(No Model.)

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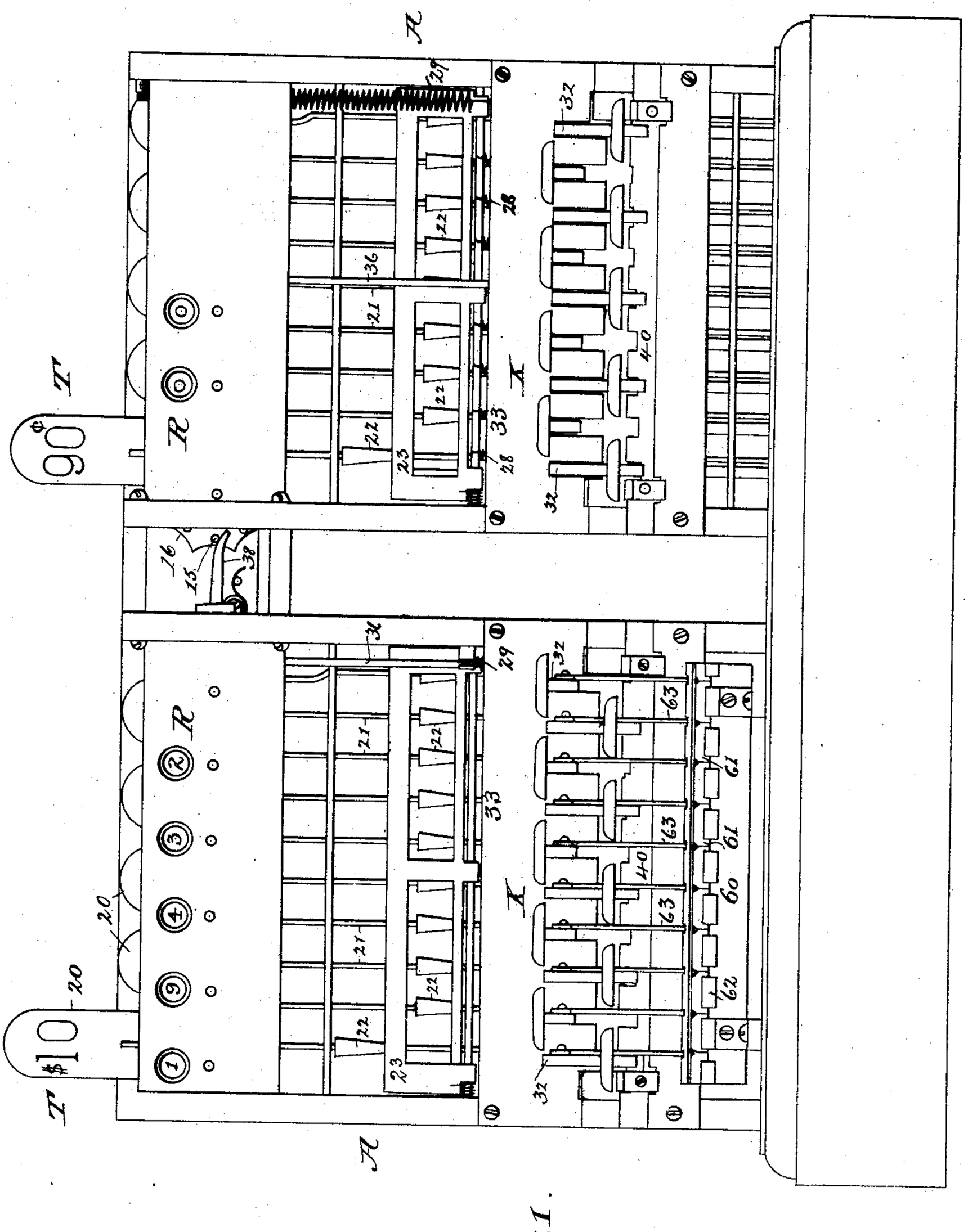
L. EHRLICH.

CASH REGISTER.

No. 502,353. Patented Aug. 1, 1893.



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(No Model.)

4 Sheets—Sheet 2.

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No. 502,353. Patented Aug. 1, 1893.

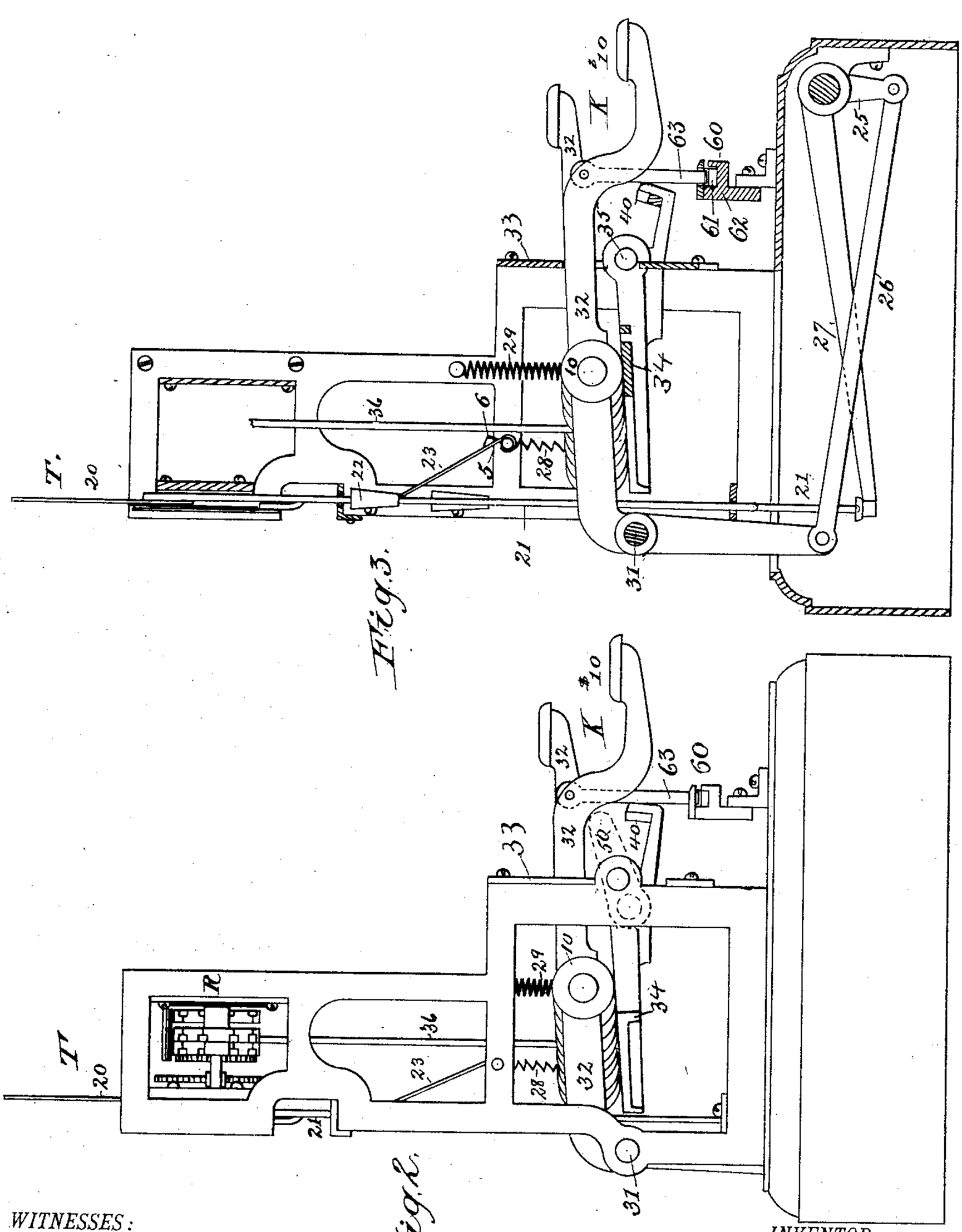

Fig. 3.

Fig. 4.

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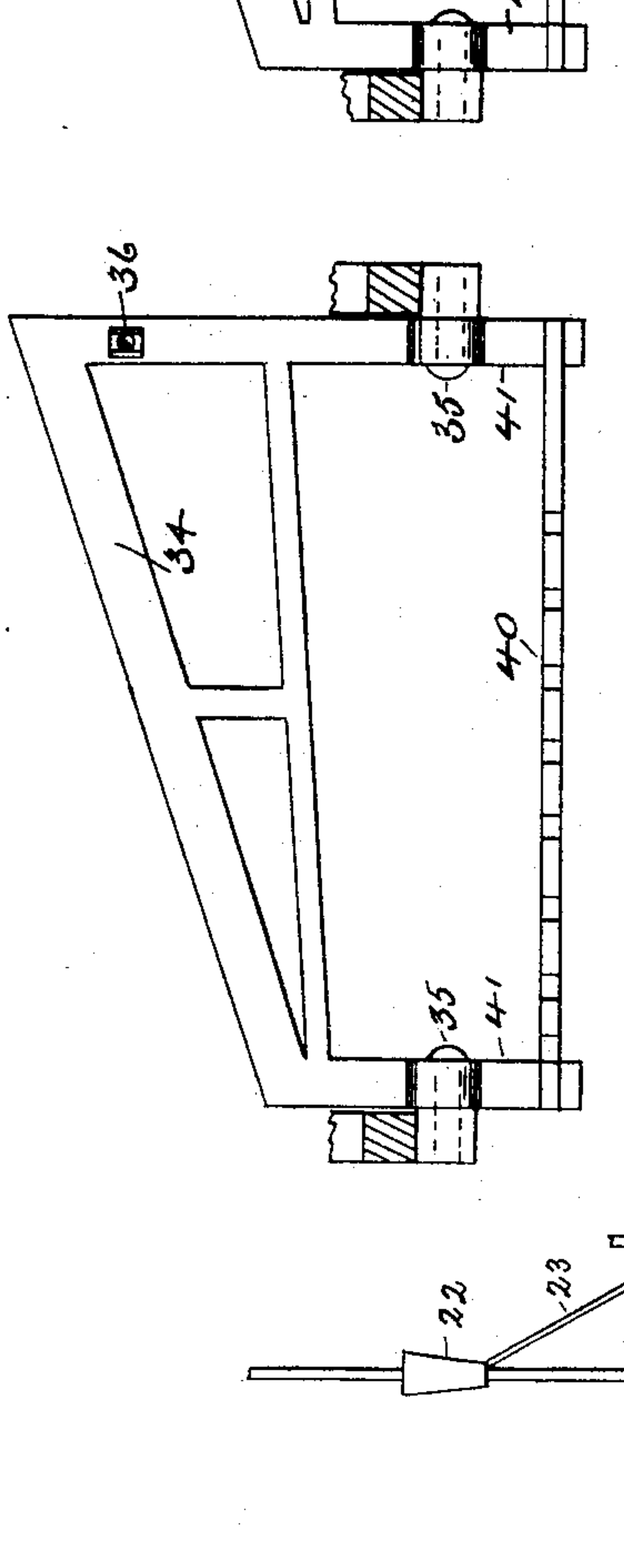

Fig. 4.

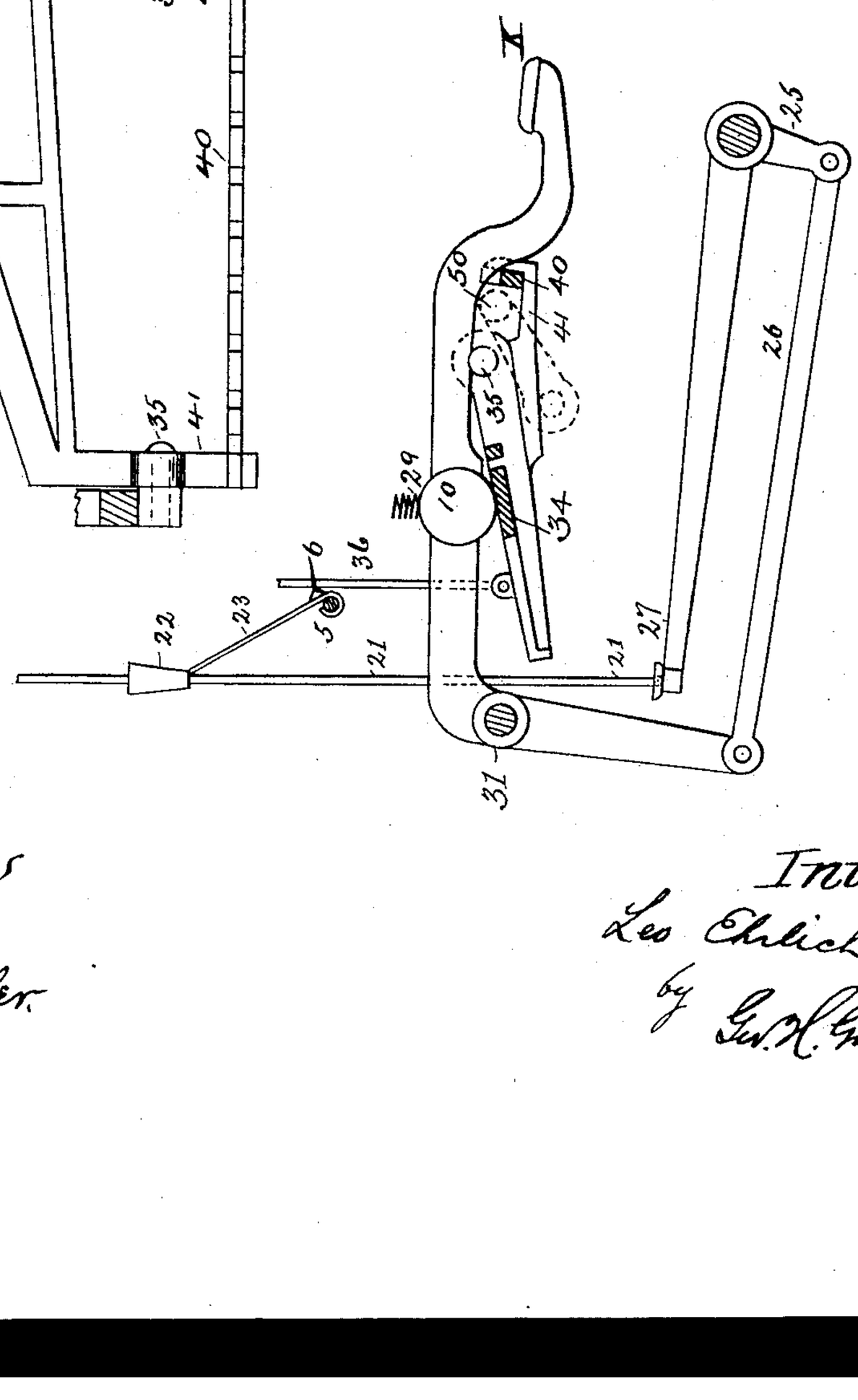

Fig. 3a.

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No. 502,353. Patented Aug. 1, 1893.

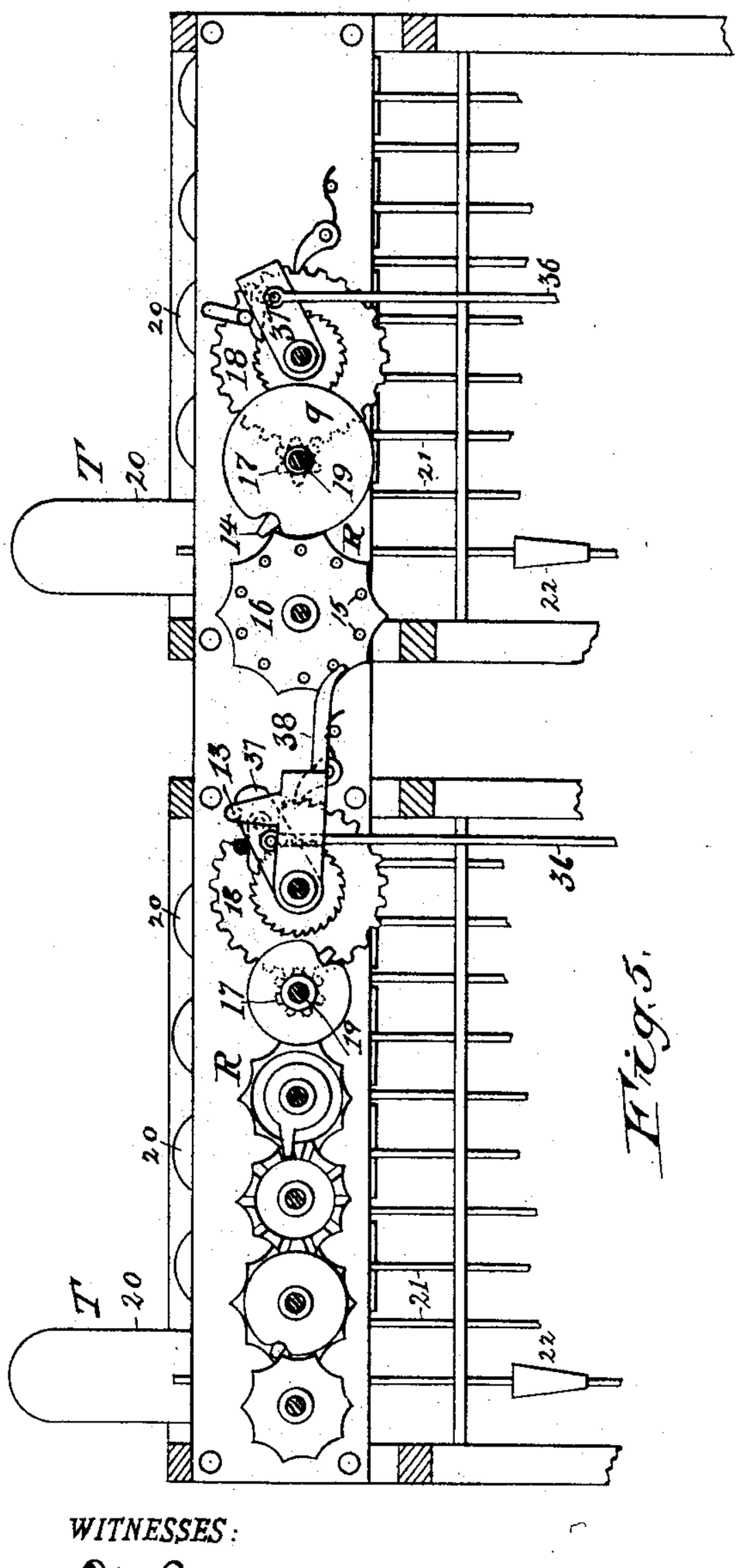

Fig. 5.

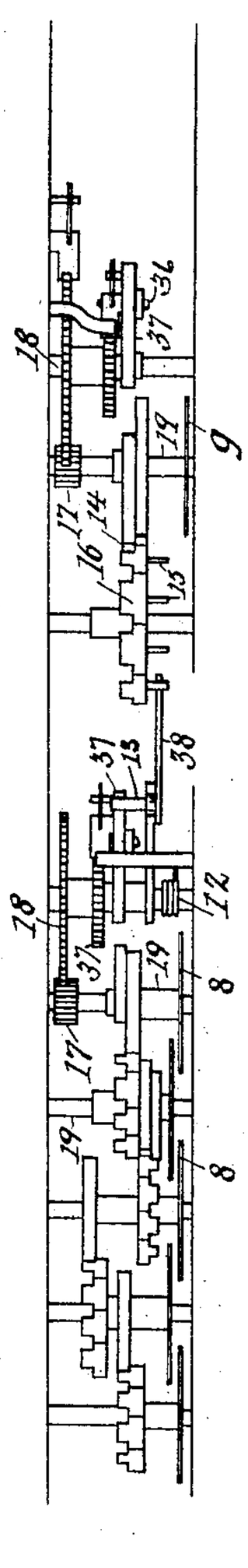

Fig. 6.

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UNITED STATES PATENT OFFICE.

LEO EHRLICH, OF ST. LOUIS, MISSOURI, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE NATIONAL CASH REGISTER COMPANY, OF DAYTON, OHIO.

CASH-REGISTER.

SPECIFICATION forming part of Letters Patent No. 502,353, dated August 1, 1893.

Application filed November 20, 1889. Serial No. 330,975. (No model.)

To all whom it may concern:

Be it known that I, LEO EHRLICH, a citizen of the United States, residing at St. Louis, State of Missouri, have invented certain new and useful Improvements in Cash-Registers, fully set forth in the following description and represented in the accompanying drawings.

This invention relates generally to registering or adding machines, wherein a counting device or devices and means consisting, for instance, of a plurality of keys for actuating said device or devices are employed; and it more particularly relates to that class of such machines that are adapted to register cash receipts or payments or both.

In United States Letters Patent No. 388,030, granted to me August 21, 1888, for an improvement in cash registers, there is described, among other things, a plurality of keys, each having an assigned value, a register actuating lever common to all of said keys and a counter or register that is actuated through the movement of said lever whenever any key is operated, the extent of movement of the register agreeing with the assigned value of such key.

It has been found in practice undesirable, as well as impractical, to employ a single register actuating lever that is common to all of the keys in a machine employing a large number of keys, as the range of movement of said lever necessary to effect the proper movement of the register is too great for effective operation when either of the keys of the higher values is operated. So, too, such a machine is open to the objection that there is not difference enough in the range of movement of the lever when adjacent keys are operated consecutively to insure an accurate register of the value of those keys.

It is the object of the present improvements to overcome these objections and to further improve the construction and operation of this class of machines.

To this end the invention may briefly be said to consist, among other things, in the combination of two or more register actuating levers, a plurality of keys for each of said levers, a register operated by each of the levers and connecting or carrying mechanism from one register—as for instance the lower one—to the other or higher one, whereby a single reading of the registers will give the total value of the keys operated.

It furthermore consists in novel combinations, constructions and arrangements of parts too fully hereinafter set forth to need further preliminary description.

In the accompanying drawings the present improvements are illustrated in connection with a machine embodying some of the features shown and described in the aforesaid patent; it is to be understood, however, that the invention is not necessarily limited to an embodiment in such a construction of machine, as others may be employed without departing from the spirit thereof.

In said drawings Figure 1 is a front elevation of the improved machine, the inclosing case being removed. Fig. 2 is a side elevation thereof. Fig. 3 is a vertical sectional elevation of the same; and Fig. 3ª is a sectional detail of one of the keys and its mediate connections, the key being depressed. Fig. 4 is a horizontal section taken on the line 4, 4 of Fig. 1, showing more particularly the register actuating levers, some of the keys being omitted. Fig. 5 is a sectional elevation of the register, and Fig. 6 is a plan view thereof.

The registering machine with which the present improvements are shown as embodied, consists of a plurality of keys K in two or more banks, a plurality of visual indicators T, and a register R, all mounted in a suitable frame-work A. The machine may be capacitated to register or register and indicate independently cents, dimes and dollars, in which case the keys would be arranged in three banks, but as a construction embodying two banks, one for dimes or tens of cents and the other for dollars, will illustrate in all essential particulars the present invention; that form of machine is shown. The cents bank of keys is arranged at the right hand of the machine and embraces keys bearing the values of ten to ninety cents, and the dollars bank at the left hand embracing keys bearing the value of one to ten dollars, as shown in Figs. 1 and 4. Each bank is shown as

mounted independent of the other. Thus the keys of the dollars bank are pivoted at the rear of the machine upon a fulcrum rod 31, while those of the cents bank are mounted upon a similar rod not shown.

As the construction and arrangement of many of the mediate and immediate connections with the keys of each bank are the same, a description of one bank will suffice for both; any parts in one bank not duplicated in the other will be specified. The keys are in the form of bell crank levers 32, one arm of each extending forward horizontally through guide slots in a front plate 33, and having a finger piece or button on its end bearing the assigned value, and the other arm of each lever extending downward for connection with the means for operating the visual indicators.

Below the keys of each bank is mounted the register actuating lever 34. This lever is mounted on pivots 35 at the forward part of the machine, arranged parallel with the fulcrum rod of the keys. It is broad enough to enable each of the keys in the bank to contact with it to rock it on its pivots. As each of the key levers contacts with the actuating lever at different distances from its pivots, that portion of the latter lever not necessary to afford a bearing surface for the key levers is cut away, so that the actuating lever is formed in the shape shown to lighten it as much as possible. That portion of each key lever contacting with the actuating lever may be a simple point or projection as that formed by a disk 10, adjustably secured to the key lever, so that its point of contact with the actuating lever may be adjusted to or from the fulcrum rod to obtain the requisite amount of movement of the actuating lever when the key lever is operated. Each of the key levers having the same extent of movement, the variation in the movement of the actuating lever to impart the necessary movement to the register to coincide with the assigned value of the keys, is obtained by arranging the contact points, as the disks 10, on each at different distances from the fulcrum rod. Thus the one dollar key, being the lowest unit of value in the dollars bank, will have its disk 10 arranged near said fulcrum rod so that only that unit of movement will be imparted to the actuating lever, while the ten dollar key, being the highest value in that bank, will have its disk 10 arranged the greatest distance from the fulcrum rod so that a movement corresponding to ten units of value will be imparted to the actuating lever. The movements of the actuating lever are transmitted to the register through a rod 36, properly secured at one end to that lever, and at the other end to the pawl or pawl carrier of a pawl and ratchet 37 forming part of the register R.

It may be remarked that in the register of the cents bank the unit of the register is a fixed one, always indicating "0," as the machine illustrated is only capacitated to register tens of cents. The ratchet wheel in both of the registers is secured to a sleeve that also carries a gear wheel 18, that gears with a pinion 17, secured to a shaft 19. The ratchet wheels, gears and pinions are so proportioned that the movement of the ratchet wheel, equal to one tooth, will impart a one-tenth revolution to the shaft 19. The pinions 17 have ten teeth and will complete a revolution each time the ratchet wheels are moved the distance equal to ten teeth. The disk 9, of the cents bank, will bear numerals indicating tenths of a dollar, while the disk 8, of the dollars bank, will bear numerals indicating multiples of a dollar from 1, 2, 3, &c., to 0, the next adjacent shaft carrying the disk 7 bearing tens of dollars, the next carrying the disk 6 hundreds of dollars and so on, the register illustrated being adapted to register 99,999.90.

In order to carry from the register of the cents bank to that of the dollars bank, each time the shaft 19 of the cents bank register has made a complete revolution the pawl or pawl carrier of the dollars register is provided with a supplemental actuating arm 38 that is rocked just as the shaft 19, of the cents register, is about to complete its complete revolution. The connection between said shaft and the arm 38 may be direct, but it is preferred to interpose a disk 16, that has pins or projections 15, to contact with the end of the arm, and is moved step by step by means of a tooth 14, carried by said shaft 19, in a familiar way. The arm 38 is mounted loosely upon the shaft carrying the pawl and ratchet of the dollars register and has a projection 13 that bears against the pawl carrier, so that each time the arm is vibrated a corresponding vibration will be imparted to the pawl carrier and the shaft 19 carrying the disk 8 moved the distance of one tooth, thus adding one dollar to the dollars register. The arm 38 is returned to its normal position after each vibration by a spring 12 (see Fig. 6). From the foregoing it will be understood that while each portion of the register is independent of the other portion, that is to say, that while the portion registering tens of cents is movable independent of the portion registering dollars, and the latter of the former, the carrying device represented by the arm 38 is such that whenever the cents register has or is about to complete a revolution a movement will be transmitted to the dollars register through said arm to carry "one" onto that register. By this means, that portion of the register registering cents need only indicate cents or tens of cents, the dollars being carried immediately onto the dollars portion of the register; in other words, the necessity of employing an independent register for the cents having a sufficient number of dials to preserve the register of cents separate from the dollars register is avoided, so that a single reading of the dials will give the total amount registered by both portions of the register

without the necessity of any addition or multiplication of the readings.

It has been found in practice, that under severe handling through quick or sudden movements of the keys, the register actuating lever will be moved too great a distance, causing an inaccurate register to be made. To obviate this over movement of the lever, there is combined with said lever and the keys, a stopping bar 40 that moves with the actuating lever and contacts with the key that is moved, or with some piece moved by the key, so that the actuating lever is absolutely and positively stopped against further movement.

In the illustration (see Figs. 3 and 4), the stopping bar 40 is carried by the actuating lever 34 and forms a part of it. It is mounted at the end of a pair of arms 41 projecting in the opposite direction to that of the actuating lever, and extending under the keys of the bank, so that when the actuating lever is vibrated downward by any key, the stopping bar will, in unison therewith, be vibrated upward until it meets the key, when a further movement of the key, actuating lever and stopping bar is prevented. As the actuating lever moves to different positions according to the key being operated, the stopping bar will be stopped or notched at the points of contact with the keys to allow the actuating lever to move its proper distance before being stopped.

The visual indicators T may be of any of the ordinary forms; as shown, they are in the form of tablets 20, each bearing a value corresponding to the key with which it is combined. Each tablet is mounted at the end of a rod 21 supported to move vertically in the frame-work. The rod is provided with a collar 22 secured thereto, and is engaged by a pivoted wing 23 of sufficient length to engage the collar of any of the rods of a bank, and is held to duty by a spring 5. The collars are tapered in form with the greatest diameter uppermost, so that the smallest end when the rod is elevated will be supported upon the end of the wing. The effect of this form of collar is that its longer diameter contacting with the wing vibrates it away from the rods, a distance greater than is necessary to disengage it from the smaller end of the collar of a rod it is supporting in its elevated position, so that said collar is freed and its rod permitted to fall to its normal position during a less movement of the rod that is being elevated than is usual, whereby the tablet of the rod that has been held elevated is caused to be withdrawn from sight at an earlier period of the movement of the next key that may be operated.

The connection between each key and each tablet rod is had through a bell crank lever 25, pivoted near the front of the machine, the smaller arm of which is connected with one arm of the key lever by a connecting rod 26, and the longer arm of the lever 25 has a cupped end 27 in which the end of the rod 21 is received. When a key is depressed through the connections described, the longer arm of the lever 25 is elevated so as to raise its rod 21 a distance sufficient to cause its collar to be engaged by the end of the wing 23, as will be understood. Each of the key levers may be returned to its normal position after each operation by a spring 28, and the register actuating lever may be also returned to its normal position by a spring 29, although it is obvious that the stopping bar 40 may be of sufficient weight to cause this return movement.

The means for causing an audible alarm to sound whenever a key is moved may be of any well known form, and as it forms no part of the present invention there is simply illustrated by dotted lines Figs. 2 and 3 a pivoted bar 50 extending under the keys that at each vibration will trip a detent of an alarm mechanism not herein shown.

So far as the combination of two or more register actuating levers with a plurality of keys for each lever, a register operated by each of the keys and connecting carrying mechanism is concerned, the form of actuating lever may be varied, as for instance, it may be like that shown in United States patent to Ritty and Ritty, No. 221,360.

It is contemplated employing in the machine a stop device whereby when one key is being operated all the remaining keys will be locked against movement, but as such a mechanism forms no part of the present invention it has not been illustrated or described. So, too, a mechanism by which when a key is moved it must be moved to its fullest extent may also be employed, but as this also forms no part of this invention no description thereof is given.

Instead of the pawl and ratchet connection between the actuating lever and the register, it is obvious that a rack and pinion, as shown in my said patent, may be employed to properly effect the registering of the machine.

There is shown as combined with one bank of keys see Figs. 1, 2, and 3, and of course it could be combined with the other bank and in practice would be, an automatic lock 60, for the keys whereby the depression of more than one key at a time is prevented. This lock consists of a number of blocks 61, confined within a guide way 62 so as to be capable of slight movement longitudinally of the guide way. The blocks are one less in number than the keys and each of the keys is provided with a pendant 63, the free end of which overlies the abutting ends of the blocks so that in depressing a key its pendant 63 will move down between a pair of adjacent blocks and separate them a distance equal to the thickness of the pendant. In so doing the edges of the blocks will be moved slightly beyond the free ends of the pendants of the keys so that any attempt to depress another key while the first one mentioned is depressed will be prevented by the contact of the pendant with a block which being unable to move

to one side will prevent it from moving farther. The upper edges of the blocks may be beveled as shown so that the pendants of the levers will pass between adjacent blocks readily and the ends of the pendants may be similarly pointed or beveled to aid their movement between the blocks.

What is claimed is—

1. The combination of two or more register actuating levers, a plurality of keys for each lever, a register consisting of a plurality of adding wheels operated by each lever and carrying mechanism between the registers, substantially as described.

2. The combination of two or more register actuating levers, a plurality of keys for each lever, a register operated by each lever, carrying mechanism between the registers, and visual indicators moved by the keys, substantially as described.

3. In a registering machine, the combination of a plurality of keys, a register, a lever operated by the keys and a stopping bar engaged by a key for determining the movement of said lever, substantially as described.

4. The combination of a register actuating lever, a plurality of keys therefor, a stopping bar engaged by the key, and a register operated by said lever, substantially as described.

5. The combination of a register actuating lever, a plurality of keys therefor, a stopping bar carried by said lever and common to said keys and a register, substantially as described.

6. The combination of a register actuating lever, a plurality of keys therefor, a stopping bar vibrating in the opposite direction to the keys and contacting with the key operated, and a register, substantially as described.

7. The combination of two or more register actuating levers, a plurality of keys for each lever, stopping bars for the levers and engaged by the keys, a register operated by each lever, and carrying mechanism between the registers, substantially as described.

8. The combination of two or more register actuating levers, a plurality of keys therefor, a stopping bar carried by each lever, a register operated by each lever and carrying mechanism between the registers, substantially as described.

9. The combination of a register actuating lever, a plurality of keys therefor, a movable stepped stopping bar for contact with the keys, and a register operated by said lever, substantially as described.

10. The combination of the bell-crank key levers, the visual indicators, the bell-crank levers 25, and connecting rods 26, substantially as described.

11. The combination of the bell-crank key levers, tablets and tablet-rods, the bell-crank levers 25, one arm of each of the latter levers bearing against a tablet-rod, and connecting rods 26, substantially as described.

12. The combination of a plurality of keys, tablets and tablet-rods, a cone-shaped collar secured to each tablet-rod, the smaller diameter downward, and a supporting wing, substantially as described.

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