No. 638,286. Patented Dec. 5, 1899.

J. SHARPE.

CASH REGISTER.

(Application filed Oct. 4, 1897.)

(No Model.) 4 Sheets—Sheet 1.

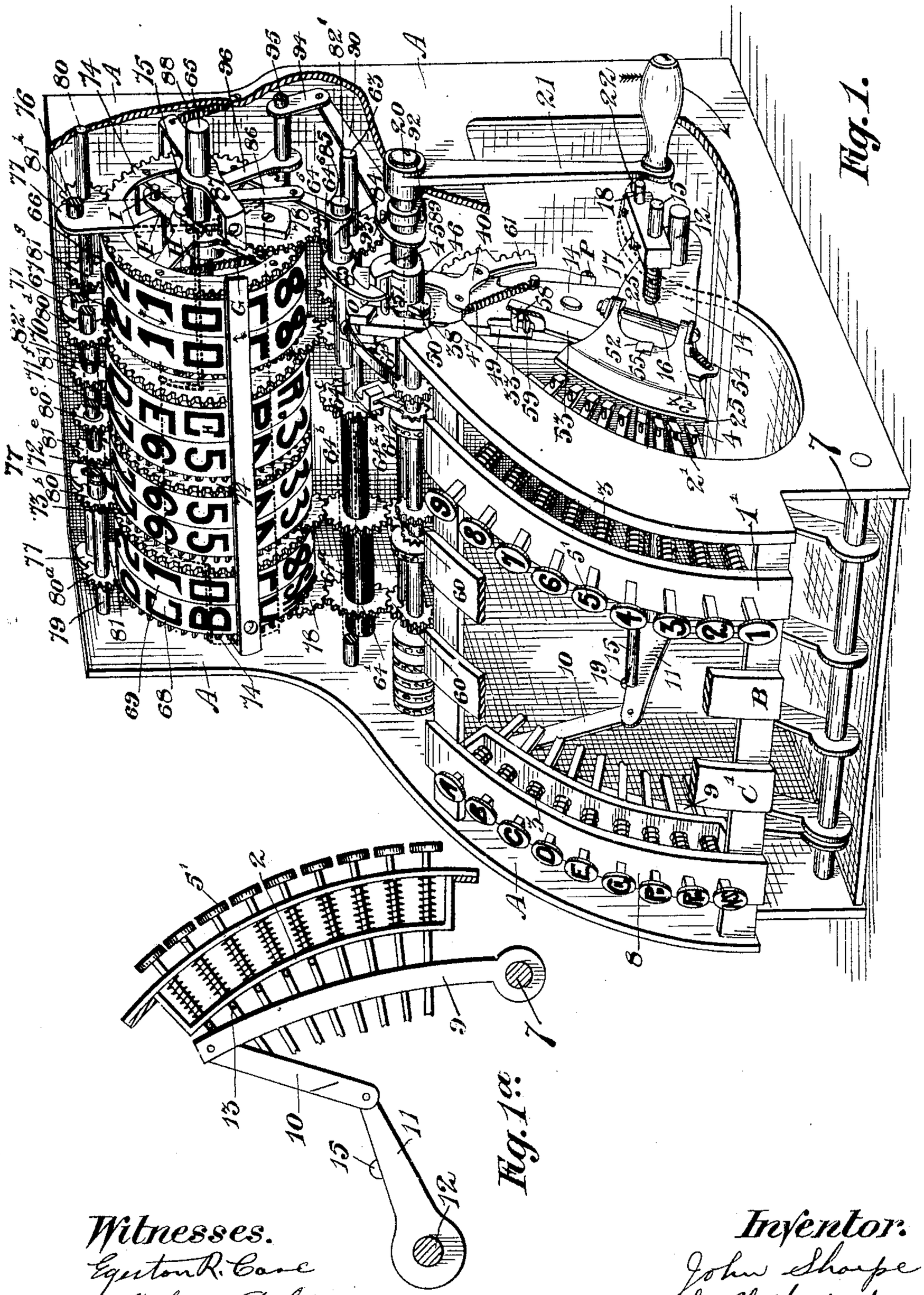

Fig. 1.

Fig. 1a.

Witnesses.
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(No Model.)

4 Sheets—Sheet 2.

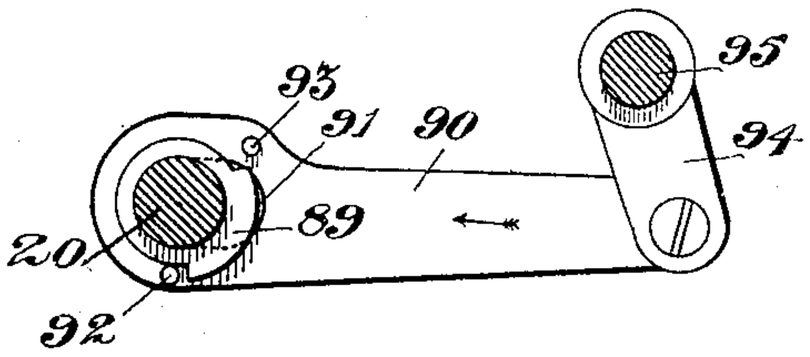

Fig. 2a.

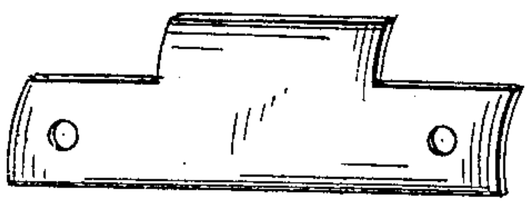

Fig. 10.

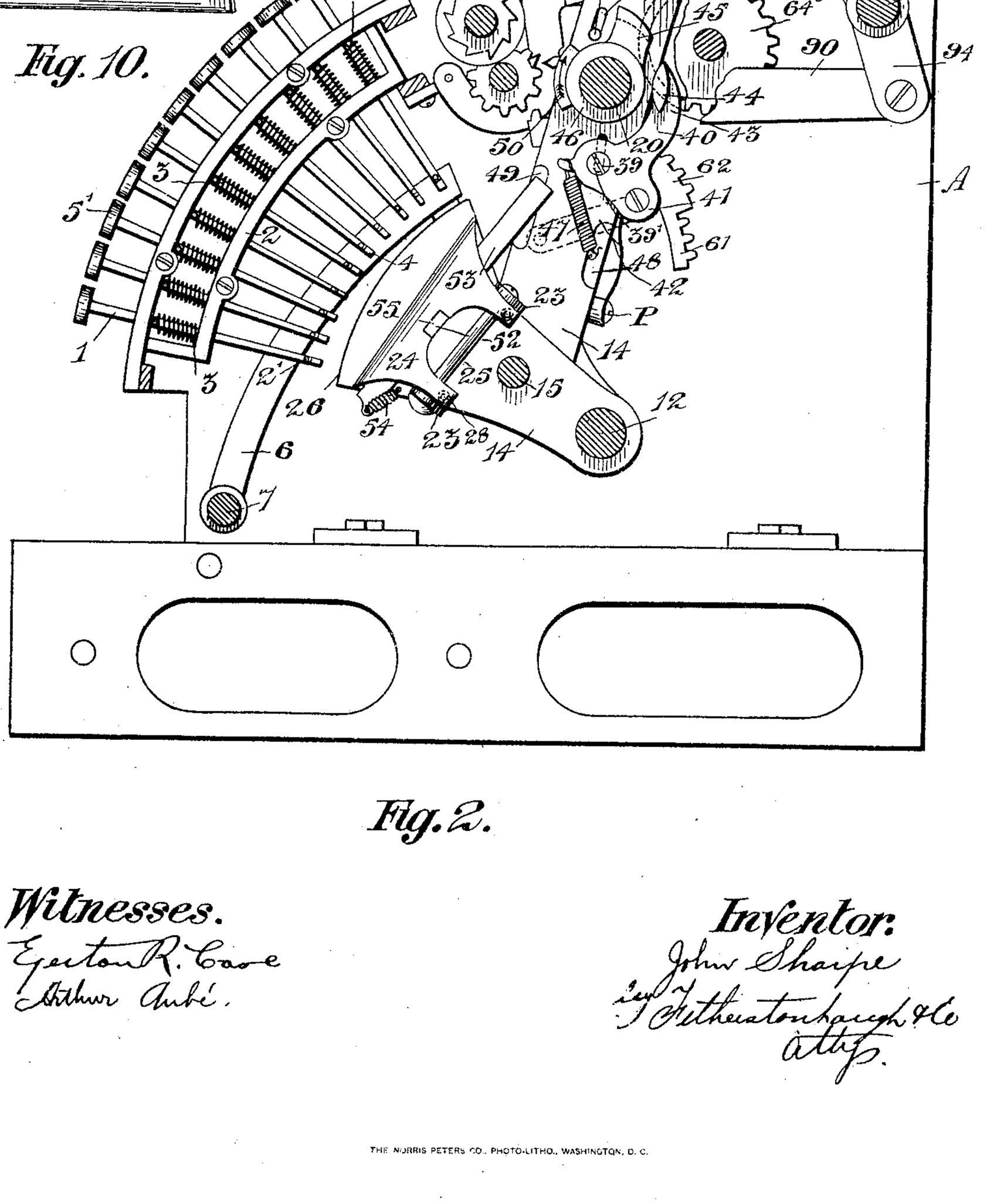

Fig. 2.

Witnesses.
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(Application filed Oct. 4, 1897.)

(No Model.) 4 Sheets—Sheet 3.

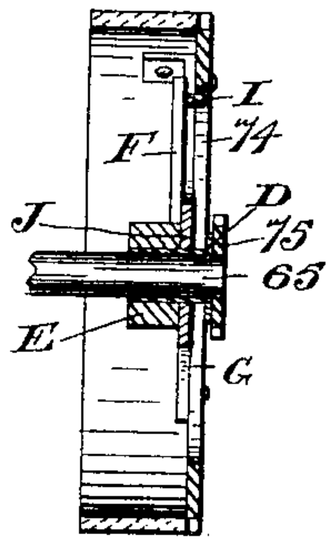

Fig. 8.

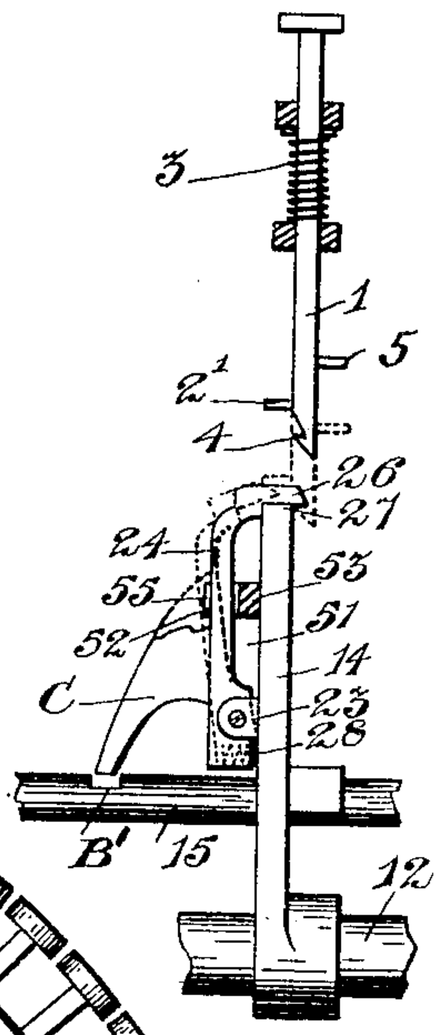

Fig. 7.

Fig. 3.

Witnesses.
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J. SHARPE.

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(Application filed Oct. 4, 1897.)

(No Model.) 4 Sheets—Sheet 4.

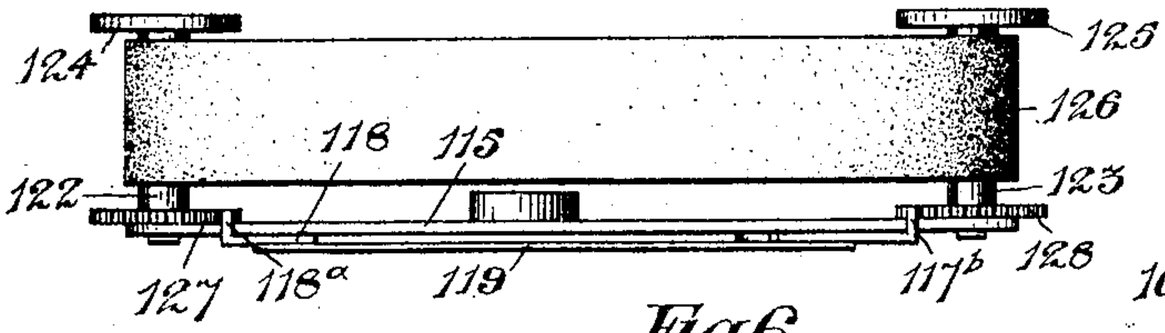

Fig. 6.

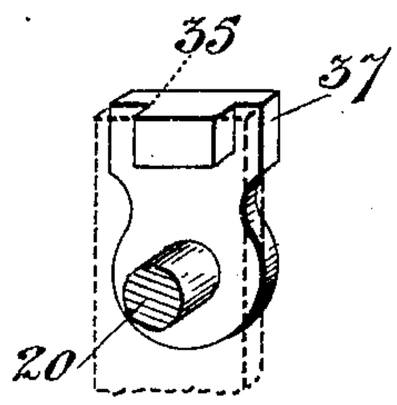

Fig. 9.

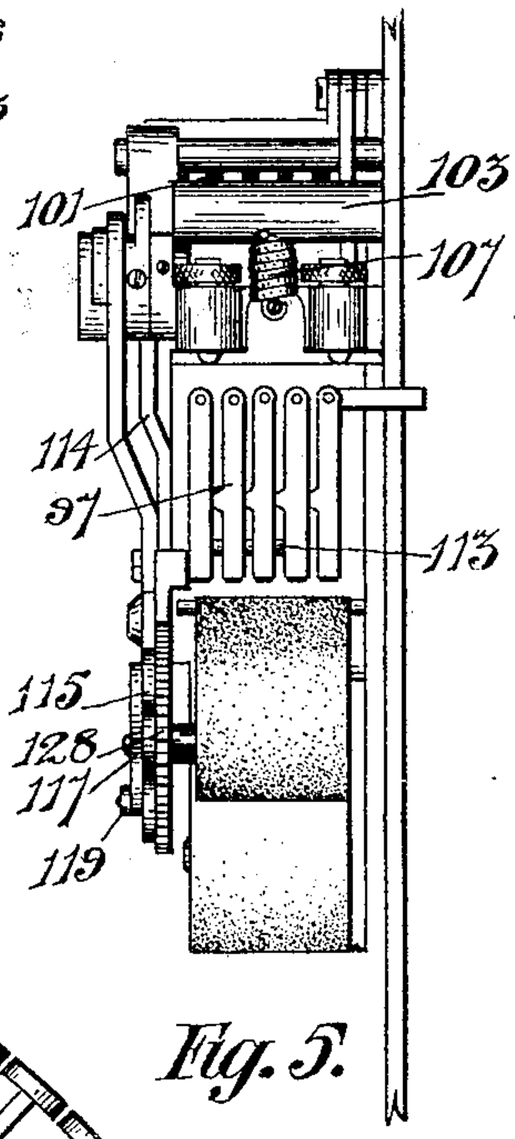

Fig. 5.

Fig. 4.

Witnesses.
Egerton R. Case
Arthur Aubé.

Inventor.
John Sharpe
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attys.

UNITED STATES PATENT OFFICE.

JOHN SHARPE, OF OTTAWA, CANADA, ASSIGNOR TO THE CAPITAL CASH REGISTER COMPANY, OF SAME PLACE.

CASH-REGISTER.

SPECIFICATION forming part of Letters Patent No. 638,286, dated December 5, 1899.

Application filed October 4, 1897. Serial No. 653,948. (No model.)

To all whom it may concern:

Be it known that I, JOHN SHARPE, a subject of the Queen of Great Britain, and a resident of Ottawa, in the county of Carleton, Province of Ontario, Canada, have invented certain new and useful Improvements in Cash-Registers, (for which I have obtained a patent in the Dominion of Canada, numbered 57,216, bearing date August 25, 1897,) of which the following is a specification.

My invention relates to improvements in cash-registers, and is a further improvement on the machine patented to me and Jose Alexander Banfield under No. 571,098, dated November 10, 1896, so I shall only describe what parts are necessary in the old machine to assist me in explaining my new improvements.

The object of my invention is, first, to provide a machine by means of which all transactions are shown and exposed on two sets of revolving indicator-wheels bearing on their peripheries indicia corresponding with the indicia on the finger-pieces of the key-rods in the key-banks; secondly, to so arrange the indicating mechanism that it cannot be operated until the machine has been unlocked, when by the initial movement of the handle the indicator-wheels are returned to starting position, together with the distributed type-frames, before a new transaction can be recorded, and, thirdly, to provide an automatic ink-ribbon feed and means for alining the type-bars, as hereinafter more particularly explained.

Figure 1 is a perspective view of my machine with parts removed, showing the mechanism for operating the indicator-wheels. Fig. 1ª is a side view of the device for unlocking the machine. Fig. 2 is a side elevation, partially in section, looking at the right-hand side of the machine. Fig. 2ª is a side view of a rocking arm, showing its slot. Fig. 3 is a side elevation, partially in section, looking at the left-hand side of the machine. Fig. 4 is a side view of the printing mechanism and automatic ink-ribbon feed. Fig. 5 is an end view of the printing mechanism and automatic ink-ribbon feed. Fig. 6 is a plan view of the automatic ink-ribbon feed. Fig. 7 is a side view, partially in section, showing the mechanism for locking the key-rods. Fig. 8 is a sectional view of one of the indicator-wheels, showing my device attached for arresting the momentum of the said indicator-wheels. Fig. 9 is a perspective view of the upper bracket for holding the sliding plates in position adjacent to the upwardly-extending frames 14. Fig. 10 is a reduced perspective view of one form of indicator-shield.

In the drawings like letters and numerals of reference indicate corresponding parts in each figure.

In the drawings of my new machine I have only shown two banks of keys; but it will be readily understood that I use the same number as were used in the old machine, fully described in the former patent already referred to. Bank No. 1′ (shown in Fig. 1) operates exactly as the other two banks, whose positions are shown in this figure at B and C′. The key-rods are nine in number in each bank, and the finger-pieces of the several key-rods bear the same indicia as in the former patent, and each bank, as before, represents cents, tens of cents, and dollars, respectively, so it will only be necessary to describe one bank and its connecting mechanism to clearly understand the operation of the others.

A A are the standard-plates.

1 are unrotatable key-rods having bearings in the frames 2, which are suitably supported at the front of the machine. Near the lower ends of the key-rods 1 are stop-pins 2′. Each key-rod is provided with a return-spring 3. The inner ends 4 of the several key-rods are hook-shaped. 5 are laterally-projecting pins secured to the key-rods 1. 5′ are the finger-pieces of the several key-rods. 6 is a rock-lever loosely journaled on a rod 7, supported in the standard-plates A A. The rock-lever 6 projects backwardly and rearwardly into the path of movement of the several laterally-projecting pins 5 on the several key-rods and is normally in contact with the pin on the lowermost key-rod, whereby its forward movement is arrested.

8 is a special bank of keys having a rock-lever 6 and also an extra rock-lever 9, connected by a link 10 to an arm 11, loosely journaled on the rod 12. The first five key-rods, counting from "A" downward, in this bank are provided with laterally-projecting pins 13,

the uppermost one of which normally rests in contact with the rock-lever 9.

14 are upwardly-extending plates secured on the rod 12, which is supported in the standard-plates A A.

15 is a rod loosely supported in the plates 14. On this rod is a spring 16. On the right-hand end of the rod 15 is secured a stop-block 17, provided with a pin 18. The pin 18 and the end of the rod 15 project through the outer casing of the machine. (Shown as removed in Fig. 1.) In the standard-plate at the left-hand side of the machine is a hole 19 in the path of movement of the end of the rod 15.

20 is the main shaft of the machine, which, passing through the upper ends of the plates 14, is journaled in the standard-plates A A.

21 is the handle, secured on the right-hand end of the shaft 20. The handle is provided near its lower end with a pin 22, which is normally in contact with the pin 18. When the parts above described are in this position, the machine is locked.

The plates 14 are provided, as in the old patent, with lugs 23, to which are pivoted segmental detents 24 by the pins 25. The segmental detents are provided with a beveled projecting end 26, which normally extends over the segmental end 27 of the plates 14 and is held yieldingly in that position by springs 28, arranged in pockets in the ends of the detent 24. (See Fig. 7.)

29 is a link connecting the rock-lever 6 with a short arm 30 on the toothed segmental rock-lever 31. It will be noticed that the rock-lever 6 is curved rearwardly from the key-bank and that the pins 5 on the key-rods are at different distances from such rock-lever. This arrangement is planned upon the throw to be given the toothed segmental rock-levers 31 by the depression of the key-rods, the first or lowest key-rod throwing the toothed segmental rock-lever nine teeth, while the next throws it eight teeth, and so on up to the ninth, which throws the toothed segmental rock-lever 31 only one tooth forward.

B′ are notches cut in the rod 15.

C is an arm secured to or forming part of the segmental detents 24. In its normal position the end of the arm C is directly above the notch B′ and barely escapes the rod 15 when such rod is moved. The object of the arm C is to prevent any keys from being locked after the machine has been operated or partially operated, as will be clearly understood later on.

The toothed segmental rock-levers 31 are pivoted by pins 32 to sliding plates 33. The sliding plates 33 have their upper and lower ends recessed, as shown at 34 and 35, so as to be held in position to the upwardly-extending plates 14 by their respective brackets 36 and 37. (See Fig. 3.) It will be understood that the brackets 36 and 37 allow the free upward and downward movement of the sliding plate 33 and keep the latter in its position adjacent to the plate 14. Each sliding plate is provided with an elongated slot 38, through which the main shaft 20 passes. By means of this elongated slot the sliding plate has a lengthwise movement. Each sliding plate 33 has pivoted to it by a pin 39, extending through a slot 39′, a lever 40. The arm 41 of the lever 40 is connected by a link 42 with the front side of the toothed segmental rock-lever 31. (See Figs. 2 and 3.) 43 is an upwardly-extending arm on the lever 40.

44 is a cam-faced lug projecting laterally from the arm 43 into the path of movement of an undercut cam 45, secured to a collar 46, secured to the main shaft 20.

47 is a spring connected at one end to the lever 40 and at the other end to a pin secured to the sliding plate 33. This spring keeps the lever 40 in its normal position, as shown in Fig. 2.

48 and 49 are recesses cut in the sides of the plates 14.

50 is a cam secured to a collar 46 on the main shaft. The pin 51, secured to the sliding plate 33, extends through a slot O in the plate 14 into the path of movement of the cam 50.

On reference to Fig. 7 it will be seen that the segmental detent 24 is provided with a transverse slot 51′ and notch 52, as in the old patent. In this recess is arranged a slide 53, which is projected upwardly and rearwardly relatively to the segmental detent 24 by means of the spring 54, connecting the slide 53 with the plate 14. 55 is a beveled lug secured to the slide 53. This lug 55 coöperates with a similarly-constructed surface in the notch 52. The function of the parts above described is to release the locked key-rods. When the slide 53 is raised up, as hereinafter explained, its lug 55 coöperates with the notch 52, thereby forcing the segmental detent 24 out of engagement with the hooked end of the depressed key-rod, which is immediately returned to normal by its return-spring 3.

56 are screws extending through slots 57 in the plate 14, securing the slide 53 to such plate and allowing it to operate in alinement with the slots 57.

Secured to the upper end of the slide 53 is a beveled-edge pin 58 (see Fig. 1) in the path of movement of a beveled-edge pin 59, secured to the sliding plate 33 and operating in the recess 49.

60 are a series of idler-pinions on the main shaft 20, which are arranged in alinement and to mesh with the supplemental toothed segments 61, secured to or forming part of the toothed segmental rock-levers 31. The toothed segments 61 are normally out of engagement with the pinions 60.

62 is a segmental rack formed on the rock-lever 31, designed to operate the adding mechanism, which I do not describe, as I do not claim this in my present invention.

63 is a shaft parallel with the main shaft and is journaled in the standard-plates A A. On the shaft 63 are independent sleeves 64[a],

64^b, and 64^c. The shaft 63 is provided with a series of gear-wheels, which are arranged as follows: The wheel 64′ is secured to the sleeve 64^a, the wheel 64^2 is secured to the sleeve 64^b, the wheels 64^3 and 64^4 are secured to the sleeve 64^c, and the wheels 64^5 and 64^6 are secured to the shaft 63.

65 is a bearing-rod supported near the top of the machine in the standard-plates A A. On this rod are loosely journaled a series of two sets of revolving indicator-wheels, four of which are arranged in pairs of two at each end of the machine, while the remaining four are grouped together in the center of the machine. (See Fig. 1.) The numbers or indicia on the indicator-wheels are arranged to correspond with the indicia on the finger-pieces of the key-rods. Suitably secured to one side of each indicator-wheel and loosely journaled on the rod 65 is a gear-wheel 74.

The indicator-wheels 66 and 67 on the right-hand side of the machine and the indicator-wheels 68 and 69 on the left-hand side of the machine are arranged to be read from the front of the machine through suitable openings. The indicator-wheels 70, 71, 72, and 73 are arranged to be read from the rear side of the machine through suitable openings.

76 is a rod supported in the standard-plates A A. To this rod are secured a number of supporting-frames 77, which are also supported on the bearing-rod 65. Near the lower end of each supporting-frame are journaled idlers 78, which are normally in mesh with four of the gear-wheels on the shaft 63. (See Fig. 1.)

79 and 80 are two shafts journaled near the top of the machine in the standard-plates A A. Secured to or on the shaft 79 are four idler-pinions 80^a, 80^b, 80^c, and 80^d, which mesh, respectively, with the gear-wheels 74, secured to the indicator-wheels 68, 69, 71, and 70. The two pinions 80^b and 80^c are connected together by a sleeve 81 on the shaft 79.

81^e, 81^f, 81^g, and 81^h are four idler-pinions on the shaft 80, which mesh, respectively, with the gear-wheels 74, secured to the indicator-wheels 73, 72, 67, and 66. The two pinions 81^f and 81^g are connected together by a sleeve 82 on the shaft 80. The sleeves 81 and 82 are loosely journaled on the shafts 79 and 80, respectively, and the object of such sleeves, together with the shafts 79 and 80 and pinions 80^b, 80^c, 81^f, and 81^g, is to transmit motion from the main indicator-wheels to the secondary set of indicator-wheels. Hence it will be understood that if one of the main indicator-wheels be rotated the secondary wheels will also be rotated by their respective pinions and will expose the same amount at the rear side of the machine as is exposed at the front of the machine. When I describe the operation of the machine, the operation of the indicator-wheels will be clearly understood.

82′ is a dead-shaft situated above the main shaft and supported in the standard-plates A A.

83 is an arm secured to a collar 84, loosely journaled on the shaft 82′.

85 is an arm secured to or forming part of the other end of the collar 84. This arm is connected by a link 86 to a flash-frame 87, loosely journaled on the bearing-rod 65. The flash-frame 87 is suitably connected to the standard-plate at the right-hand side of the machine by a spring 88. Secured to the flash-frame 87 are two suitable shields or shutters, which will be moved up and cover the indicator-wheels at the front and rear sides of the machine when the machine is being operated. I have shown one form in Fig. 10.

89 is a cam secured to the main shaft 20.

90 is an arm loosely journaled, by means of an elongated slot 91, on the main shaft. (See Fig. 2^a.) This arm 90 has a lengthwise movement. 92 and 93 are pins secured to the arm 90 in the path of movement of the cam 89. 94 is a link connecting the arm 90 with the rock-shaft 95.

On reference to Fig. 8 the construction of my device for arresting the momentum of the indicator-wheels and returning them to position after it has overcome the momentum in such wheels will be seen. It is to be understood that each main indicator-wheel is provided with one of these devices. D is a sleeve secured to or forming part of the pinion 75. This sleeve has secured to its opposite end a hub E, which is provided with two arms F and G. (See Figs. 1 and 8.) It will be understood that the hub E, with its connected parts, being secured to the same sleeve D as the pinion 75, will be revolved when such pinion is revolved. H is a spring connected at one end to the end of the arm G and at the other end to one of the arms of the gear-wheels 74, as shown in Fig. 1. I is a pin secured to the arm F. The pin I is normally held in contact with one of the arms of the gear-wheels 74, as shown in Fig. 1. The hubs J of the gear-wheels 74 are loosely journaled on the sleeve D. 96 are detents secured to the rock-shaft 95. The function of the detents 96 is to engage with the pinions 75 after an operation of the said pinions and indicator-wheels and said indicator-wheels have been forced positively into alinement (by means hereinafter described) and lock the indicator-wheels in position after an operation. The indicator-wheels when locked by the above detents represent on their peripheries through suitable openings in the front and rear sides of the machine the amount and character of the transaction just recorded by the machine. If, for example, key No. 9 in bank 1′ be operated, the indicator-wheel 66 will be revolved in the direction indicated by arrow far enough to bring the figure "9" at its proper opening. The hub E and its arms F and G, being connected to the same sleeve D as the pinion 75 and such pinion being in continuous mesh with the main shaft, are operated whenever a key-rod is depressed and the handle turned and will

operate its connected parts just mentioned, which by means of the spring H pulling on the arm of the wheel 74, to which it is attached, will revolve the indicator-wheel 66 as long as movement is given to it by the above-mentioned parts. When the indicator-wheel has been moved so as to bring the figure "9" at its respective opening, it is forced positively into alinement by a means I shall now describe, which means at the same time forces the type-bars in the type-frames also positively into alinement. When the indicator-wheels have been alined, they are locked by the detents 96 engaging with the pinions 75, as before described. There is no overthrow of the indicator-wheels during this operation, because immediately the pinion 75 has been locked by the detent 96 the other parts to which it gives movement are also locked. The indicator-wheels have an overthrow only when they are being returned to starting position by the means which at the same time returns the distributed-type frames to starting position also, as will be understood later on.

I shall now describe, in so far as it is necessary to explain my improvements, my new means for holding the type-frames connected with the printing mechanism in place and alinement while the printing is being performed by their respective plungers. (See Fig. 4.)

The type-frames 97 are provided with the same kind of type 98, secured by means of their stems 99 in the type-frames, as in the former patent.

100 are return-springs on the stems of the type-bars.

101 are four part gear and part serrated wheels loosely journaled on the main shaft. The geared portion of these wheels is in constant mesh with the geared portion of the racks 102, secured to or forming part of the type-frames. Also in constant mesh with the geared portion of the wheels 101 are gear-wheels 200. The sleeves on the shaft 63 extend out and have secured to their outer ends one of the wheels 200, as also has the shaft 63. The wheels 200 are in constant mesh with the indicator-wheels. For example, the wheel 64', being secured to the sleeve 64^a and being in constant mesh with the indicator-wheel 68 by means of the intermediate gearing, will revolve its gear-wheel 200, which wheel, being in constant mesh with one of the gear-serrated wheels 101, revolves this wheel, which through its geared portion operates its respective type-bar, when the toothed segment 61 meshes with the idler in mesh with the wheel 64' and by the operation of the handle is operated. The serrated portions of the wheels 101 are engaged periodically by the end of the arm 105 of the detent 103, when the cam 108 engages the end of the arm 106 and moves the detent 103 around its pivot 104 against the resistance of its spring 107. The end of the arm 105 being of the same shape and width as the serrated portion of the wheels 101 will when it engages with such wheels force them into alinement, when they, through their geared portion, force the type-frames positively into alinement. The wheels 101 being in engagement with the gear-wheels 200 and such wheels being in constant gear with the indicator-wheels by means of the intermediate gearing will force the indicator-wheels positively into alinement. It will be understood that when the detent 103 is forcing the wheels 101 into alinement and they by the means above described are forcing the type-bars and indicator-wheels into positive alinement the pinion 75 will not be engaged by the detents 96, as was before mentioned. The spring 107, secured near the outer end of the detent 103, keeps the arm 105 out of engagement with the serrated portion of the wheels 101 when in its normal position.

110 is a downwardly-extending rock-lever pivoted to the standard-plate A at 110'.

111 is a roller pivoted to the lever 110. This roller extends into the path of movement of a cam 112, secured to the main shaft 20. At the lower end of the rock-lever 110 is secured a pin 113, extending inwardly across and into the path of movement of the type-frames 97.

114 is a rock-lever the upper end 131 of which extends into the path of movement of the cam 112 on the main shaft. This rock-lever 114 is the same as was used in the old machine to impart a rocking movement to the ink-pads. In my present machine I use the lever 114 to impart a lateral movement to the sliding frame 115, to which it is connected by a pin 119'.

116 are slots in each end of the sliding frame 115.

117 and 118 are spring-actuated dogs loosely pivoted to the sliding frame 115 and connected together at their lower ends by a link-rod 119. The dog 117 is held in position by means of a spring 120', pivoted to the sliding frame 115. This spring bears against a square shoulder 117^a on such dog.

120 and 121 are rods secured to and projecting outwardly from the standard-plate A. The above-mentioned rods are provided with sleeves 122 and 123. On the inner ends of the sleeves 122 and 123 are secured disks 124 and 125, (see Fig. 6,) which serve as guides to the ribbon 126. On the outer ends of these sleeves are secured ratchet-wheels 127 and 128. These ratchet-wheels also serve as guides to the ribbon.

117^b and 118^a are the points of the dogs 117 and 118, respectively. It will be seen from Fig. 6 that the points of the dogs project inwardly in suitable position to engage with the ratchet-wheels 127 and 128. These ratchet-wheels are provided with tooth-shaped lugs 129 and 130. The object of these tooth-shaped lugs is to disengage the actuating-dogs 117 and 118 from their respective ratchet-wheels, as will be understood later on.

Having now described the principal parts involved in my invention, I shall describe its operation.

In my new machine, as in the old one, each bank of keys is provided with the same mechanism as bank No. 1′, so it will only be necessary to describe the operation of one bank to thoroughly understand the operation of the others. The keys designated "A," "B," "C," "D," and "E" in bank No. 8 are supposed to represent different clerks in an establishment, as in the former patent. Before the machine can be operated it must be unlocked by means of one of the above-mentioned keys. When it is desired to record a transaction, one of the above keys is depressed. During this operation the pin 13 on the key-rod depressed (see Fig. 1ª) abuts the rock-lever 9, depressing such rock-lever, which by means of the link 10 depresses the arm 11 sufficiently to escape below the end of the rod 15. At the same time a key-rod is depressed the hooked end 4 engages with the beveled edge 26 of the detent 24, forcing such detent into the dotted position shown in Fig. 7, and moving the arm C downwardly until its end descends into the notch B′ in the rod 15. When the hooked end 4 has passed the beveled edge 26, it is prevented from moving any farther by its stop-pin 2′ and the detent 24 is forced back to normal by means of the springs 28, as also will be the arm C, as it is secured to the detent. The machine is now ready to be unlocked. Before unlocking the machine, however, the required keys to be operated in one or in all the key-banks must be depressed and locked in position by means identical with that just described. The required keys are now depressed. While in this position if any keys be intentionally or inadvertently operated in a bank in which a key has been depressed or operated the first-operated key is released and brought back to normal by its return-spring 3 when the hooked end of the newly-operated key is pushing the detent 24 out of its path, as will be readily understood on reference to Fig. 7. The required keys being now locked in position, the handle is unlocked by pressing on the right-hand end of the rod 15, moving its other end into the hole 19 far enough to allow the pin 18 to move out of the path of movement of the pin 22, secured to the handle. The machine is now unlocked. It will now be understood that no keys can be operated in any of the banks when the rod 15 has been moved, as the notch B′ has been moved out of the path of movement of the end of the arm C, and such arm being normally in close proximity to such rod will, if a key-rod be depressed, abut said rod and not move far enough to allow the detent 24 to be moved out of its present position, and consequently the depressed keys will be securely locked and no newly-pressed keys can be locked while such notch is out of the path of movement of the end of the arm C. At the same time a key-rod is depressed its pin 5 abuts the rock-lever 6, and by means of the link 29 tilts forward the toothed segmental rock-lever 31 and its connected parts. It will be seen from the drawings that the pins 5 are at different distances from the rock-lever 6, which curves rearwardly from them. This arrangement is planned upon the throw to be given the toothed segmental rock-levers 31 by the depression of the keys. The first or lowest key has a throw of nine teeth, and so on up to key No. 9, which throws the toothed segmental rock-lever 31 forward one tooth. When key No. 1 is depressed, the toothed segmental rock-lever 31 is advanced nine teeth, and so on up to key No. 9, which advances the said rock-lever 31 only one tooth and leaves the remainder in position to operate the idlers 60. At the same time the toothed segmental rock-lever 31 is thrown forward the cam-faced lug 44 on the arm 43 is thrown backward. It will of course be understood that if no keys have been operated in any bank the cam 45 will pass by the outer surface of the lug 44 and not operate it. To continue the operation: The handle 21 is now turned in the direction indicated by arrow and revolves the cam 50, which, coming in contact with the pin 51, raises the sliding plate 33 and the toothed segmental rock-lever 31 up until the toothed segment 61 is brought into engagement with the idlers 60 and held in engagement. Simultaneously the above movement is taking place the sliding plate 33 is raising up the lever 40 the distance equal to the length of the slot 39′. The operation of the handle still continuing revolves the cam 45 around so that its outer surface engages with the inner surface of the cam-faced lug 44, thereby rocking the lever 40 around its pivot, which by means of the link 42 forces forward the toothed segmental rock-lever 31, whose toothed segment 61, being in engagement with the idlers 60, revolves such idlers around the distance equal to the number of teeth represented by the key depressed. When the toothed segments 61 are operating the idlers 60, they are forced forward to their fullest extent and stopped by the stop P coming in contact with the sliding plate 33. This checking of the toothed segments serves also to arrest the momentum of the indicator-wheels, printing mechanism, and registering mechanism through the intermediate gear, as in the former patent. At the same time the cam 50 is engaging with the pin 51 and raising the sliding plate 33 the beveled-edge pin 59 engages with the beveled-edge pin 58 and raises the slide 53. Simultaneously when the slide 53 is being raised its beveled lug 55 engages with the notch 52, thereby forcing the detent 24 (see Fig. 7) out of engagement with the hooked end of the key-rod. The liberated key-rod is then brought back to normal by its spring 3. It is to be remembered that after the rod 15 has been pushed and

the pin 18 moved out of the path of the pin 22 and the handle started to be turned the spring 16 will immediately push the stop-block 17 and rod 15 back to normal, so that when the cycle of the machine has been completed it will be locked as before. It will now be understood that the notches B' will have been returned to normal and be in the paths of movement of the arms C when the slide 53 operates to disengage or unlock the depressed keys. When this movement just described has taken place, the lever 11 and its connected parts are brought back to normal by any suitable means, such as a spring connecting the rock-lever 9 to the under side of the key-supporting frame 2. The slide 53 is brought back to normal by its return-spring 54 and the detents 24 to normal by their springs 28 when the cam 50 releases the pin 51. As soon as the lug 44 has been fully operated upon by the cam 45 the cam 50 moves out of engagement with the pin 51 and allows the sliding plate 33 to immediately drop back to normal and restore the toothed segmental rock-lever 31 and its connected mechanism also to normal. The pinion 60, having been operated by the toothed segment 61, communicates motion to the gear-wheel $64'$, (see Fig. 3,) which in turn operates the idler 78, which communicates motion to the indicator-wheels by means of the pinion 75 and its connected mechanism. It will now be seen that the indicator-wheels are revolved by the intermediate mechanism above described.

I shall now describe the operation of the indicator-wheels.

On shaft 63 I have shown six idlers. $64'$ meshes with the idler next to indicator-wheel 68. 64^2 meshes with the idler next to indicator-wheel 69. These two wheels mesh direct with the indicator-wheels just mentioned. The wheels 64^3 and 64^4 are connected together by a sleeve 64^c. The wheel 64^4 meshes with the idler next to indicator-wheel 67. The wheels 64^5 and 64^6 are secured to the shaft 63. The wheel 64^6 meshes with the idler next to the indicator-wheel 66. We will assume that key No. 9 in the cent-bank or bank 1' has been depressed and, as before described, the toothed segment 61 will be advanced by the operation of the handle 21 and will mesh with the idler in mesh with the gear-wheel 64^5 and revolve such wheel, communicating motion to the wheel 64^6, and such wheel by means of the idler 78 and pinion 75 operating the indicator-wheel 66 in the direction indicated by arrow far enough around to bring to the proper opening the figure "9." This is of course regulated by the number of teeth on the toothed segment 61, that mesh with the idler in mesh with the gear-wheel 64^5. The wheel 64^3 transmits motion to the wheel 64^4 and it in turn to the indicator-wheel 67 in the same way as those above described. As before stated, the wheels $64'$ and 64^2 are operated direct by their respective toothed segments by means of the intermediate idlers 60. The initial movement of the handle causes the cam 89 to engage with the pin 92 and move the arm 90 by means of its slot 91 on the shaft 20 in the direction indicated by arrow, (see Fig. 2^a,) and such arm by means of its link 94 will throw the detents 96 out of engagement with the several pinions 75. This movement has, of course, to take place before the indicator-wheels are moved. When the indicator-wheels have been operated, the cam 89 comes in contact with the pin 93 and moves the arm 90 in the opposite direction and by means of the link 94 engages the detent 96 in sufficient time with the pinions 75 to lock the indicator-wheels and prevent them from moving around too far and not presenting the proper indicia at their respective openings. The initial movement of the handle causes the cam 45 to move around and release the arm 83, when such arm, assisted by the spring 88, will quickly drop and by means of the link 85 throw the flash-frame 87 and the shutters or screens connected thereto in the direction indicated by arrow far enough to prevent the indicator-wheels from being seen when they are revolving. When the indicator-wheels have been revolved and represent at their respective openings the amount and character of the transaction recorded, the above-mentioned parts are brought to normal by the cam 45 as it returns to normal, engaging with the arm 83 and by means of the arm 85 and link 86 moving the flash-frame and screens connected thereto into normal position. This will uncover the indicator-wheels at the front and back of the machine. It is to be understood that the said indicator-wheels are covered on the front and rear sides of the machine by any suitable transparent covering, such as glass, the said covering to be rendered opaque less a space equal to the length of the figures on the said indicator-wheels.

It will be understood that the above-mentioned screens operate between the covering and the indicator-wheels.

I shall now describe how the motion is transmitted from one indicator-wheel to the other by means of the pinions secured to or on the shafts 79 and 80.

We will suppose that the indicator-wheel 66 is being revolved. The pinion 81^h meshes with the gear-wheel secured to this indicator-wheel, and being secured to the same shaft 80 as the pinion 81^c revolves this pinion, which being in mesh with the gear-wheel secured to the indicator-wheel 73 revolves this indicator-wheel in the same direction and through the same distance as indicator-wheel 66. Again, the pinion 81^g meshes with the indicator-wheel 67, which is operated by the idler 64^4, and being secured to the same sleeve 82 as the pinion 81^f revolves such pinion, which being in mesh with the indicator-wheel 72 revolves this indicator-wheel in the same direction and through the same distance as indicator-wheel 67. It will be clearly seen that

the indicator-wheels 66 and 73 revolve together and that the indicator-wheels 67 and 72 do also.

Now as regards the operation of the pinions on the shaft 79 in transmitting motion to the remaining indicator-wheels we will suppose that the indicator-wheel 68 is being revolved. The pinion 80^a meshes with this indicator-wheel and being journaled on the same shaft as the pinion 80^d revolves this pinion, which, being in mesh with the indicator-wheel 70, moves it in the same direction and through the same distance as indicator-wheel 68. Again, the pinion 80^b meshes with the indicator-wheel 69, which is operated by the idler 64^2, and, being secured to the same sleeve 81 as the pinion 80^c, revolves such pinion, which, being in mesh with the indicator-wheel 71, revolves this indicator-wheel in the same direction and through the same distance as indicator-wheel 69. It will now be clearly understood that the indicator-wheels 68 and 70 revolve together and that the indicator-wheels 69 and 71 do also.

I shall now describe the operation of my device for automatically feeding the ink-ribbon.

During the initial movement of the main shaft 20 the cam 112 engages with the end 131 of the rock-lever 114, and through such rock-lever operating the sliding frame 115 in the direction indicated by arrow. When this operation takes place and the dog 117 is in the position shown in Fig. 4, the ratchet-wheel 128 will be revolved around one tooth at a time by the end 117^b of said dog. As the ratchet-wheel moves so also does the tooth-shaped lug 130, secured thereto, and as such tooth-shaped lug is in the path of the end 117^b of the dog 117 it will when it comes in contact with such end force the dog 117 around its pivot and cause the shoulder 117^a to escape below the spring 120′, when said spring will immediately force itself against the dog and above such shoulder and hold the latter in that position until again displaced by the toothed lug 129 on the ratchet-wheel 127 coming in contact with and forcing the dog 118 out of contact with the wheel 127, and by means of the link-rod 119 throwing the dog 117 into the position shown in Fig. 4. It will be seen from the operation just described that when the ribbon is fed onto the sleeve of one of the ratchet-wheels and such ratchet-wheel completes a revolution the respective dog of that ratchet-wheel is released and the ribbon fed onto the sleeve of the opposite wheel, as above mentioned.

My next group of mechanism to describe is the returning of the indicator-wheels and their respective type-frames to starting position before another transaction can be registered, indicated, and recorded.

When the handle is at normal, the indicator-wheels and their corresponding type-frames are in the position left by the last operation of the machine—that is, the indicator-wheels are exposing at their respective openings the amount and character of the last transaction and the type-frames are in the position that they were brought into by the same transaction to bring the representative type-bars into position to be impressed upon the paper and print the same amount on the paper as is exhibited on the peripheries of their corresponding indicator-wheels. We will suppose, for example, that the indicator-wheel in bank 1′, which represents the figure "9" at its respective opening, (as taken as an example before,) be returned to normal, and also its connected type-frame, by the initial movement of the handle. For this purpose the cam 112 comes in contact during the initial movement of the handle with the roller 111, swinging the rock-lever 110 around its pivot and away from the main shaft, and by means of the pin 113 abutting the distributed type-frames restores them to starting position. This restoring of the type-frames to starting position also restores the indicator-wheels to starting position, as follows: As before mentioned, the racks 102 are in constant mesh with the gear-wheels 200 by means of the wheels 101, and the gear-wheels 200, being in constant mesh with the indicator-wheel 66, by means of the wheel 64^6 and intermediate gear, returns such indicator-wheel to starting position. It will be readily understood that by its return movement to starting position there is a considerable amount of momentum in such indicator-wheel, and the pinions 75 would be injured by being suddenly locked if such pinions were directly connected to the indicator-wheels. They are not, as before described.

To gradually overcome the momentum in the indicator-wheels during their return movement to starting position is the function of the device shown in Fig. 8, the operation of which I shall now describe. During this movement the indicator-wheels have an overthrow. When the pin 113 is being operated and is returning the type-frames to starting position and they by means of the intermediate gearing before described are operating their corresponding indicator-wheels in the opposite direction to that in which they were revolved in bringing the figure "9" at their respective openings, so that the indicator-wheels will represent at the openings the ciphers, ("0,") and the indicator-wheels 68 and 70 will represent at their respective openings the characters, whatever they may be, at which they are set, which will indicate that they have been brought back also to starting position, the type-frames will have been brought also back to starting position. During the revolution of the pinion 75 by the intermediate gearing the pin I abuts the arm of the wheel 74 and by that means communicates motion to the indicator-wheels. When the pinion 75 and hub E, being secured to the same sleeve D, have been brought to rest and the hub J of the gear-wheel 74 being loosely journaled on such sleeve, it will be seen that

the indicator-wheels are free to revolve after the pinion 75 and hub E, with its arms F and G, have been brought to rest. At the same time the type-frames have been returned by the pin 113 to starting position they are brought to the limit of their return movement, and consequently to rest. When such type-frames are brought to rest, the pinion 75 and its connected parts by means of the intermediate gearing are also brought to rest. This stopping of the type-frames and intermediate mechanism between said type-frames and the indicator-wheels does not stop the rotation of the indicator-wheels, as they are loose on the sleeve D. The arms F and G being stationary, the spring H will be extended by the continued movement of the indicator-wheels until said spring is capable of overcoming the momentum in such indicator-wheels and revolving them in the opposite direction. During this return movement the arm of the wheel 74, which is normally in contact with the pin I, comes in contact with such pin and prevents the indicator-wheels from revolving around too far and not be brought back to starting position. This return movement of the indicator-wheels takes place during the initial movement of the handle, and consequently before the toothed segmental rock-levers 31 have been raised up into position and operate the indicator-wheels, as before described.

It will be seen from the above specification that my machine is of positive action and cannot be tampered with and so put out of order.

What I claim as my invention is—

1. In a combined cash register and indicator, a series of banks of key-rods, a rock-lever for each bank of key-rods, and also a settable toothed segmental rock-lever deriving its primary motion from the said key-rods, a main rotary shaft, the partial revoluble indicator-wheels loosely journaled to the said shaft and the train of gear interposed between the said partial revoluble wheels and the indicators and engaged by the supplemental segmental rock-lever whenever a key-rod is depressed.

2. In combination in a cash-register, a series of finger-keys, the main shaft, a reciprocating type-frame, a toothed rack carried thereby, a wheel having a periphery partly toothed and partly serrated, said toothed portion being adapted to engage said rack, gearing operated from the main shaft also engaging said teeth, and a positively-operated pawl adapted to engage said serrations to lock said type-frame.

3. A series of operating finger-key rods, a detent for the purpose of locking the latter, slide 53, having a beveled-edge pin 58, sliding plate 33, edge pin 59, secured thereto, the whole being operated from the main shaft as specified, to release the depressed key-rods during the initial movement of the main shaft, as described.

4. In combination a revoluble shaft, a rock-lever and means on the said shaft to rock the said lever, a laterally-moving frame, actuating-dogs secured thereto in the path of movement of ratchet-wheels, lugs on the said wheels to alternately disengage and engage said dogs to alternately operate the ratchet-wheels so as to move the ink-ribbon back and forth, substantially as described.

5. In combination, a main shaft, a rock-lever, and pinions upon said shaft, and the mechanism, interposed between the rock-lever and said pinions, engaged therewith, said rock-lever operated from the main shaft for moving the said pinions a positive distance in one direction during the initial movement of the main shaft, a series of operating finger-keys, the toothed segments, the said toothed segments designed to be operated by the main shaft to move the said pinions a positive distance in the opposite direction, as described.

6. In combination a series of banks of finger-keys, the detents in the paths of said finger-keys to which are secured arms C, the rod 15, provided with notches B′, into which the ends of the arms C, descend when the detents are being forced outwardly by the locking of the key-rods, as set forth and for the purpose specified.

7. The combination of a cash-register, the bank of keys 8, a rod 15 extending from side to side of the register, one side thereof having a hole in alinement with the rod, a spring encircling the rod, the lever 11 normally held interposed between the end of said rod 15 and said hole, the main shaft, a handle carried thereby, a pin 22 projecting from said handle, and a pin projecting from the block 17 normally in the path of the pin 22, substantially as described.

8. The combination with the indicator-wheels, main shaft, and cam 45, thereon, of the arm 83, journaled on the rod 82′, shutter-frame 87, connected to said arm by link 86, spring 88, to assist positively the movement of the shutter-frame, all arranged substantially as shown and described.

JOHN SHARPE.

Witnesses:
E. R. CASE,
ARTHUR AUBÉ.