

(No Model.)

7 Sheets—Sheet 1.

L. EHRLICH.  
CASH REGISTER.

No. 509,656.

Patented Nov. 28, 1893.

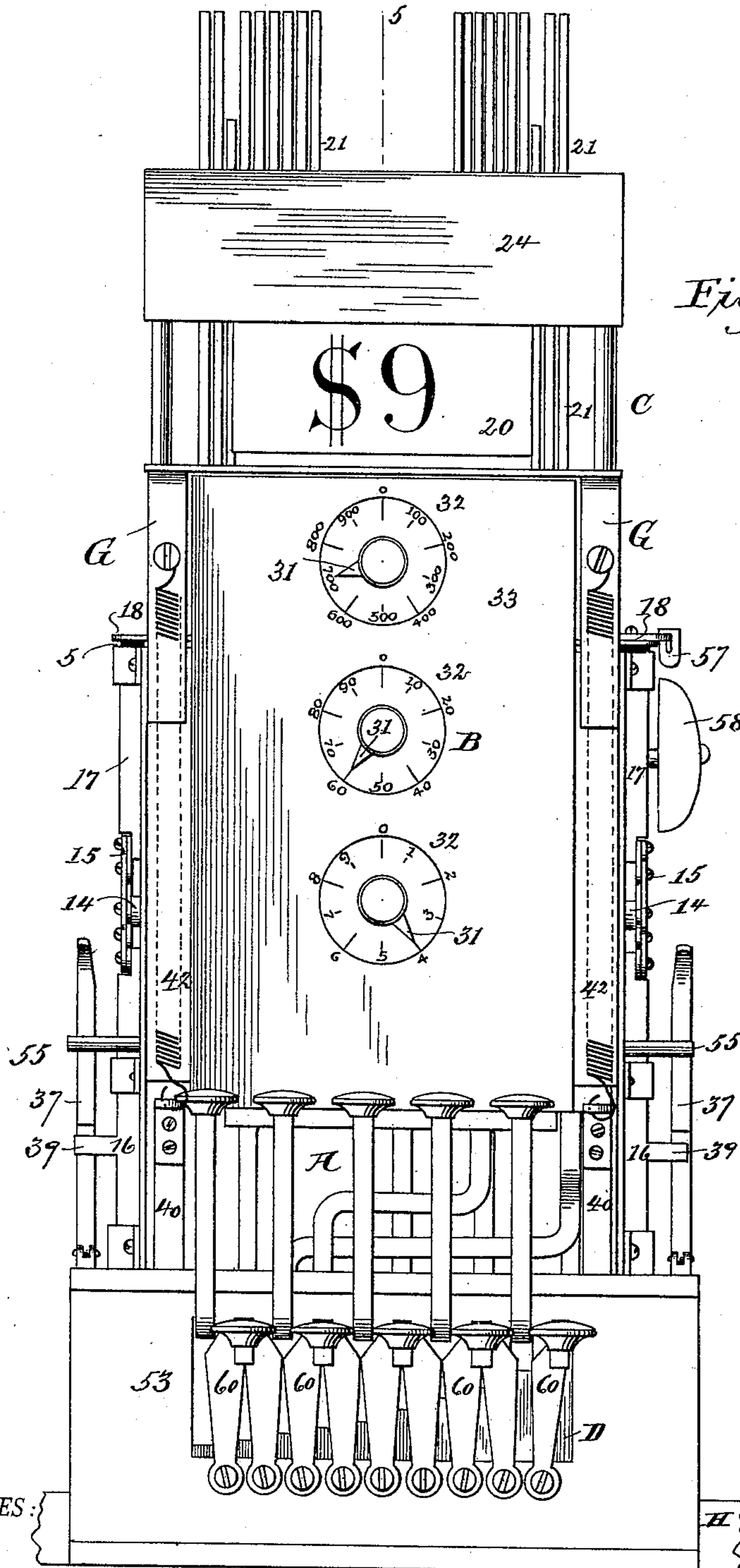


Fig. 1.

WITNESSES:

C. W. Benjamin  
Nettie Marler

INVENTOR

Leo Ehrlich

BY

Geo. H. Graham

ATTORNEY

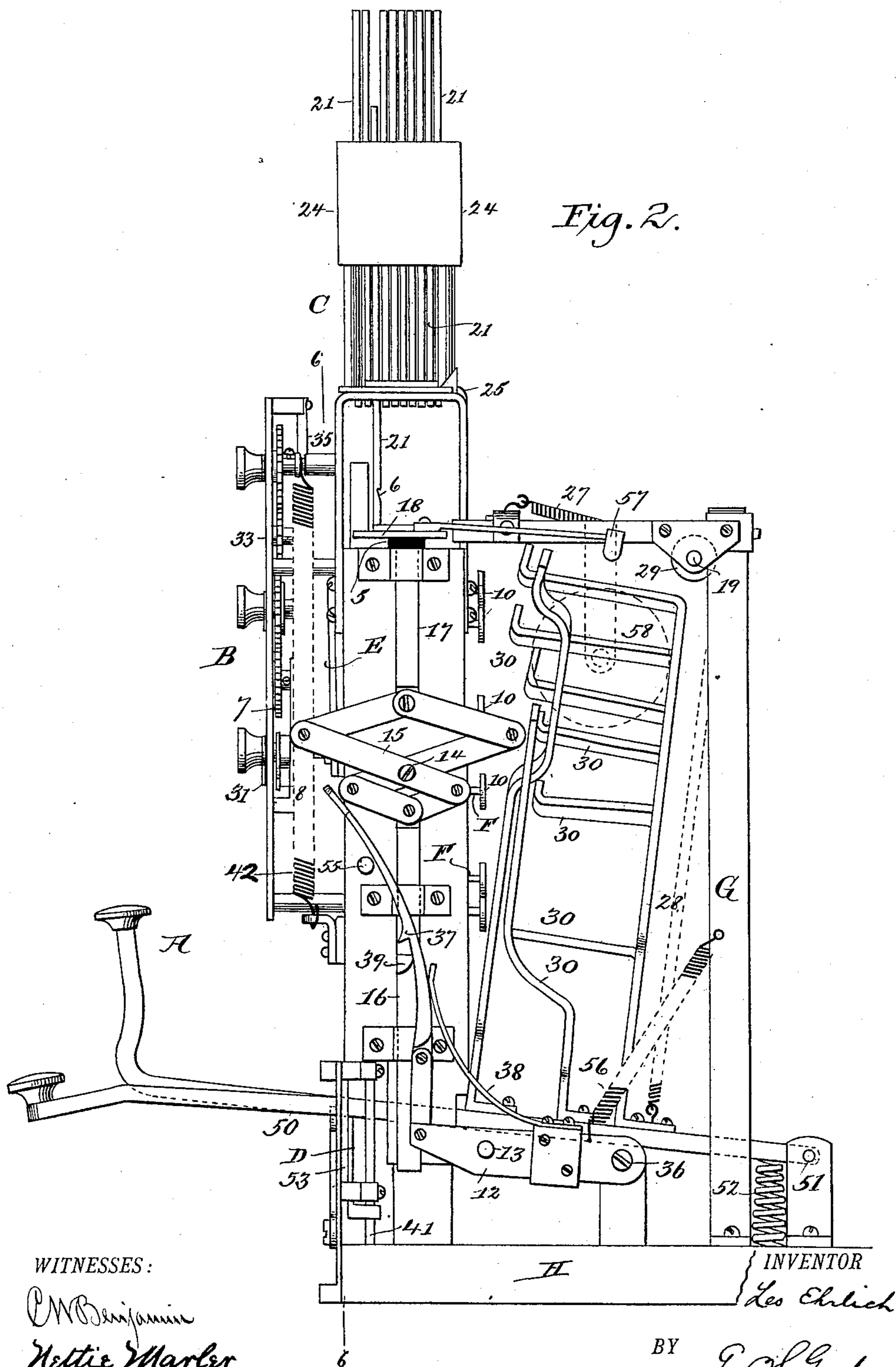
(No Model.)

7 Sheets—Sheet 2.

L. EHRLICH.  
CASH REGISTER.

No. 509,656.

Patented Nov. 28, 1893.



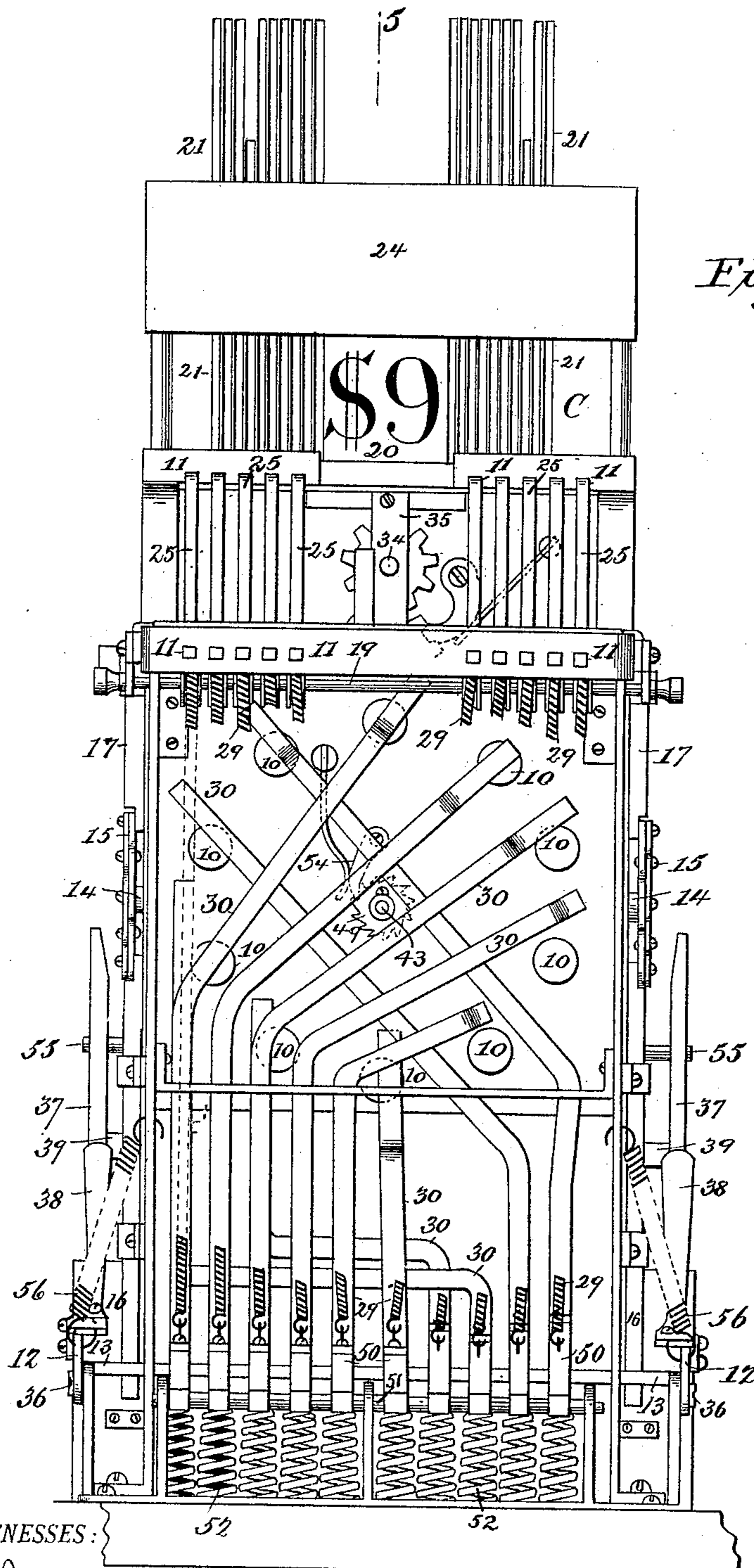
(No Model.)

7 Sheets—Sheet 3.

L. EHRLICH.  
CASH REGISTER.

No. 509,656.

Patented Nov. 28, 1893.



WITNESSES:

*W. Benjamin*  
*Nettie Marler*

INVENTOR

*Leo Ehrlich*

BY

*Geo. H. Graham*

ATTORNEY

(No Model.)

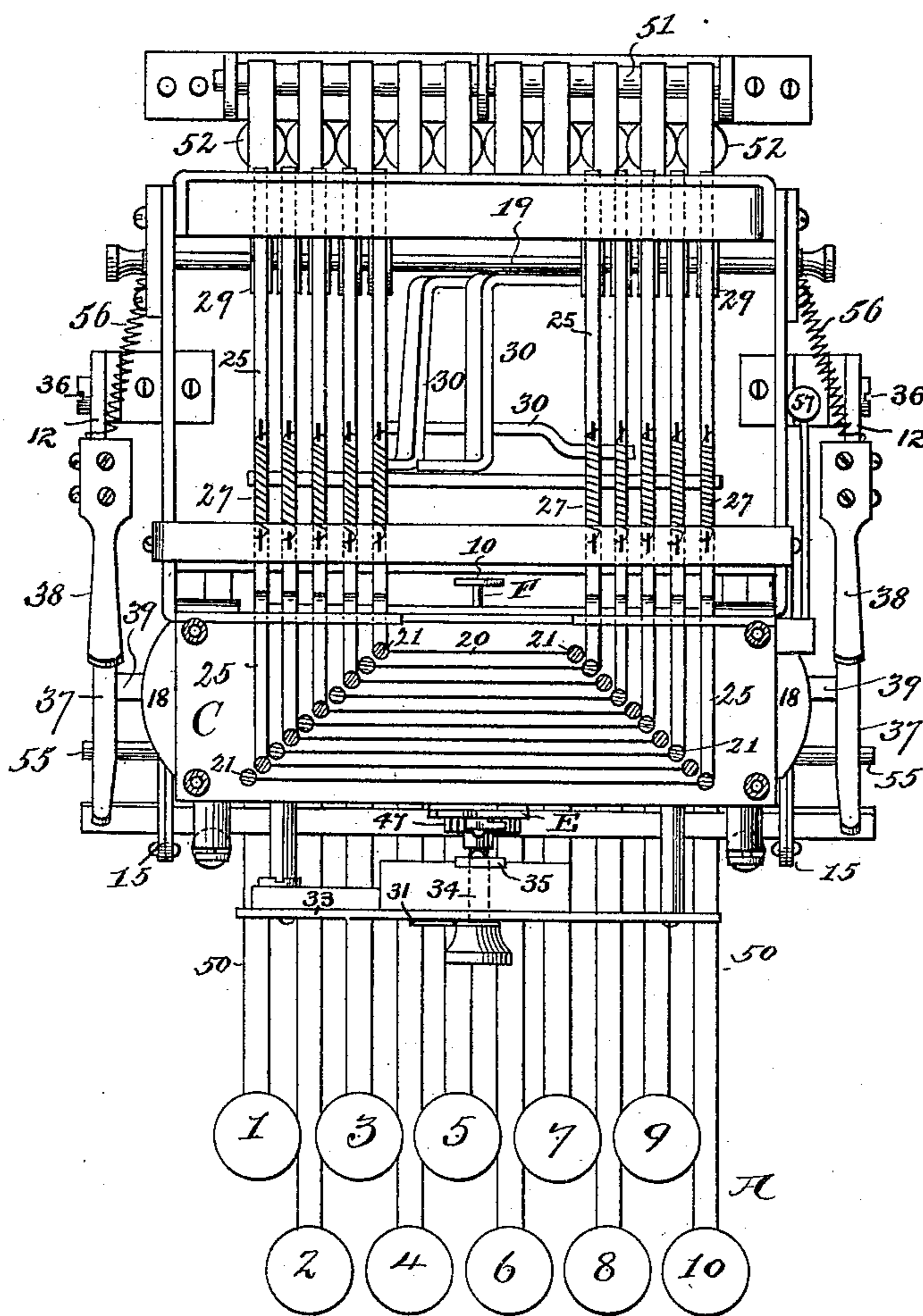
7 Sheets—Sheet 4.

L. EHRLICH.  
CASH REGISTER.

No. 509,656.

Patented Nov. 28, 1893.

*Fig. 4.*



WITNESSES:

*C. W. Benjamin*  
*Hettie Marler*

INVENTOR

*Leo Ehrlich*

BY

*Geo. H. Graham*

ATTORNEY

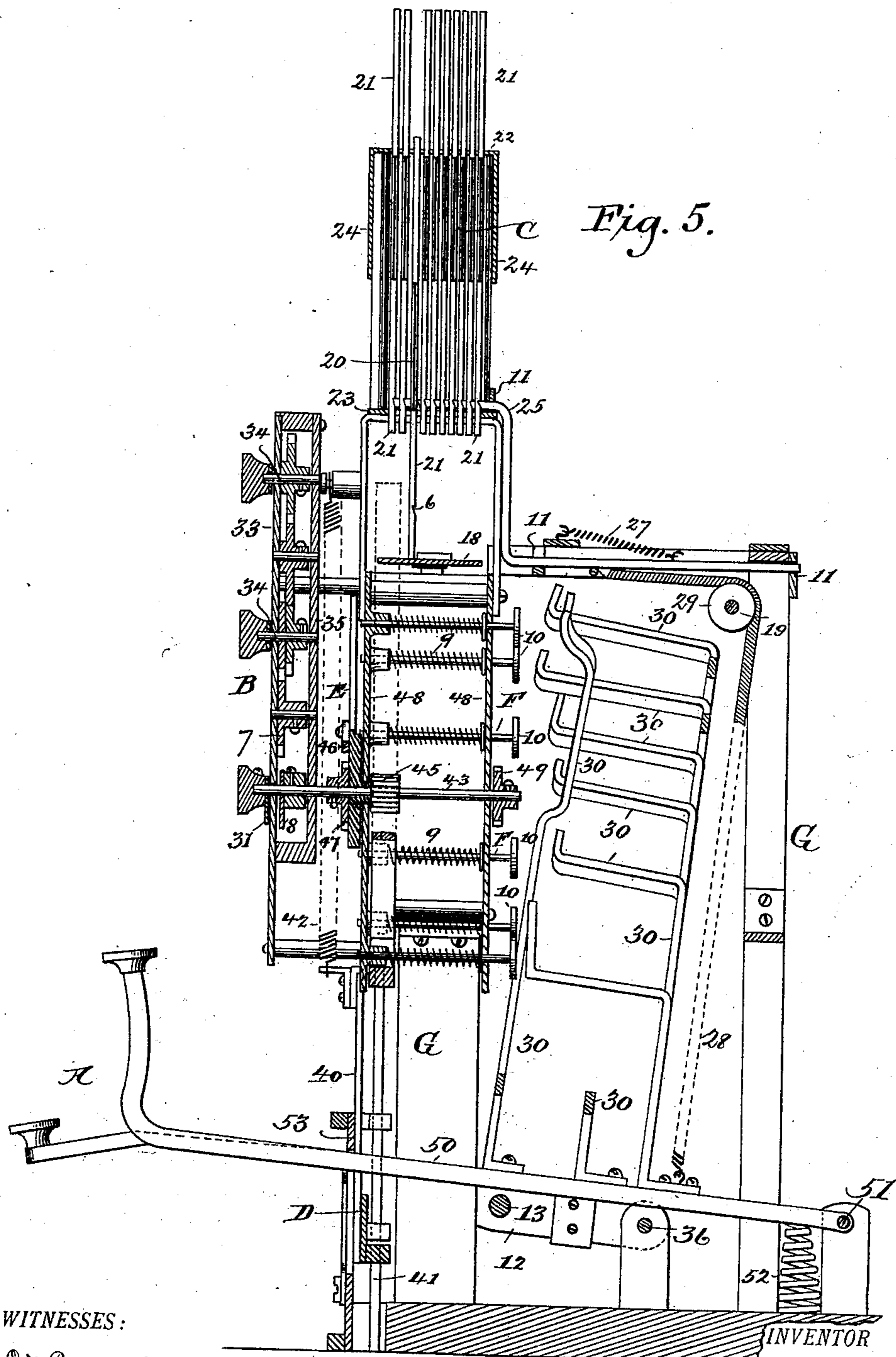
(No Model.)

7 Sheets—Sheet 5.

L. EHRLICH.  
CASH REGISTER.

No. 509,656.

Patented Nov. 28, 1893.



WITNESSES:

C. W. Benjamin  
Hettie Warler

INVENTOR

BY

L. Ehrlich  
J. H. Graham  
ATTORNEY

(No Model.)

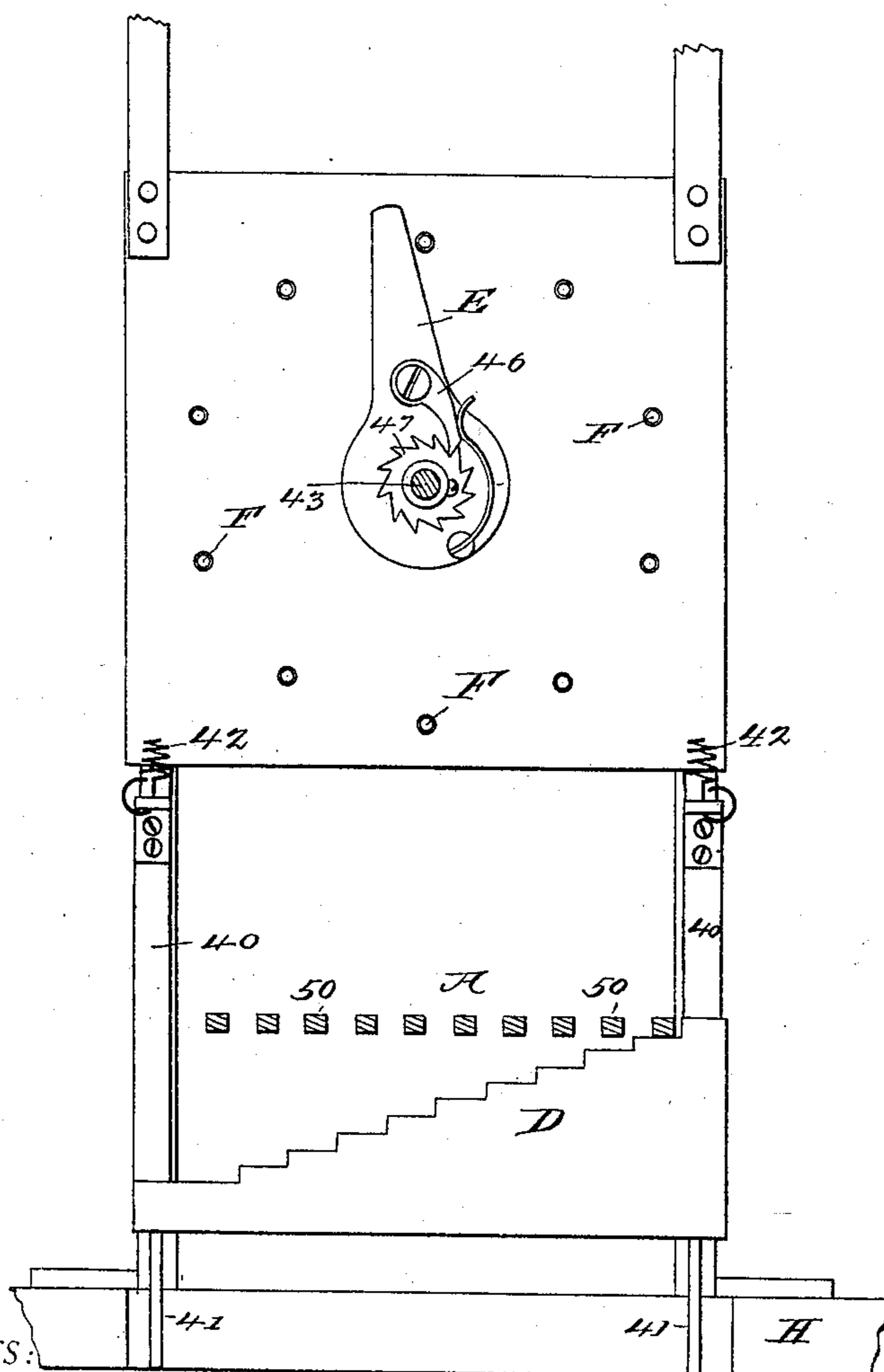
7 Sheets—Sheet 6.

L. EHRLICH.  
CASH REGISTER.

No. 509,656.

Patented Nov. 28, 1893.

*Fig. 6.*



WITNESSES:

*Ch Benjamin*  
*Nettie Marler*

INVENTOR

*Leo Ehrlich*

BY

*E. H. Gmbaum*

ATTORNEY

(No Model.)

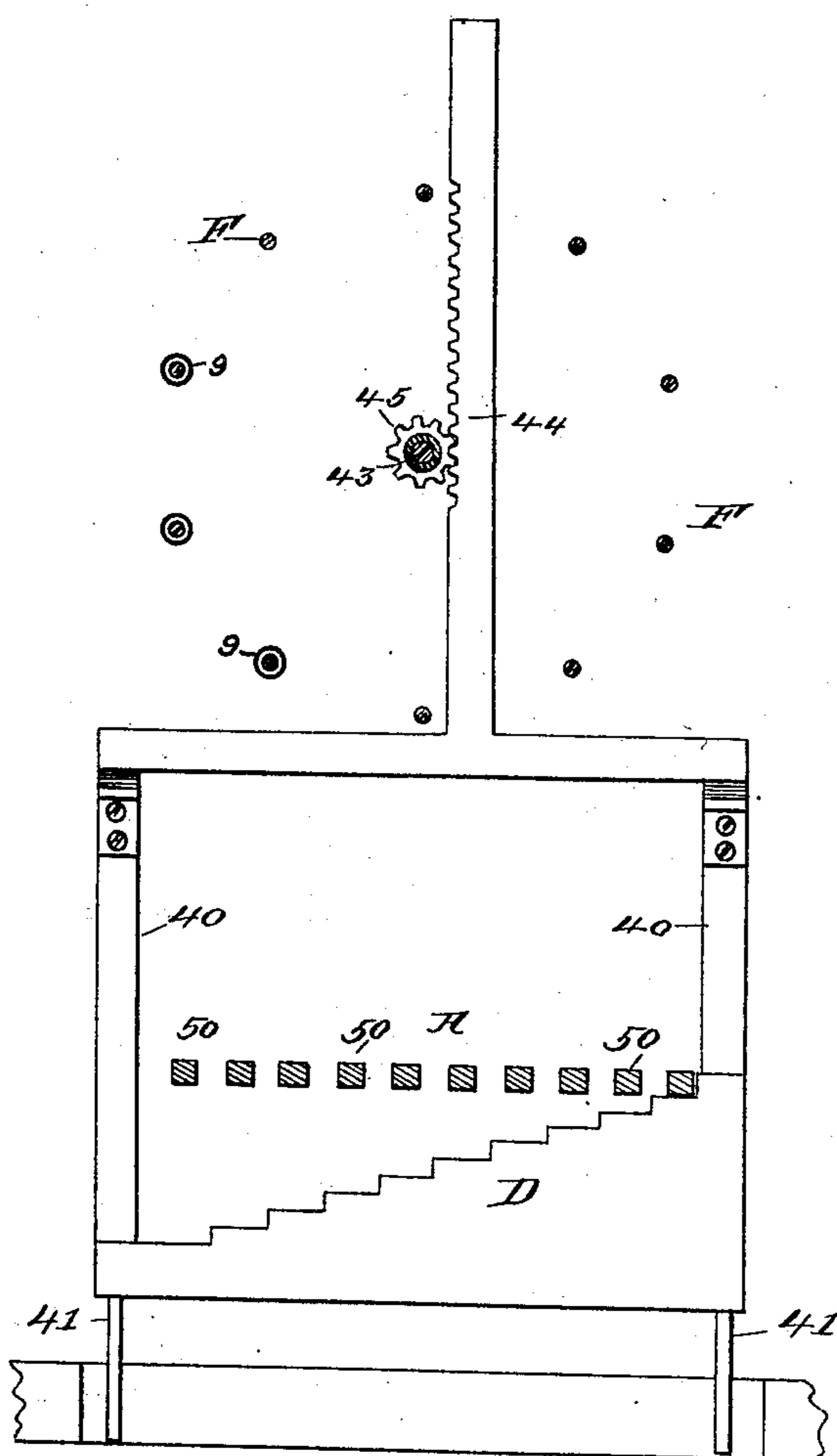
7 Sheets—Sheet 7.

L. EHRLICH.  
CASH REGISTER.

No. 509,656.

Patented Nov. 28, 1893.

*Fig. 7.*



WITNESSES:

*Benjamin*  
*Nettie Marler*

INVENTOR

*Leo Ehrlich*

BY

*Geo. H. Graham*  
ATTORNEY

# 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. 509,656, dated November 28, 1893.

Application filed November 18, 1889. Serial No. 330,751. (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 to registering devices, and particularly to that class known as cash registers, and wherein a plurality of keys each having an assigned value are adapted when operated to impart the necessary movements to a registering device to add to that device an amount equivalent to their values.

The present invention while designed as an improvement on such devices also embraces an improved mode of assembling, exposing and removing from view a plurality of visual indicators each having an assigned value corresponding with that of the keys; and the invention consists in the novel structure, arrangement and combinations of parts herein-after fully set forth.

The accompanying drawings illustrate a complete machine adapted to practical use and embodying the present improvements, in which—

Figure 1, is a front elevation. Fig. 2, is a side elevation. Fig. 3, is a rear elevation. Fig. 4, is a plan view, a portion being broken away to expose the arrangement of the visual indicators. Fig. 5, is a central vertical section taken on the line 5, 5 of Figs. 1 and 3. Fig. 6, is a vertical section taken on the line 6, 6 of Fig. 2, showing particularly the moving stop-arm and its controlling stops. Fig. 7, is a similar section the plate shown in Fig. 6 being removed, exposing the actuating rack and pinion for the stop-arm, the actuating bar and a portion of the keys for operating it.

The improved registering machine consists essentially of a plurality of keys, A, and a register B operated by said keys. It also consists of a plurality of visual indicators C. As herein embodied, the keys are combined with a stepped actuating bar D, a rack-bar and pinion for operating the register, a movable stop-arm E, a plurality of stops F adapted to control, determine or limit the movement of the stop-arm, the extent of movement of which

arm determines the extent of movement imparted to the register B; all of which parts being mounted in a suitable frame G that is secured on a base H.

In the drawings, the keys consist of levers 50, adapted to rock on a fulcrum rod 51, that is mounted at the rear of the machine. These key-levers are pressed to their normal position by suitable springs 52, and at or near their forward ends extend through slotted openings in a guide plate 53 by which the key-levers are guided and steadied in their vibrations.

The actuating bar D, in the order of key-levers shown, is arranged immediately below the key-levers so as to be struck and moved thereby, and is secured to an open frame 40 that is adapted to reciprocate vertically on vertical guide rods 41, a suitable spring or springs 42 being arranged to hold the actuating bar in its normal position.

The actuating bar D has its operative edge stepped as shown in Figs. 6 and 7 to coincide with the movement necessary to be imparted to the rack bar and pinion 45, to effect the proper register of the key operated. Thus in the case of the key having the lower value, as one dollar, and located at the extreme left hand of the bank shown in Figs. 6 and 7, said key will only contact with the actuating bar near the limit of its vibration; while the key having the highest value, as ten dollars, and located at the right hand of the bank, will move the actuating bar through the whole of its vibration. Each reciprocation of the actuating bar is imparted to the lowest portion of the register, as for instance the shaft 43, by a rack bar 44 carried by the open frame 40, the teeth of which gear with a pinion 45 that is mounted to turn loosely upon the register shaft 43. So far as the effect of the stepped actuating bar is concerned it may be employed independent of the stop-arm and controlling stops, but in order to insure accurate registry the use of the stop-arm and stops is to be preferred.

Upon a sleeve extending from the pinion 45 through one of the side plates of the machine is mounted the stop-arm E, so that said stop-arm and pinion will move in unison. The stop-arm and pinion are coupled to the

register shaft 43 when moving in one direction, by a spring pressed pawl 46 carried by the stop-arm and a ratchet 47 rigidly mounted on the said shaft and by which the stop-arm and pinion are permitted to return to their normal positions after each movement, leaving the register-shaft 43 in the position to which it has been moved. The shaft 43 may also be provided with another ratchet wheel 49 that is engaged by a hold back pawl 54.

In order to control or limit the movement of the stop-arm and consequently that of the register-shaft, so that the movement of the latter shall coincide with the assigned value of the key operated, the stops F are arranged to be projected one at a time into the path traveled by the stop-arm so as to be struck thereby and prevent it from moving farther. These stops normally lie out of the path of the movement of the stop-arm but the connections between them and the keys are such, that when any key is operated, the stop corresponding to that key is moved to obstruct the movement of the stop-arm beyond it. The stops are also arranged with respect to the path of movement of the stop-arm so that the stop for the key of the lowest assigned value, say one dollar, will be projected into the path of the stop-arm to obstruct its movement nearest its normal position, so that only that part of its entire movement requisite to add one dollar to the register will be effected. Again, the stop moved by the operation of the key having the highest assigned value, say ten dollars, will obstruct the stop arm when it has moved a distance sufficient to add that amount to the register.

Many ways of arranging the stops and connecting them to be operated by the keys will occur to skilled mechanics. One form, as shown, consists of sliding stop-pins mounted in bearings formed by a pair of plates 48, forming part of the framework, and each held in its normal or withdrawn position by a spring 9, the rear ends of the stop-pins having a head 10 for contact with the connections of the keys. The connections employed are a number of arms 30, one connected with each key-lever 50, and of such shape, length and position as to bear against the proper stop-pin when a key and its arm are moved. In construction shown there is enough lost motion between the keys and the stops to permit the stop-arm to commence its movement before the stop which is to limit its movement is projected into its path for that purpose, and at the same time to permit the key-lever to move to the limit of its vibration. It is to be observed however that this lost motion is not essential in all constructions embodying a stop-arm and a plurality of stops to limit its movement except in so far as it may be necessary where the stop-arm to effect the register of the highest value, is required to make a complete revolution, as in the present instance, or more. In such case and in the structure illustrated, it is necessary in effecting the register of the

highest value, say ten dollars, that the stop-arm shall have moved from its normal position before the stop is projected.

From the foregoing it will be understood that in depressing, say the nine dollar key, the latter will strike the actuating bar and move it with it, and thus cause the rack bar to turn the pinion and stop-arm E. The connection consisting of the arm 30 carried by that key will thereupon strike the rear end of the proper stop-pin F and move it forward against the pressure of its spring into such position that the stop-arm will strike it and its further movement be prevented, at which time the register will have been moved a distance equivalent to nine and will have added that amount to the amount it previously registered. Upon releasing the key the parts, with the exception of the register, will resume their normal positions ready for the next movement imparted by depressing a key.

The register B may be of any of the usual constructions. As shown it consists of rotating index hands 31 which move over indicating dials 32 formed on the face of a front plate 33 forming part of the frame of the machine. Three such index hands and dials are illustrated the lower one representing dollars up to ten, the second one tens of dollars up to one hundred, and the third one hundreds of dollars up to one thousand. Of course the lower portion of the register might indicate cents and be adapted to carry dollars onto the adjacent index and so on. The lowest index hand 31, is mounted on the end of the register-shaft 43, while the other index hands are mounted on short shafts 34, turning in bearings in the front plate and in a back-strip 35, secured thereto.

The usual carrying tooth 8, is secured to the shaft 43, which, through an intermediate wheel 7, imparts a step by step movement to the shaft of the adjacent indicator; and the last named shaft is correspondingly provided with a carrying tooth which through an intermediate wheel imparts a step by step movement to the highest indicator; the construction and operation of which parts are too well known to need further description.

The visual indicators C so far as the other parts of the register are concerned may be of any form, but as embodied herein, they consist of a plurality of tablets 20, each of which is mounted between a pair of vertically movable rods 21 that are properly guided by plates 22, 23 supported from the framework. These tablets normally lie in an assembled position or stack between a pair of side plates 24 which cover them in their normal position so that the indicating numerals, delineated preferably on both of the tablets, are not exposed. Preferably one of each of the pair of rods 21 is engaged by a holding detent 25 which when moved frees the rod and its tablet and permits them to descend under their own weight into a position shown in Figs. 1, 3 and 5 and exposing its indicating numerals;

the said detent being adapted to again engage one of the rods when the tablet is raised to remove it from view. To permit the rods and tablets to move to their exposed position there is sufficient space left below them for that purpose and their rods are of such length as to properly guide them in said movement. The holding detents 25 consist of rods of suitable shape that are held and guided by bearings 11, so that they may each have a limited movement to and from the rods 21, their engaging ends being held in position to engage with a notch 6 in the rods by springs 27. There are as many tablets as there are keys in the machine, and for each tablet there is a single holding detent. The connection between each detent and its respective key is had by a flexible medium such as a spring 28, which attached at one end to the detent passes over a loose guide-wheel 29, supported upon a rod 19, with its opposite end attached to a key.

Combined with the visual indicators is a restorer or restoring plate 18 adapted to be moved each time a key is moved to return an exposed tablet to its normal position so that its detent will engage it and hold it until the detent is moved to release it. This plate is arranged horizontally beneath the rods of the tablets, and as shown forms the means of limiting their downward movement. The restoring plate is fixed to the end of a pair of guide rods 17, one on each side of the machine, which rods slide on brackets projecting from the framework. There is provided a second pair of rods 16, one on each side of the machine also sliding in brackets on the framework. The two pairs of rods are connected together by a lazy-tongs joint 15, which being pivoted upon a stud 14 upon the movement of the lower rods 16, impart a movement in the reverse direction to the guide rods 17 and restoring plate 18. The lazy-tongs joints are so proportioned that they will impart a greater upward movement to the restorer than the downward movement of the rods 16. The movement of any of the keys is imparted to the restoring plate 18 by a rock-frame consisting of a bar 13 underlying all of the keys and mounted between a pair of arms 12 that are pivoted at 36 to brackets rising from the base of the machine; a spring 56 holds the rock-frame in its normal position. The rock-frame carries upon both sides of the machine a pawl 37, pivoted to the arms 12, and pressed to duty by a spring 38. Both of these pawls engage in the rocking of the frame with a stud 39 projecting from each of the rods 16 and carry the rods 16 downward with them, imparting as previously stated the reverse or upward movement to the guide rods 17 and restorer 18. In this downward movement of the pawls their upper ends each contact with a fixed pin 55 projecting from the framework in such position that so soon as the restorer 18, has been moved the required distance to return a tablet to its normal position, the

pins will, upon the further movement of the pawls downward, rock the latter from engagement with the studs 39 and permit the restorer and operating connections to return to their normal positions either under the weight of the restorer or aided by a suitable spring.

In the arrangement shown, the disengagement of the pawls from the stud 39 will be effected before the key which is imparting the movement to the rock bar 13 has completed its downward vibration, so that the restorer will have commenced to return to its normal position before a detent 25 will have released a tablet corresponding to the key operated, which will then be free to move to its exposed position. A buffer 5 of soft rubber or other suitable material may be interposed below the restoring plate 18 to lessen the blow on its return.

Any means for sounding an audible alarm may be employed. There is shown a hammer 57, extending from one side of the restoring plate 18, in position to strike a bell 58 mounted on the framework, as in Fig. 1, and in dotted lines Fig. 2, by which construction each time the restoring plate is moved and falls to its normal position an alarm will be sounded.

It is to be remarked in conclusion, that so far as the combination of the stop-arm and limiting stops is concerned, the means of moving said stop-arm from the keys may be varied from that shown. Thus, instead of a stepped actuating bar and mounted to reciprocate vertically, it may be a plain pivoted bar, as shown in Letters Patent No. 388,030, dated August 21, 1888, the keys as in the structure shown in said patent bearing against the actuating bar at different points from the fulcra.

The improved register may also be provided with a locking device for preventing the movement of two or more keys simultaneously. As shown there is provided a series of fingers 60 pivoted to the front guide plate 53, and at their upper ends inclined and projecting between the key-levers. The fingers are arranged so that only one key at a time can be moved between them, the fingers being rocked to one side or to opposite sides of the key by the action of the latter bearing against their inclined ends.

What is claimed is—

1. The combination of a series of operating keys representing different values, a reciprocating registering frame actuated thereby and movable different degrees by keys of different values, a rack movable with the frame, a pinion meshing with the rack, a stop arm turning with the pinion, a series of stops movable by the keys into the path of the arm, to arrest it at different points, a register, and a ratchet-and-pawl or clutch connection between the same and the pinion and stop arm, by which the arm and pinion are caused to turn the register with them in one direction but not in the other, substantially as described.

2. The combination of the key levers 50, the vertically sliding stepped registering frame D actuated thereby, the vertical rack-bar 44 carried by said frame, the rotary shaft 43 connected with the register, the ratchet 47 fast thereon, the pinion 45 and stop arm E loose thereon and turning together, the former meshing with the rack bar 44 and the latter carrying the pawl 46 engaging the ratchet 47, the stops F movable into the path of the arm E, and the arms 30 carried by the key levers and co-operating with the stops 43, substantially as and for the purpose described.

3. The combination of the key levers 50, the vertically sliding indicators 20 normally tending to drop into indicating position, the detents 25 normally holding them in non-indicating position, the connections 28 between the detents and key levers, the vertically reciprocating restoring plate 18 co-operating with the indicators 20, and means interme-

diating said plate and the key levers for lifting the plate when the front end of a key lever is depressed, substantially as and for the purpose described.

4. The combination with the keys of a register and indicating tablets therefor, a rack-bar operated by the keys, a restorer for returning the tablets to their normal position, and lazy-tongs connections between the rack-bar and restorer, substantially as described.

5. The combination with the keys of a register and indicating tablets therefor, a rack-bar operated by the keys, a restorer for returning the tablets to their normal position, a lazy-tongs connection with the restorer and an operating pawl carried by the rack-bar, substantially as described.

LEO EHRLICH.

Witnesses:

R. E. JACKSON,  
O. S. FIELD.