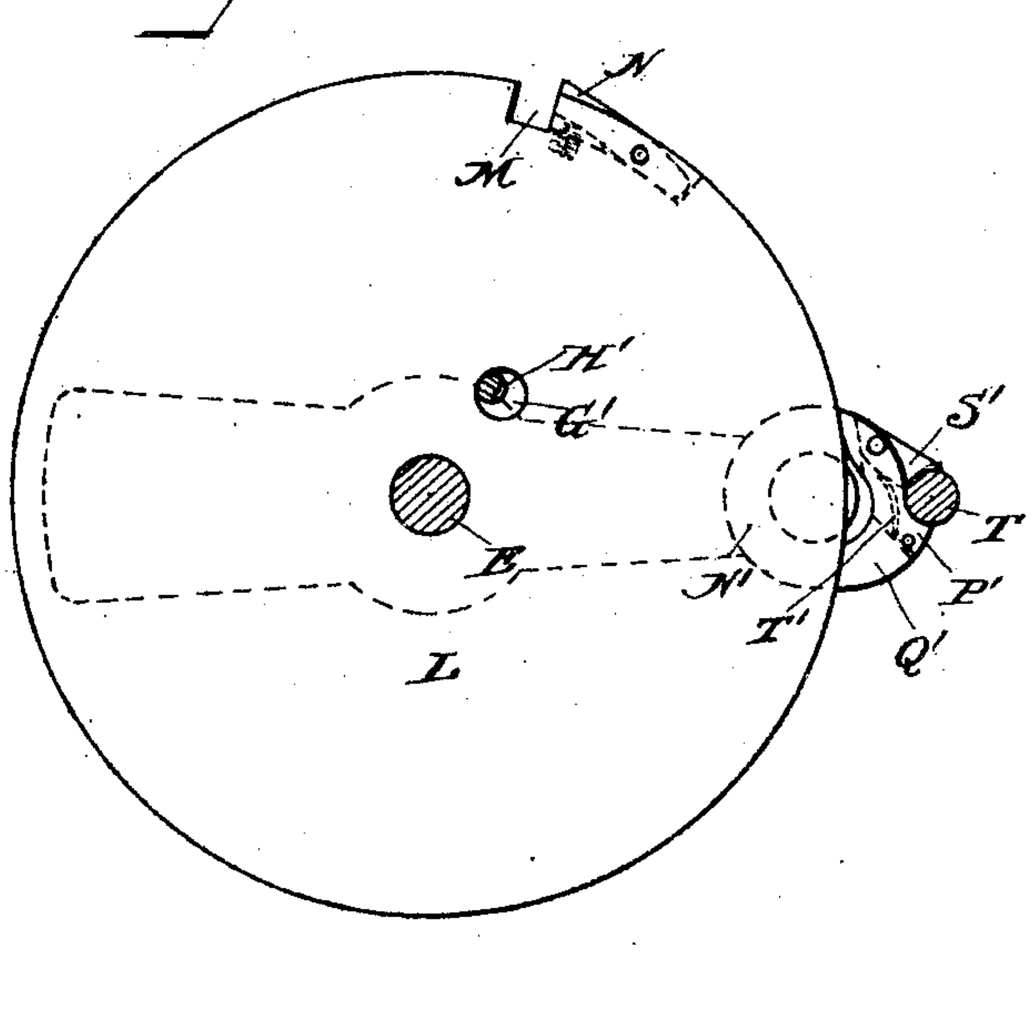
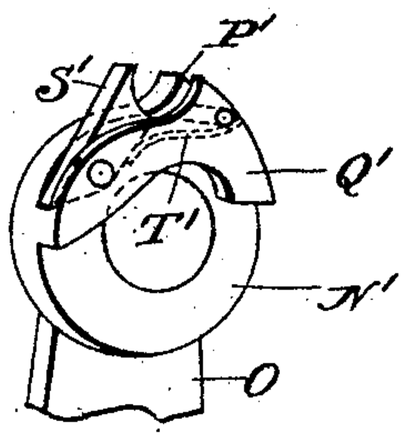


Fig. 11.



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UNITED STATES PATENT OFFICE.

JOHN PFEIFER, OF DAYTON, OHIO, ASSIGNOR TO THE NATIONAL CASH REGISTER COMPANY, OF SAME PLACE.

CASH REGISTER, INDICATOR, RECORDER, AND CHECK-PRINTER.

SPECIFICATION forming part of Letters Patent No. 502,317, dated August 1, 1893.

Application filed April 11, 1893. Serial No. 469,933. (No model.)

To all whom it may concern:

Be it known that I, JOHN PFEIFER, a citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented a certain new and useful Improvement in Cash-Registers, of which the following is a description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates more particularly to that class of cash registers which are commonly known as "dial" machines, by reason of the fact that the indicator of the machine consists of a rotary or oscillatory dial, bearing in a circle upon its face the various numbers to be indicated, each of which is adapted to be exposed singly at a window or sight opening in the casing. Combined with the indicating dial is a series of keys bearing numbers corresponding to those upon the dial, and an operating mechanism controlled by a suitable handle, whereby upon setting any one of the keys and then actuating the operating mechanism by means of the handle the dial will be turned to expose to view at the sight opening the particular number corresponding to the key which was operated or set, all as is common in this class of machines. There is also combined with the indicating dial and operating mechanism a register upon which the values of the operated keys are added, and a printing mechanism by which such values may be printed upon a record-strip or an inserted check or ticket, or both if desired.

My invention has for its object certain improvements in the construction of this class of machines, by which their efficiency is increased and their liability to improper manipulation lessened.

Its novelty consists in the new combinations, modes of operation, constructions and arrangements of parts, which will be hereinafter more particularly described and fully set forth in the claims.

In the accompanying drawings, Figure 1 represents a front elevation of my improved machine mounted upon a drawer-compartment containing the usual money-drawer; Fig. 2 an enlarged side elevation of the left hand side of the machine, without the drawer compartment, and with the side plates of the casing removed to expose the parts within; Fig. 3 a corresponding view of the right hand side of the machine, but with the front plate of the framework and the parts forward of it in central section; Fig. 4 a vertical section in a plane immediately forward of and parallel with the rear frame plate, looking toward the front of the machine, with the base plate, however, shown in full; Fig. 5 a corresponding view in the plane indicated by the lines 5—5 in Figs. 2 and 3, looking toward the front of the machine, and Fig. 6 a view upon the same plane looking toward the rear of the machine; Fig. 7 a detail view in a plane immediately forward of the driving disk, looking toward the front of the machine and showing the rear ends of the keys and the detent plate and locking devices co-operating therewith; Figs. 8 and 9 detail views of one of the keys; Fig. 10 a detail view of the driving disk and co-operating parts, taken in a plane immediately in front of said disk and looking toward the rear of the machine; and Fig. 11 a detail perspective view of the latch or coupling device.

The same letters of reference are used to indicate identical parts in all the figures.

The framework of the machine consists chiefly of a vertical front plate A, a vertical rear plate B, and an intermediate plate C, all three secured upon a base D. Secured upon the forward face of the plate A is an annular ornamental plate A′ provided with a large central opening in which fits a circular plate A^2, the plate A^2 being secured to and supported by the plate A′ upon the front plate A. Journaled at its rear end in a bearing on the rear plate B and passing at its forward end through and journaled in the plate A^2 is the main operating or driving shaft E of the machine. This shaft projects forward of the plate A^2 and has secured upon it an operating handle F by which it may be oscillated backward and forward through a complete revolution. A toothed wheel G fast upon this shaft near its rear end and a co-operating pawl H, Fig. 4, compel a full revolution of the shaft when started in either direction. The movement of the shaft in each direction is limited to a single revolution by two studs I I fast upon the rear face of the wheel G and

adapted to co-operate with an arm J loose upon the shaft E immediately in rear of the wheel G.

In the position of the parts shown in Fig. 4, when the shaft E and wheel G are turned by the operating handle in the direction of the arrow the right hand stud I will engage the arm J and carry it around with the wheel until it strikes the boss K upon the rear frame-plate, to which the pawl H before referred to is pivoted. This engagement of the arm J with the boss K arrests the parts just as they complete a revolution. Upon the return movement of the parts the left hand stud I will pick up the arm J and carry it around until it strikes the boss K and arrests the parts in the position shown in Fig. 4. Fast upon the shaft E between the plates A and A^2, within the circular opening in the plate A', is a disk L, Figs. 3 and 5, which will be hereinafter referred to as the driving-disk or driving-member of the machine. It is provided at one point upon its periphery with a notch M, and pivoted in a slot at one side of the notch is a plate N whose end adjacent the notch is normally projected beyond the periphery of the disk by a coiled spring confined beneath it. The disk L co-operates with an arm O loosely mounted on the shaft E in rear of the disk, a latch carried by the arm O serving to intermittently couple the arm to the disk in the manner hereinafter described.

The frame-plate A is provided with a circular opening co-incident with the circular opening in the plate A before described, so that the disk L and arm O may revolve together when coupled by the latch. Secured to the arm O, in this instance between the arm and a circular plate P fastened to the forward side of the arm, is the circular indicating dial Q, said dial being provided with an opening R, Fig. 4, opposite the upper end of the arm O and through which the latch for coupling the arm to the driving disk extends. The plates A and A' are provided in their upper portions with co-incident openings S through which the numbers upon the dial Q may be singly exposed, as seen in Fig. 1.

Mounted in tubular bearings projecting forwardly from the plate A^2 are a series of reciprocating keys T, in this instance twenty in number, and provided with buttons on their front ends numbered to correspond with the indicating numbers upon the dial. These keys are yieldingly held in their outer normal positions by springs U coiled around them and confined between shoulders upon them and the bottoms of the tubular bearings in the plate A^2. The inner ends of the keys pass through and are supported in a fixed annular plate V, Figs. 3, 5 and 7, fastened to the plate A^2. Secured to the rear face of the plate A^2 is a circular plate W with whose periphery co-operate notches or recesses X in the keys T, the keys being arranged in circular order around said plate with their notches X fitting over its edge, Fig. 3. The engagement of the inner walls of these notches X with the periphery of the plate W holds the keys in their normal position against the pressure of the springs U tending to throw them outward. Immediately in rear of the plate W is loosely mounted, upon the shaft E or upon a bearing extended rearward from the plate A^2 around the shaft E, a toothed detent plate Y, Figs. 3 and 7, the teeth upon its periphery being shown in dotted lines in Fig. 7. This plate is yieldingly held in normal position by a spring Z, Fig. 7, connected at one end to the plate Y and at its other end to the fixed plate W, the plate Y being provided with an opening B' through which the spring Z passes. In this normal position of the plate Y the radial faces of its teeth fit in notches C' in the respective keys. Each key is provided with a third notch D' connected with the notch C' by an inclined or beveled surface E', Figs. 8 and 9, and when the key is pressed inward its beveled portion, bearing against the co-operating tooth of the plate Y, forces the latter in the direction of the arrow, Fig. 7, until the notch D' is brought opposite the tooth, whereupon the plate will spring backward and its tooth will engage the notch D' and hold the key in this position. When any other key is pressed inward the movement given the plate Y by the bevel E' of such key will release the key which had previously been pressed inward and permit it to be thrown outward to normal position by its spring U. In this manner whenever any one of the keys is pressed inward it will be caught and held by the detent plate Y until another key is pressed in, whereupon the first key will be released and thrown outward to normal position.

For the purpose of locking all of the unoperated keys as soon as the operating handle is started, and preventing any of them being pressed in until the handle has been returned to normal position, I have provided a locking disk F', Figs. 3 and 7, mounted upon the shaft E or hub of the disk L immediately in rear of the detent plate Y. This locking disk F' turns with the shaft E and disk L, but in this instance has slight independent movement, being connected to the disk L by a pin G' passing through a hole H' in the disk L. The hole H', as well as the disk L itself, are indicated by dotted lines in Fig. 7, where it will be seen that the hole H' is enough larger than the pin G upon the disk F' to permit slight movement of the latter independently of the disk L. The locking disk F' is provided with a notch at I', with which co-operates a locking arm J' which is pivoted at its lower end to the fixed plate V. When the parts are in their normal position of rest the upper end of the locking arm J' is engaged with the notch I' in the disk F', or if not engaged with it the notch is in position for the arm to be moved into engagement with it. Projecting from the rear face of the detent plate Y adjacent to the locking arm J' is a stud K'. When the parts are in the nor-

mal position shown, if any one of the keys be pressed inward the detent plate Y will be moved in the direction of the arrow, as before explained, and the stud K′ will engage the locking arm J′ and move it to the left, its upper end entering the notch I′ in the disk F′, but it will be seen that if the parts are not in normal position, so that the notch I′ is not opposite the upper end of the arm J′, the latter cannot move to the left, but will be held to the right, against the stud K′, by the periphery of the disk F′, and thus the detent plate will be locked from movement in the direction of the arrow and no key can be pressed in. By this means as soon as the operating handle is moved from normal position the periphery of the disk F′ rides over the end of the locking arm J′ and holds it in locking position and prevents any movement of the detent plate Y, and, consequently, of the keys.

The purpose of the loose connection between the disk F′ and the disk L and shaft E, by means of the pin G′ and hole H′ may now be understood: If the disk F′ were fast upon the shaft E, so as to make a complete forward revolution with it, the notch I′ would be brought opposite the end of the arm J′ at the end of such forward revolution, so that the detent plate Y would be released and any key could be pressed in. Inasmuch as a full operation of the machine involves both a forward and backward movement of the operating handle and shaft through a complete revolution, as hereinafter explained, it is desirable that the keys shall remain locked during such entire operation, and this is effected by the loose connection of the disk F′ with the shaft, which causes said disk to be turned a little less than a full forward revolution with the shaft so that the notch I′ is not brought quite opposite the end of the arm J′. To prevent the disk F′ being accidentally carried too far, by friction or by its own momentum, I provide an arresting plate L′ pivoted in a recess in the disk F′ and co-operating with a stud M′ upon the face of the detent plate. When the disk F′ has been given its full proper movement forward the plate L′ will strike the stud M′ and arrest the disk just before the notch I′ is brought opposite the end of the locking arm J′. The play of the plate L′ in the recess of the disk F′ is such that the disk F′ will be permitted substantially a full revolution less the diameter of the stud M′ with which the plate L′ co-operates. Such being the case a rigid projection upon the disk F′ might be substituted for the pivoted plate L′, but I prefer to employ the latter. It will be understood that the end of the arm J′, bearing upon the periphery of the disk F′, does not stand in the path of the projecting end of the plate L′, the disk F′ being of sufficient thickness to permit the location of the plate and arm in different planes.

The latch for coupling the indicator to the driving disk L may next be described, reference being had to Figs. 5, 10 and 11. It consists of a disk N′ journaled upon a stud O′ carried by the outer end of the arm O and provided at one point on its periphery with a projecting cam-shaped portion P′. The side of the disk adjacent the driving disk L is cut away, as shown, leaving a portion overlapping and fitting against the periphery of the disk, and this overlapping portion is further rounded out or recessed to form a coupling lug Q′ adapted to enter and fit within the notch M in the disk L when said notch is brought opposite the lug, the engagement of the two being insured by a coiled spring R′ connected at one end to a hook upon the disk N′ and at its other to an eye secured upon the forward face of the disk P, Fig. 3. The overlapping portion of the disk N′ is slotted and has pivoted in it a catch-plate S′ yieldingly held in normal position by a spring T′ confined in a slot beneath the plate. Assuming now, with this description and with the parts in the positions shown in Figs. 5 and 10, where the latch of the arm O is engaged with the key numbered 25, that the diametrically opposite key, numbered 75, be pressed inward and the operating handle be given a complete backward and forward revolution, the operation of the parts and the result will be as follows: The pressing in of the 75 key will release the 25 key, in the manner heretofore explained, and the 25 key will be thrown forward to normal position by its spring and its rear end disengaged from the latch carried by the arm O. When the operating handle has completed about three-fourths of its backward revolution the notch M in the disk L will be brought under the lug Q′ of the latch-disk N′ and the spring R′ will oscillate said disk and draw the lug into the notch M, thereby coupling the arm O to the disk L. During the farther backward movement of the operating handle and disk L the arm O will be carried with them to their limit of movement. It will be remembered that the indicating dial Q is fastened to and turns with the arm O (it is omitted from Fig. 5 in order to expose the parts beyond it) and the arrangement of the parts upon the dial is such that when the arm O has been turned to this initial position by a full backward movement of the operating handle and driving disk what may be termed the initial indicating point on the dial will be brought opposite the sight opening S; (where no automatic screen is employed the dial usually bears a cipher at this point, so that the dial may be said to have been returned to zero, but in the present machine there is employed an automatic screen and the sign upon the dial at this point is $1.) When the operating handle and driving disk L are now given their return forward revolution the arm O and dial will be carried with them until they have completed about three-fourths of a revolution and the number 75 upon the dial has been brought opposite the sight opening, whereupon the plate S′ of the latch will strike the inner end of the 75 key,

which, it will be remembered, had been pressed in, and the latch-disk will be rocked on its pivot, the lug Q′ lifted out of the notch M in the disk L, and the arm O and dial arrested by the contact of the plate S′ with the key, and the latch caused to embrace the key between the plate S′ and part P′, in the same manner as shown in connection with the 25 key in Fig. 5. The arm O and dial being thus uncoupled from the driving-disk, the latter goes on to normal position alone, the overlapping portion of the latch-disk N′ resting upon the periphery of the disk L and the latter rigidly holding the latch in position, with the key embraced between the plate S′ and part P′ so that the arm and dial are securely locked in the new indicating position.

The purpose of the spring-pressed plate N pivoted in the slot in the disk L adjacent to the notch M is to insure the coupling of the arm O to the disk L when the notch M in the disk is brought opposite the coupling-lug Q′ of the latch. This lug, as it rests upon the periphery of the disk L, stands immediately in the path of the projecting end of the plate N, so that it is impossible for the disk to be turned so rapidly that its notch M could be carried by the lug without the latter entering it and coupling the arm to the disk.

If, with the parts in the position shown in Fig. 5, a key between the 25 key and the one at the initial position had been pressed in, instead of the 75 key, the spring-plate S′ of the latch would yield and pass under such newly operated key as the arm O and indicator were turned to initial position and then as they were turned forward upon the return movement of the operating handle the plate S′ would engage the key and cause the latch to couple the arm O to it in the manner above explained.

To prevent any possibility of the indicator being overthrown by its own momentum, when turned to initial position in either direction, I have provided a swinging stop U′, Fig. 4, pivoted to a cross-bar V′ and limited in its movement by two pins W′ and adapted to be engaged upon opposite sides by a lug X′ upon the outer end of the arm O; as will be readily understood.

The automatic screen for the indicating dial, before referred to, may be now described. It consists of a longitudinally sliding plate Z′ mounted upon guides upon the rear face of the front frame-plate A, Fig. 5, and provided with an opening B^2 of approximately the same size as the sight opening S and adapted to coincide with the latter when the plate is slid to the right in said figure. A spring C^2 connected at one end to the screen-plate Z′ and at the other to the frame-plate A tends to pull the screen-plate to the left and interpose its solid portion between the dial and said opening and hide the former from view. When the operating handle is in its normal position the screen plate is held in its right hand position by a lever D^2 pivoted at E^2 to the plate V and engaging at its upper end a pin F^2 upon the screen plate. A stud G^2 projecting from the forward face of the driving disk L bears against the lower end of the lever D^2, below its pivot, when the operating handle and disk L are in normal position, and holds the upper end of the lever thrown to the right and the opening B^2 of the screen plate co-incident with the sight opening, thereby exposing to view the number upon the indicating dial. As soon as the operating handle and disk L are moved out of normal position the pin G^2 upon the latter is carried away from the lever D^2 and the spring C^2 thereupon throws the screen plate Z′ to the the left between the sight opening and dial and hides the latter. When the disk L reaches normal position again, at the end of the operation, its stud G^2 strikes the lower end of the lever D^2 and throws the screen plate to the right again and exposes the new number upon the dial.

The mechanism for registering the sum of the values indicated may be next described: Fast to the rear side of the indicating arm O is a gear wheel H^2, which drives the type-wheels hereinafter described, and fast to the rear side of this gear wheel is a clutch member I^2 whose rear end consists of a circular disk provided upon its rear face with a series of radial grooves, Fig. 5, in this instance twenty in number. Loosely mounted upon the shaft E in rear of this clutch member I^2 is a registering wheel J^2, in this instance having fast upon or integral with it, between it and the clutch member I^2, a ratchet K^2. This ratched is provided upon its forward face with one or more clutch teeth L^2, Fig. 6, adapted to co-operate with the radial grooves in the member I^2. By means to be described, the registering wheel and ratchet are slid rearward at the beginning of movement of the operating handle from normal position, and at the end of its first or backward revolution they are slid forward again and the teeth L^2, Fig. 6, engaged with the grooves in the member I^2 and the registering wheel thereby coupled to the arm O and indicating dial. During the return movement of the operating handle the registering wheel is therefore carried with the indicating dial until the latter is arrested by the operated key, whereupon the registering wheel and dial come to rest together. In this manner the registering wheel is caused to turn with the indicating dial during the movement of the latter from initial position to the new indication, and thus the value of such indication will be added upon the registering wheel; the latter will remain stationary during the reverse movement of the indicating dial, from indicating to initial position. The registering wheel is in this instance provided with a naught and nineteen numbers representing multiples of five from 5 to 95, arranged at equidistant points around its periphery, so that a complete revolution of the wheel will register the sum of one dollar. At

each complete revolution of said wheel such sum of one dollar will be added upon a train of dollar registering wheels M^2, Fig. 3, through the following connection: A disk N^2 in rear of the registering wheel J^2 and secured to or formed integral with it has secured to it a plate O^2 provided with a tooth P^2 projecting beyond the periphery of the disk and adapted to engage a toothed wheel Q^2 upon a shaft R^2 mounted at its forward end in the frame-plate C and at its rear end in the frame-plate B, said toothed wheel Q^2 in turn meshing with a toothed wheel S^2 splined upon a shaft T^2 journaled in the frame-plates B C and having fast upon it near its rear end a toothed wheel U^2 meshing with a toothed wheel V^2 upon a shaft beneath, the wheel V^2 in turn meshing with the driving gear W^2 of the primary dollar-registering wheel M^2. At each complete revolution of the registering wheel J^2 the toothed plate O^2 upon the disk N^2 will engage the wheel Q^2 and turn it one notch, and such movement of the wheel Q^2 will be transmitted to the primary dollar wheel M^2 and the latter advanced one number. The wheel Q^2 has fast upon its forward side a locking disk X^2 co-operating with the periphery of the disk N^2 and a notch or recess Y^2 therein, to lock the wheel Q^2 from movement except when being turned by the toothed plate O^2 on the disk N^2, in the usual manner. Each of the dollar registering wheels M^2 is arranged to advance the next higher wheel one number at each complete revolution by means of the usual transfer wheels Z^2 and co-operating parts.

To enable the dollar registering wheels to be readily reset to zero the toothed wheel S^2, as before stated, is splined upon the shaft T^2. It is yieldingly held in normal position by a spring A^3 secured to its hub and engaging a notch in the shaft T^2, but it may be slid rearward and disengaged from the wheel Q^2, having a milled hub for grasping it for that purpose whereupon the shaft T^2 may be rotated by means of a milled thumb-piece B^3 secured to its rear end and the registering wheels M^2 be turned to zero through the medium of the connecting gears V^2 W^2, as will be readily understood.

The means for shifting the registering wheel into and out of engagement with the clutch member I^2 may now be described, reference being had more particularly to Figs. 2 and 3. Fast upon the shaft E in rear of the disk N^2 above described is a disk C^3. A coiled spring D^3 surrounds the shaft E between the disks C^3 and N^2 and presses the disk N^2 and the registering wheel forward and tends to maintain them in engagement with the clutch member I^2. The disk C^3 is provided at one point in its periphery with a notch or recess E^3, Fig. 2, having parallel inclined or beveled walls as shown. Pivoted at its lower end to a plate F^3 of the frame-work is an arm or lever G^3 provided at its upper end with a stud H^3, preferably surrounded by an anti-friction sleeve or collar, Fig. 4, which is adapted to co-operate with the disk C^3 and notch E^3 therein. The arm G^3 is connected by a link I^3 with a second similar arm J^3 pivoted at its lower end to the plate F^3 and provided at its upper end with a stud K^3 similar to the stud H^3 and fitting in a circumferential groove L^3 in the disk N^3. The link I^3 is connected to the arm J^3 by a slot and pin so that the arm J^3 and link may have slight independent movement. A coiled spring M^3 connected to the arm G^3 tends to pull the latter rearward. Its movement in that direction is limited by its connection with the arm J^3, the spring M^3 not being of sufficient strength to overcome the resistance of the spring D^3 which holds the disk N^2, and consequently the arm J^3, in forward position. In the normal position of the parts, therefore, the stud H^3 upon the arm G^3 fits in the recess E^3 in the disk C^3. Such being the case it will be seen that when the operating handle is given its first or backward revolution and the disk C^3 is turned in the direction of the arrow upon said disk the upper end of the arm G^3 will be forced rearward by the engagement of the upper inclined wall of the recess E^3 with the stud H^3 upon the arm, and the arm will be maintained in this rearward position by the engagement of the stud H^3 with the rear face of the disk until the latter completes its revolution. In thus moving rearward the arm G^3 carries the arm J^3 with it, and consequently moves the disk N^2 and connected parts with it, against the pressure of the spring D^3, and disengages the teeth L^2 on the ratchet K^2, Fig. 6, from the clutch-member I^2, and thereby disconnects the registering wheel from the indicator and driving mechanism. When the operating handle and the disk C^3 complete their backward revolution the recess E^3 will be brought opposite the stud H^3 again and the spring D^3 will thereupon immediately throw the parts forward again, the stud H^3 entering the recess and the registering wheel becoming coupled to the indicator. Upon now giving the operating handle and disk C^3 their return revolution to normal position the lower inclined wall of the recess E^3 will engage the stud H^3 on the arm G^3 and the latter will be thrown forward and the stud will bear against the forward face of the disk C^3 during the return revolution of the latter. This forward movement of the arm G^3 will not effect the arm J^3 and connected parts, the slot in the link L^3 permitting the arm G^3 to move independently of the arm J^3. In this manner, and by this means, at each operation of the machine the registering mechanism is disconnected from the indicator and driving mechanism during the first half of the movement of the latter and is coupled to the indicator and actuated by it during the second half of the movement of the latter and the driving mechanism.

A pawl N^3 pressed by a spring O^3 into en-

gagement with the ratchet K^2, Figs. 2 and 6 prevents retrograde movement of the registering wheel.

The printing mechanism, by which the different values indicated may be printed upon a record-strip and upon an inserted check or ticket, may be now described. The gear wheel H^2, which, as before stated, is fastened to the rear side of the indicator arm O, meshes with a second gear wheel P^3 fast upon a shaft Q^3 journaled in the rear frame-plate B and middle plate C and projecting forward of the latter. This shaft has fast upon it, in front of the plate C, two type-wheels, R^3, S^3, each bearing upon its periphery a series of type numbers corresponding to the numbers upon the indicating dial. Co-operating with each of these type-wheels is an impression platen T^3 upon an arm U^3 hung at one end upon a rock-shaft V^3 journaled in the frame plates A, C, Figs. 2, 5 and 6. These arms U^3 rest upon and are actuated by an arm W^3 which is fastened upon the rock-shaft V^3 between the arms U^3, Fig. 2, and whose free end is widened so as to project beneath both arms U^3. Fast upon the rock-shaft V^3 in rear of the plate C is a lever X^3 to whose lower hooked end is connected a strong spiral spring Y^3, Fig. 4, secured at its opposite end to the frame plate C at Z^3. The upper end of the lever X^3 is connected by a link A^4 with a plate B^4 fast on a rock-shaft C^4. The latter has fast upon it an arm D^4 which is connected by a link E^4 with a bell-crank-lever F^4 loosely mounted on the shaft R^2, Figs. 3 and 4. The vertical arm of this bell-crank-lever has pivoted to it a weighted trigger G^4 adapted to co-operate with a cam H^4 fast upon the shaft E, as shown by the dotted lines in Fig. 4. The trigger G^4 is capable of yielding on its pivot in one direction but is held from movement in the other by a lug I^4 on the arm of the bell-crank. When the shaft E is given its first revolution by the operating handle the cam H^4 simply flips up the trigger G^4 as it passes it and does not move the bell-crank and connected parts, but at the end of the return revolution of the shaft the cam rides over the rounded nose of the trigger and forces the upper arm of the bell-crank rearward, lifting the extremity of its lower arm and thereby rocking the shafts C^4 and V^3 against the tension of the spring Y^3. When the cam clears the end of the trigger G^4 the spring Y^3 re-sets the parts with considerable force and the arm W^3 fast upon the rock-shaft V^3 throws the arms U^3 upward and carries their platens T^3 against the types to effect the printing.

The record-strip J^4 is carried in a supply roll wound upon a roller K^4 journaled in brackets L^4 secured to the left hand side of the casing, Fig. 1. From the reel K^4 the strip is led through an aperture M^4 in the side of the casing, Fig. 6, thence across the machine, beneath the type-wheel S^3 and between it and its co-operating platen T^3, and wound upon a storage reel N^4 mounted upon a lateral extension of the middle frame-plate C, Fig. 4. The storage reel N^4 has fast upon its side a ratchet O^4 with which co-operates a pawl P^4 pivoted to the plate B^4 fast upon the rock-shaft C^4. At each rocking of the shaft C^4 by the cam H^4, in the manner above described, the storage-reel will be turned by the pawl P^4 and a portion of the record-strip wound thereon. This movement is imparted to the storage-reel while the cam is passing the trigger, so that the strip has been moved and come to rest when the platen is actuated by the spring to effect the printing.

An endless inking-ribbon Q^4, Figs. 5 and 6, is passed at one end around a roller Q^5 carried by a bell-crank-plate R^4, led thence beneath the type-wheels, being of sufficient width to underlie both of them, thence under a guide-rod S^4, and thence around a roller T^4. The latter has fast upon it a ratchet U^4 with which co-operates a sliding pawl V^4 mounted by a slot and pin upon the frame-plate C and having connected to it a retracting spring W^4. The extreme lower end of the pawl V^4, beyond its tooth which co-operates with the ratchet, is bent rearward, as shown in Fig. 3, and this bent end of the pawl stands in the path of the head of the screw X^4 by which the pawl P^4 heretofore described is pivoted to the plate B^4 fast on the rock-shaft C^4, Fig. 4. At each movement of the plate B^4 to the left in Fig. 4 the pawl V^4 will be slid to the left, to turn the ratchet U^4 of the inking ribbon roller at the same time that the pawl P^4 turns the ratchet O^4 of the storage-reel, and thus the inking ribbon will be advanced at each operation of the machine, to present a fresh inking surface at the printing point. A coiled spring Y^4 connected to the bell-crank R^4, Fig. 6, yieldingly presses the lower arm of said bell-crank to the left and maintains the inking ribbon in taut condition.

The front plate A is provided with an aperture Z^4 opposite the printing point, through which a check may be inserted between the type-wheel R^3 and its co-operating platen T^3, to cause the amount indicated and registered to be printed upon such check simultaneously with the printing of it upon the record-strip, as will be readily understood. The plate A has secured to it in front of the aperture Z^4 a shelf A^5 to facilitate the insertion of such checks and upon which their outer ends may rest while they are being printed.

The machine is also provided with an alarm mechanism consisting of a gong B^5, shown in dotted lines in Fig. 4, arranged to be sounded by a striker C^5 carried by an arm D^5 fast on the rock-shaft C^4, whenever said rock-shaft is actuated by the cam E in the manner before explained, a spring G^5 connected to the arm D^5 assisting the spring Y^3 in re-setting the parts. The rock-shaft C^4 also has fast upon it an arm E^5 which co-operates with a lever F^5 extending down into the drawer-compartment and actuating the drawer-latch to release the drawer at each operation of the machine, but

which it is thought unnecessary to illustrate and describe in detail here, since no claim will be made to this feature of the machine.

I am aware that it is not broadly new, in a machine of this character, to employ a notched driving disk, such as L, oscillating backward and forward through a complete revolution at each operation, an oscillatory indicating dial carried by an arm such as O, and a coupling device between the arm and driving disk co-operating with a series of keys to disconnect the indicator at different points determined by the key operated; also, that in such machines both registering and printing mechanisms have been employed and actuated by the indicating mechanism. I believe I am the first, however, to combine a locking device of any sort with the driving mechanism, operating keys and detent plate of a machine of this class, in such manner as to lock the keys from movement when the driving mechism has been moved from normal position; also the first to employ in a machine of this style a coupling device between the driving disk and indicator of such character that the indicator becomes positively locked to the operated key by the latch when it is arrested by such key; also the first to connect the indicator with the register by means of a clutch such as that shown and described; as well as the first to produce the several other novel combinations set forth in my claims.

Having thus fully described my invention, I claim—

1. The combination of the central driving shaft, the concentric series of keys, the detent plate co-operating with the keys, and a lock co-operating with the detent plate and operating to lock the latter from movement when the driving shaft is turned from normal position, whereby operation of the keys is prevented when said shaft is out of normal position, substantially as described.

2. The combination of the central driving shaft, the locking disk F′ mounted thereon, the concentric series of keys, the detent plate co-operating with the keys, and a locking device interposed between the detent plate and locking disk and operating to lock the latter and the keys from movement when the driving shaft is turned from normal position, substantially as described.

3. The combination of the central driving shaft, the notched locking disk F′ mounted and capable of slight oscillation thereon, the concentric series of keys, the detent plate co-operating with the keys and provided with a projection, as the stud K′, and the locking arm J′ interposed between the disk F′ and detent plate, substantially as described.

4. The combination of the central driving shaft, the driving disk L fast thereon, the notched locking disk F′ loose thereon and loosely connected to the driving disk L, as by the hole and pin G′ H′, the concentric series of keys, the detent plate co-operating therewith and provided with the stud K′, and the locking arm J′ interposed between the disk F′ and detent plate, substantially as described.

5. The combination of the central driving shaft E, the driving disk L fast thereon, the notched locking disk F′ loose thereon and connected to the disk L by the hole and pin G′ H′, the plate L′ pivoted to the disk F′ and co-operating with a fixed stop M′, the concentric series of keys, the detent plate Y provided with the stud K′, and the locking arm J co-operating with the disk F′ and stud K′, substantially as described.

6. The combination of the concentric series of keys T, each provided with three notches, X, C′, D′, the fixed plate W whose periphery co-operates with the notch X, and the spring-pressed oscillatory detent plate Y provided on its periphery with the teeth co-operating with the notches C′ D′ in the keys, substantially as described.

7. The combination of the concentric series of keys, mounted in tubular bearings and guided at their inner ends in the fixed plate V, the springs U′ surrounding the keys within the tubular guides and bearing against shoulders upon the keys, the fixed plate W co-operating at its periphery with the notches X in the keys, and the spring-pressed detent plate Y provided on its periphery with the teeth co-operating with the notches C′ D′ in the keys, substantially as described.

8. The combination of the oscillatory driving disk L provided with the notch M, the concentric series of keys, the oscillatory arm O mounted upon the same axis as the disk L, the coupling device or latch N carried by the arm O and provided with the portion overlapping the periphery of the disk L and having the coupling lug Q′ adapted to co-operate with the notch M, and having also the cam-shaped projection P′, the spring-pressed pivoted plate S′, and the spring R′, the plate S′ and portion P′ operating to embrace the operated key and lock the arm O thereto, substantially as described.

9. The combination of the oscillatory driving disk L provided with the notch M, the spring-pressed pivoted plate N carried by the disk L and projecting beyond its periphery, the oscillatory arm O mounted upon the same axis as the disk L, the concentric series of keys, and a spring-pressed latch carried by the arm O and co-operating with the keys and with the notch M and plate N of the disk L, substantially as described.

10. The combination of the oscillatory driving shaft E, the driving disk L fast thereon and provided with the notch M, the spring-pressed pivoted plate N carried by the disk L, the concentric series of keys, the arm O oscillating on the shaft E, the latch-disk N′ pivoted to the arm O and provided with the portion overlapping the disk L and having the extended part P′ and the coupling lug Q′ adapted to co-operate with the notch M, the

plate L′ pivoted in the disk N′, and the spring R′ connected to the disk N′, substantially as described.

11. The combination of the central driving shaft E, the notched driving disk L fast thereon, the concentric series of keys, the oscillatory arm O mounted on the shaft E, the coupling device carried by the arm O and co-operating with the disk L and the keys, the gear-wheel H^2 fast upon the arm O, the type-wheel R^3 geared to the wheel H^2, the platen T^3 carried by an arm or reciprocating support U^3, a spring co-operating with said arm to throw the platen against the type-wheel, and a cam, as H^4, actuated by the driving shaft, and connections between the same and the actuating spring of the arm U^3, for putting the spring under tension and releasing it to cause it to throw the platen T^3 against the type-wheel, substantially as described.

12. The combination of the driving shaft E, the notched driving disk L fast thereon, the concentric series of keys, the arm O loose upon the shaft, the coupling device carried by the arm O and co-operating with the disk L and keys, the shaft Q^3 geared to the arm O, the type-wheels R^3 S^3 fast upon the shaft Q^3, the platen T^3 carried by reciprocating arms or supports U^3 and co-operating with the type-wheels, an actuating arm W^3 for the platen arms, a spring co-operating with the arm W^3 to cause it to throw the platens against the type-wheels, the cam H^4 fast upon the shaft E, and connections between the cam and the arm W^3 for retracting the latter against the tension of the spring and releasing it, substantially as described.

13. The combination of the central driving shaft E, the notched driving disk L fast thereon, the concentric series of keys, the arm O loose upon the shaft E, the coupling device carried by the arm O and co-operating with the disk L and keys, the registering wheel J^2 loose upon the shaft E, a clutch between said wheel and the arm O, one member of the clutch being movable longitudinally of the shaft E into and out of engagement with the other member, and a shifter for such moving clutch member actuated by a cam upon the shaft E, substantially as described.

14. The combination of the central driving shaft, the notched driving disk L fast thereon, the concentric series of keys, the arm O loose upon the shaft, the coupling device carried by the arm O and co-operating with the disk L and keys, the registering wheel J^2 mounted upon the shaft E, a clutch between said wheel and the arm O, one member of said clutch being movable longitudinally of the shaft E into and out of engagement with the other member, the disk C^3 fast upon the shaft E and provided with the recess E^3 having the inclined or beveled walls, the shifting arm or lever G^3 carrying a stud co-operating with the disk C^3, and connections between the arm G^3 and movable member of the clutch, substantially as described.

15. The combination of the central driving shaft, the notched driving disk L fast thereon, the concentric series of keys, the arm O loose upon the shaft E, the coupling device carried by the arm O and co-operating with the disk L and keys, the clutch member I^2 fast upon the arm O, the registering wheel J^2 mounted to turn and slide upon the shaft E and provided with clutch teeth L^2 co-operating with the clutch member I^2, the disk C^3 fast upon the shaft E and provided with the recess E^3 having the beveled walls, the spring D^3 interposed between the disk C^3 and registering wheel, the pivoted shifting arms G^3 J^3, the former provided with a stud co-operating with the disk C^3 and the latter provided with a stud fitting in a circumferential groove L^3 in a disk or part turning with the registering wheel, the link I^3 connecting the arms G^3 and J^3, and the spring M^3 connected to the arm G^3, substantially as described.

16. The combination of a driving gear, as Q^2, for a train of registering wheels, a rotary shaft T^2, a gear-wheel S^2 splined thereon and adapted to be moved into and out of mesh with the wheel Q^2, and a second gear-wheel U^2 fast upon the shaft and geared to the primary registering wheel, substantially as described.

17. The combination of the driving gear-wheel Q^2, the rotary shaft T^2, provided with a thumb-piece B for turning it, the gear-wheel S^2 splined upon the shaft and provided with a spring A^3 co-operating with a notch in the shaft, the gear-wheel U^2 fast upon the shaft, and the primary registering wheel geared to the wheel U^2, substantially as described.

18. The combination of the central driving shaft, the notched driving disk L fast thereon, the concentric series of keys, the arm O loose upon the shaft, the coupling device carried by the arm and co-operating with the disk L and keys, the numbered dial Q fast upon the arm O and adapted to expose its numbers singly at the window S in the frameplate or casing, the transversely sliding screen plate Z′ provided with the opening B^2, the spring C^2 connected to said plate, and the pivoted lever D^2 co-operating at its lower end with the driving disk L and at its upper end with a projection upon the screen-plate Z′, substantially as described.

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Witnesses:
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