

(No Model.)

4 Sheets—Sheet 1.

W. KOCH.
CASH REGISTER.

No. 505,554.

Patented Sept. 26, 1893.

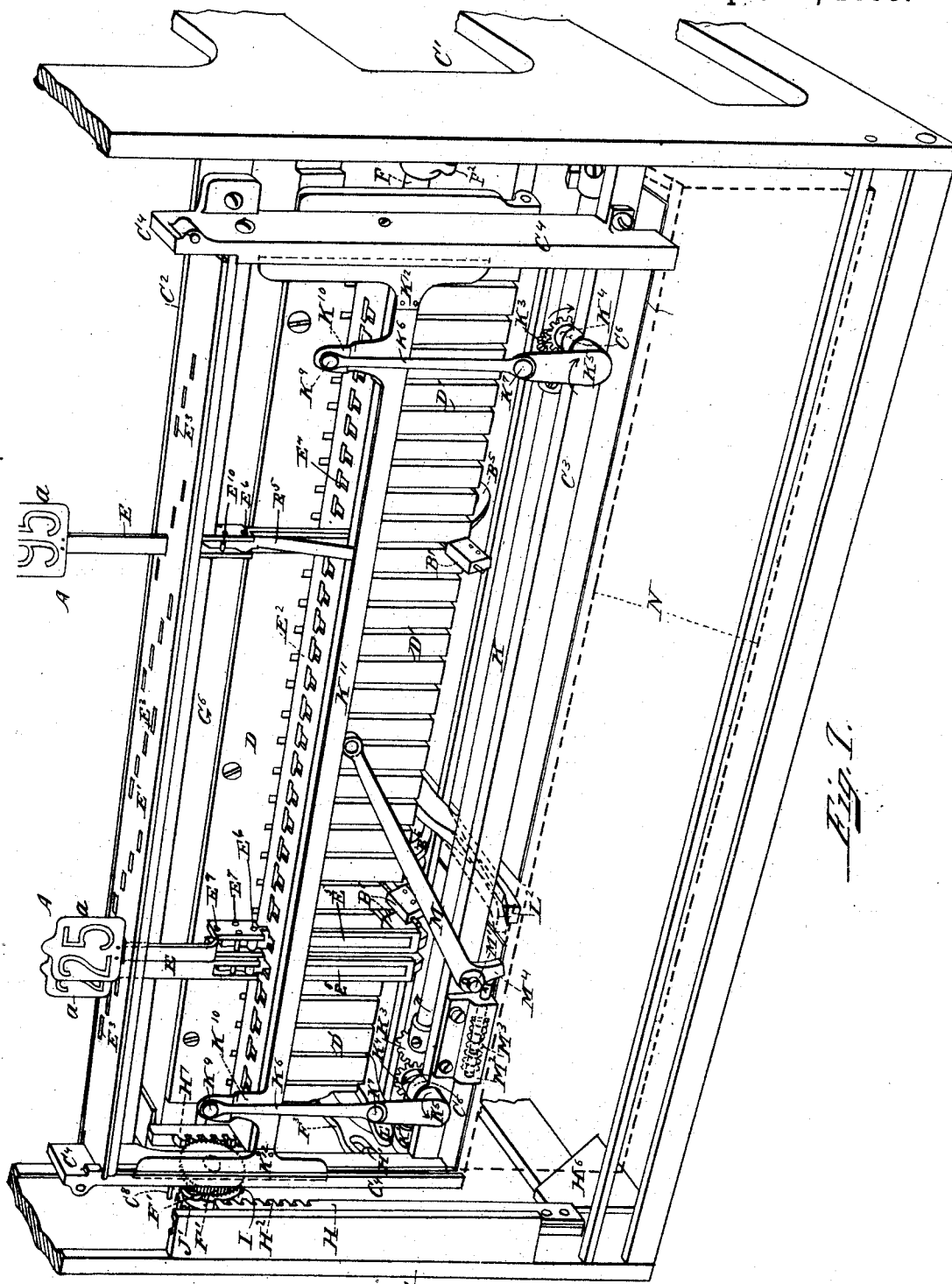


Fig. 1.

Witnesses.
E. L. Kearney.
J. A. Halliday.

Inventor
William Koch
By Edwin C. Johnson,
J. S. Koch, atty.

(No Model.)

4 Sheets—Sheet 2.

W. KOCH.
CASH REGISTER.

No. 505,554.

Patented Sept. 26, 1893.

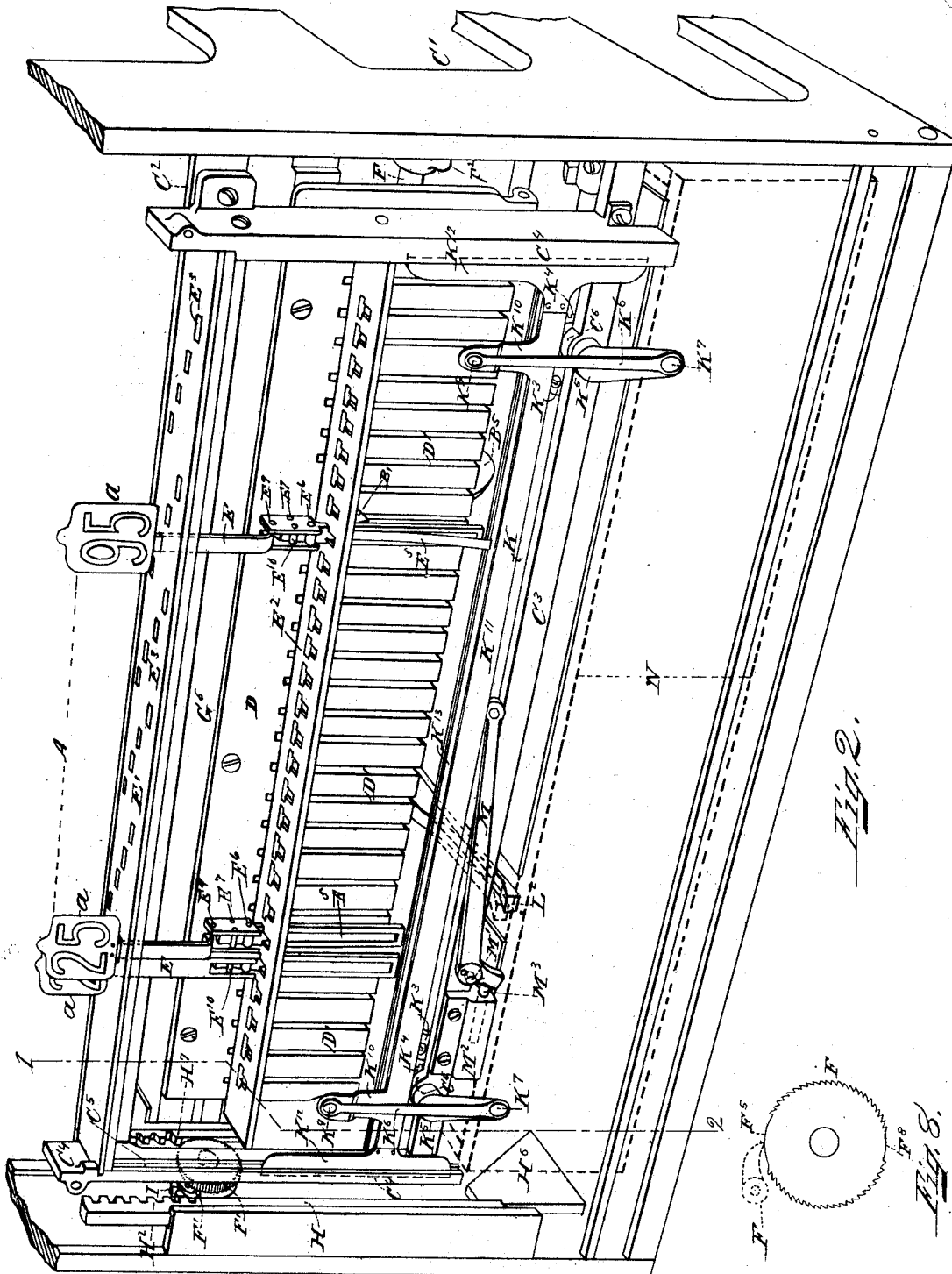


Fig. 2.

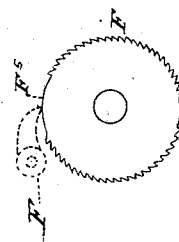


Fig. 8.

Witnesses:
E. L. Harlow
A. A. Halliday

Inventor
William Koch
By Edwin Johnson
Att. S. Koch, Att.

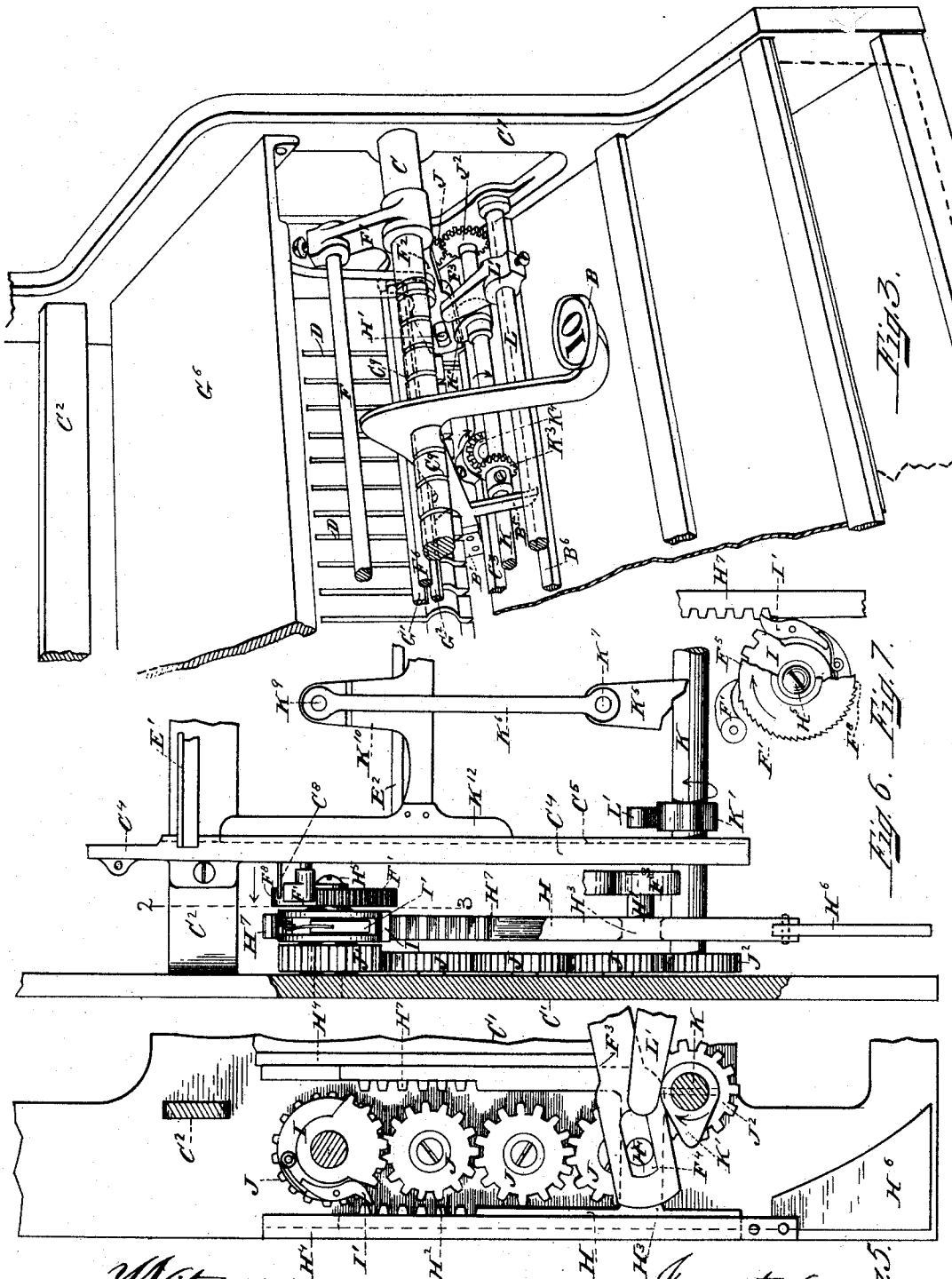
(No Model.)

4 Sheets—Sheet 3.

W. KOCH.
CASH REGISTER.

No. 505,554.

Patented Sept. 26, 1893.



Witnesses:
E. L. Heald
A. A. Halliday

Inventor:
William Koch
By Edwin C. Gibson
J. S. Rush

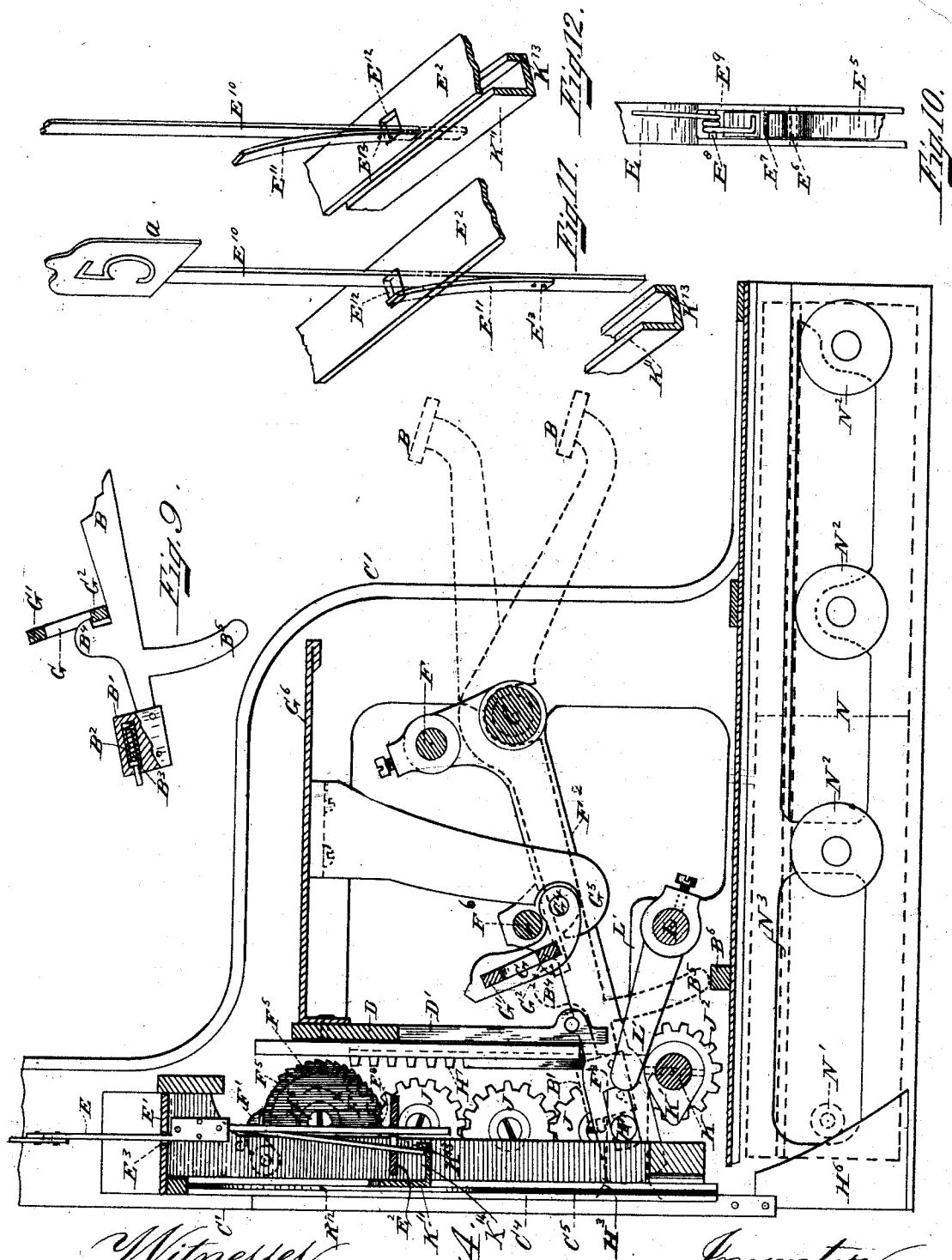
(No Model.)

4 Sheets—Sheet 4.

W. KOCH.
CASH REGISTER.

No. 505,554.

Patented Sept. 26, 1893.



Witnesses:
E. L. Kearlour
A. H. Calladay

Inventor:
William Koch
By Edwin Gilman,
and D. S. Rush

UNITED STATES PATENT OFFICE.

WILLIAM KOCH, OF NEW YORK, N. Y., ASSIGNOR, BY MESNE ASSIGNMENTS,
TO THE NATIONAL CASH REGISTER COMPANY, OF DAYTON, OHIO.

CASH-REGISTER.

SPECIFICATION forming part of Letters Patent No. 505,554, dated September 26, 1893.

Application filed December 7, 1891. Serial No. 414,294. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM KOCH, a citizen of the United States, residing in the city, county, and State of New York, have invented a certain new and useful Improvement in Cash-Registers, of which the following is a specification, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to that class of cash registers in which is employed a series of operating keys representing different values, and a series of indicators representing corresponding values, the indicators normally resting in non-indicating position and being adapted to be moved into indicating position by the operations of the respective keys, for the purpose of exposing to view the numbers representing the values of such keys.

My invention relates particularly to the indicating mechanism of such machines. In the machines of this class heretofore in use, with few exceptions, the indicators or other supports have been arranged to be engaged directly by the operating keys and moved into indicating position upon the positive strokes of such keys, and suitable means have been employed for temporarily holding them in such position after the keys have been released and returned to normal position. In my novel indicating mechanism the indicators are not moved into indicating position directly by the keys; the latter are employed simply to "set" the respective indicators, or place them in position to be acted upon and moved into indicating position by independent means, the latter, however, being also actuated by the keys. The mode of operation of the mechanism consists in "setting" the proper indicator by the positive stroke of the key, and then moving it into indicating position by the independent means during the return or negative stroke of the key. The indicator is therefore not exposed to view until the key has made its return stroke and performed all of its duties. At each operation of the machine, also, the previously exposed indicator is released and withdrawn from view during the positive stroke of the key, so that at the end of the operation only

the indicator corresponding to the newly operated key is exposed to view. The novelty of my invention consists in this new mode of operation, and in the novel constructions, arrangements, and combinations of parts for carrying it out, all as will be hereinafter fully described and particularly pointed out in the claims.

In the accompanying drawings Figure 1 represents a perspective view of the rear portion of the machine, with the casing removed and with one of the indicators in indicating position; Fig. 2 a corresponding view with all of the indicators in non-indicating position; Fig. 3 a detail perspective of the right hand end of the machine, from the front of the same; Fig. 4 a vertical section of the machine approximately on the line 1—2 of Fig. 2, looking toward the right hand side of the machine; Fig. 5 a detail view of the racks and pinions of the mechanical movement for converting the reciprocations of the keys into revolutions of a shaft; Fig. 6 a detail, partly in section, of the left hand end of the rear side of the machine, showing the same mechanical movement and other co-operating parts; Fig. 7 a detail of the segment and ratchet and one of the racks co-operating with the segment, forming part of said mechanical movement; Fig. 8 a detail view of the ratchet; Fig. 9 a detail view of the rear end of one of the key levers and the coupling bar which co-operates therewith; Fig. 10 a detail view of one of the indicator supports of Figs. 1 and 2, showing the pivoted plate carried by the same and the spring for holding the plate in normal position; and Figs. 11 and 12 detail views of a modified form of indicator support, with one of its guide plates and the lifting devices co-operating with it.

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

The general construction of the machine, and its registering mechanism, may be the same as that shown and described in my prior pending application, Serial No. 399,640, filed July 15, 1891, and the specification of the present application will be confined as much as may be to the novel indicating mechanism constituting my present invention, such description

of the remainder of the machine being given as may be necessary to a clear understanding of the invention.

The operating keys of the machine consist of levers B fulcrumed upon a horizontal rod C, in grooves of which they fit, Figs. 3 and 4, and having their rear ends confined and adapted to play in vertical slots D' in a fixed guide plate D of the frame work. Their front ends are provided with the usual numbered finger buttons, representing the amounts to be indicated and registered, and the alternate keys are so bent that their front ends will stand in two different horizontal planes, as usual. The numbered indicators *a* are carried by the upper ends of vertical plates or supports E passed through and closely fitting guide apertures E³ in a transverse guide plate E', Figs. 1 and 2. The lower ends of the indicator supports E pass through and are confined in the transverse portions of T-shaped apertures E⁴ in a second transverse guide plate E² beneath the plate E'. About midway of its length the indicator support is provided with a housing E⁹ in which is fitted at E⁶ the upper end of a narrow plate E⁵ which normally rests in vertical position in a longitudinal slot in the lower half of the indicator support. A spring E⁸ bearing against the forward side of the upper end of the plate E⁵, Fig. 10, yieldingly holds the plate in normal vertical position, with its upper end bearing against a cross pin E¹⁰ in the housing E⁹, Figs. 1 and 2. The movement of the plate in the opposite direction is limited by a similar cross pin E⁷, Fig. 10.

The rear ends of the key levers B have secured to or formed upon them housings B', Fig. 9, in bores in which are rods or plungers B³ surrounded by springs B² which press them rearward and project their front ends from the housings B'. When the keys are at rest their rear ends stand immediately in front of the lower ends of the indicator supports E, as seen in Fig. 1. When the front end of a key lever is depressed its rear end swings upward in the arc of a circle and its spring-pressed rod B³ engages the pivoted plate E⁵ of the corresponding indicator support. The strength of the spring B² which holds such rod in its rearmost position is sufficient to overcome the resistance of the spring E⁸ which holds the plate E⁵ in its normal position, and consequently the engagement of the rod B³ with the plate E⁵ will tend to force the latter rearward to the position of the right hand one in Fig. 2, the T shape of the guide slots E⁴ permitting such movement of the plate E⁵ at the proper time. When moved to this position the end of the plate E⁵ will stand in the path of travel of a vertically reciprocating lifting device, by which the indicator is lifted into indicating position, and which may now be described: This lifting device consists primarily of a transverse horizontal plate or frame K¹¹ extending across the rear sides of all the indicator sup-

ports, beneath the lower guide plate E², and having secured to or formed upon its opposite ends vertical extensions or plates K¹² which are confined and adapted to slide vertically in guide ways upon the inner surfaces of the vertical frame plates C⁴. The lifting plate K¹¹ is provided along its forward edge with an upwardly projecting flange for a purpose hereinafter explained, and in this instance also has an upwardly projecting flange along its rear edge, as seen in Fig. 4.

By means hereinafter described the lifter K¹¹ is given a complete reciprocating movement in opposite directions at each operation of the machine, being moved during the downward or positive stroke of the front end of the key lever from its upper position shown in Fig. 1 to its lower position shown in Fig. 2, and then returned to its upper position during the return upward stroke of the front end of the key lever. Keeping this movement of the lifter plate or frame in mind, it will be seen that, starting with the parts in the position shown in Fig. 1, when the front end of a key lever is depressed and its rear end thereby lifted its spring plunger B³ will bear against the plate E⁵ of the corresponding indicator support and tend to force the lower end of said plate rearward to the position shown in the case of the right hand one in Fig. 2, as before explained. The downward movement of the lifter frame K¹¹, adjacent to the rear sides of the indicator supports and plate E⁵, will, however, prevent movement of the plate E⁵ to such position until the lifter passes below the lower end of said plate. During the downward movement of the lifter, therefore, and upward movement of the rear end of the key lever, the rod B³ of the lever will press the plate E⁵ rearward as far as the position of the lifter will permit, after which, in the further upward movement of the rear end of the lever, its rod B³ will be forced into its housing and its spring B² put under tension. As soon as the lifter passes below the lower end of the plate E⁵ the spring B² will force the rod B³ rearward, out of its housing, and throw the plate E⁵ to the position of the right hand one in Fig. 2, where its lower end will stand immediately above the lifter K¹¹. Upon the return upward stroke of the front end of the operated key lever, and upward movement of the lifter K¹¹, the latter will catch the plate E⁵ which has been moved rearward and lift its indicator support and indicator to the position of the right hand one in Fig. 1, and thereby expose the indicator to view at the usual window in the casing of the machine.

It will be understood that at the downward movement of the lifter K¹¹, during the positive stroke of the operated key, any indicator which had been sustained in elevated position by the lifter, as the right hand one in Fig. 1, will be released and drop back to normal position with the lifter, the spring E⁸, Fig. 10, throwing the plate E⁵ back to normal

position in its slot in the indicator support as soon as the flange upon the front edge of the lifter clears its lower end.

From the foregoing description it will be seen that at each operation of a key lever the lifter is lowered and any exposed indicators withdrawn from view, during the positive movement of the key lever, and the catch plate E⁵ of the indicator corresponding to the operated key is set for engagement with the lifter, and then upon the return negative stroke of the key and upward movement of the lifter the latter engages such plate and lifts the indicator into exposed position.

The means for giving the lifter its vertical reciprocating movements may now be described: To ears K¹⁰ projecting upward from the rear side of the lifter near its opposite ends are pivoted at K⁹ the upper ends of links K⁶ which are pivoted at their lower ends, at K⁷, to crank arms K⁵ fast upon short shafts journaled in suitable bearings C⁶ upon the framework and having fast upon their forward ends beveled gears K⁴ which mesh with beveled gears K³ fast upon a rotary shaft K. By means hereinafter described the shaft K is given a complete revolution at each operation of the machine, and the crank arms K⁵ consequently a complete revolution in the directions of the respective arrows upon them, and the lifter K¹¹ is lowered to its lowest position during the first half of their revolution and returned to its upper position during the second half of the same. The first half of revolution of the shaft K and parts geared to it is accomplished during the positive stroke of the operated key, and the second during its negative stroke. For the purpose of partially balancing the weight of the lifter K¹¹ there is provided in this instance a spring-pressed bent lever M pivoted to the framework at M' and provided at its upper end with an anti-friction roller bearing against the under side of the lifter. The short arm M⁴ of the lever, below its pivotal point M', is engaged by a rod M³ confined in a suitable housing M² and pressed outward by a spring coiled around it, as seen in Fig. 1. This spring presses the outer end of the lever M upward with sufficient force to support the weight of the lifter, while the application of the spring to the lever is such that the complete depression of the outer end of the lever will only slightly compress the spring, so that the lever is substantially equally balanced throughout its limit of movement.

Any suitable means intermediate the keys and shaft K may be employed for rotating the latter, and there are numerous mechanical movements suitable for the purpose. That which I employ in the present instance is the same as that shown and described in my aforesaid prior application for rotating a shaft similar to the shaft K, and may be briefly described as follows, reference being had more particularly to Figs. 4, 5, 6 and 7: Mounted to slide vertically in suitable guide ways H⁴

upon the right hand side frame of the machine is a rack frame H carrying two vertical racks H² and H⁷. Fast upon a short shaft H⁵ suitably journaled in the side frame C' of the machine between the two vertical racks H² H⁷ is a segment I adapted to co-operate alternately with the opposite racks. This segment is provided with a spring tooth I' adapted to insure the engagement of the segment with the opposite racks at the ends of their respective strokes. With the parts in the position shown in Fig. 5, if the rack frame H be lifted to its limit of movement the rack H² will turn the segment I a half revolution and cause its spring tooth I' to catch beneath one of the teeth of the opposite rack H⁷, as seen in Fig. 7, and upon the return downward movement of the racks the rack H⁷ will turn the segment another half revolution. The shaft is geared by a train of gears J J² to the shaft K before described, so that the latter shaft will partake of the revolutions of the segment I and its shaft H⁵. The means for reciprocating the racks consists of a swinging frame hung upon the fulcrum rod C of the key levers and having a rearwardly extending arm F³ which is provided with a slot F⁴ embracing a stud H' upon the cross bar H³ of the rack frame. The frame which carries the arm F³ consists of two side arms hung at their forward ends upon the rod C and having their rear ends rigidly connected by a cross rod F⁶ overlying the entire series of keys. The front ends of the arms F² are extended upward from the fulcrum rod C and are likewise rigidly connected by a rod F, so that the two side arms F² and their cross rods F and F⁶ constitute a rigid frame hung upon the rod C and adapted to be lifted by the operation of any one of the key levers. The arm F³ above referred to consists in this instance simply of a rearward extension of the right hand side arm F² of the frame, as seen in Fig. 4.

The swinging frame above described in this instance, as in my prior application, also carries a coupling bar for coupling the operated keys to the frame and compelling full uniform strokes of them. This bar G is hung at its opposite ends at G' in ears projecting upward from the side arms F², Fig. 4. Its middle portion is cut away longitudinally, leaving an engaging portion G² along its lower side. This portion G² is adapted to co-operate with hooks B⁴ upon the upper sides of the key levers. The bar G has secured to one end of it a downwardly and forwardly curved arm which carries a roller G⁴ adapted to co-operate with a cam plate G⁵ secured to and depending from the top plate G⁶ of the framework. The plate G⁵ is provided with a recess in which the roller G⁴ rests when the parts are in normal position. When the front end of a key lever is depressed its rear end in rising will engage the cross rod F⁶ of the swinging frame and lift it, and as the roller G⁴ is forced rearward out of the recess in the

cam plate G⁵ the engaging portion G² of the coupling bar G will be thrown rearward into engagement with the hook B⁴ of the operated key, as seen in Fig. 9, and during the further upward movement of the parts the engagement of the roller G⁴ with the curved rear side of the plate G⁵ will hold the coupling bar in engagement with the hook of the operated key, so that the key and bar will be compelled to move together throughout the play of the key. The shaft H⁵ which carries the segment I also has fast upon it a ratchet F' with which co-operates a pawl to prevent retrograde movement of the ratchet and parts turning with it. This pawl and ratchet compel full strokes of the reciprocating racks in each direction, and incidentally full strokes of the swinging frame by which the racks are actuated, and inasmuch as the operated keys are coupled to this swinging frame as soon as they are started, and compelled to move with it throughout their limit of play, the ratchet and pawl likewise compel full strokes of such keys when once displaced from normal position; as will be readily understood, and as has been explained at length in my aforesaid prior application. To permit slight independent movement of the parts at the beginning of the positive stroke of an operated key, and also at the end of such stroke, the ratchet F' is provided with two diametrically opposite mutilated or smooth portions upon which the pawl rests at the opposite ends of the strokes of the keys.

Any suitable mechanism intermediate the keys and lifter frame may be employed for giving the latter its reciprocating movements, and it is not essential that it be actuated by a rotary driving shaft.

The method of engaging the indicator supports with the lifter may also be widely varied without departing from my invention. Thus, it is not essential that the indicator supports shall be limited to a straight reciprocating movement and be provided with the pivoted catch plates adapted to be thrown into the path of the lifter, but on the contrary the indicator supports themselves may be arranged to be swung bodily into and out of the path of the lifter. Thus, in Figs. 11 and 12 I have shown a modified form of indicator support, consisting simply of a vertical rod or plate E¹⁰ passed through a guide aperture E¹² in the plate E² which is sufficiently large to permit the lower end of the plate E¹⁰ to be swung backward and forward. The support E¹⁰ has secured to it near its lower end, at E¹³, a curved spring E¹¹ whose outer end extends through the guide aperture E¹² and when the indicator support is in its lower position serves to hold its lower end in forward normal position. Under this construction, when the front end of a key lever is depressed the spring rod B³ carried by its rear end engages the forward side of the lower end of the indicator support and forces the latter rearward as far as the position of the

descending lifter K¹¹ will permit, and as soon as the lifter clears the lower end of the support the latter will be thrown farther rearward, to its limit of movement, and will stand in the path of the lifter, so that upon the return upward movement of the latter it will carry the indicator to exposed position. Upon the succeeding positive stroke of a key and lowering of the lifter frame K¹¹ the lifted indicator support will move downward with it, and as it approaches its lower position its spring E¹¹ will throw its lower end forward into line with the other supports.

As stated at the beginning of the specification the novelty of my invention consists in the new modes of operation and broad combinations of parts, which have been above described, and my invention is therefore not restricted to details of construction or arrangement further than may be indicated by the terms of my respective claims. So far as I am aware I am the first in the art to combine a series of indicators of any sort with a series of keys co-operating therewith in any manner to "set" them for movement into indicating position, and with means of any sort common to and actuated by the keys for moving them into such position, as well as to produce the other combinations set forth in my claims.

Having thus fully described my invention, I claim—

1. The combination of a series of indicators, a series of pivoted key levers for shifting the respective indicators to set them for movement to indicating position, and means actuated by the keys for moving the set indicators to such position, substantially as described.

2. The combination of a series of indicators, a series of keys for shifting the respective indicators to set them for movement to indicating position, and a movable plate or frame actuated by the keys for moving the set indicators into such position, substantially as described.

3. The combination of a series of indicators, a series of keys operating upon their positive strokes to set the respective indicators for movement to indicating position, and a movable plate or frame actuated by the keys upon their negative strokes to carry the set indicators into indicating positions, substantially as described.

4. The combination of a series of indicators, a reciprocating plate or frame for moving them into indicating position, a series of keys for setting the respective indicators for movement by said frame, and means intermediate the keys and frame for moving the latter in one direction upon the positive stroke of a key, to withdraw the exposed indicator from indicating position, and in the opposite direction upon the negative stroke of the key to carry the set indicator to such position, substantially as described.

5. The combination of an indicator support movable both vertically and laterally, a piv-

oted key lever for moving said support laterally, to set it for movement into indicating position, and a lifter actuated by the key to carry the support to indicating position, substantially as described.

6. The combination of a series of indicator supports movable both vertically and laterally, a series of keys for moving the respective supports laterally, to set them for movement into indicating position, and a movable plate or frame actuated by the keys to carry the set indicators to indicating position, substantially as described.

7. The combination of a series of indicator supports movable both vertically and laterally, a series of keys operating during their positive strokes to move the respective supports laterally, to set them for movement to indicating position, and a movable plate or frame actuated by the keys upon their return or negative strokes to carry the set indicators to indicating position, substantially as described.

8. The combination of a series of indicator supports movable both vertically and laterally, a series of keys for moving the respective supports laterally during the positive strokes of the keys, to set the supports for movement to indicating position, and a reciprocating plate or frame actuated by the keys and movable downward during their positive strokes, to release the exposed indicator, and upward during their negative strokes, to carry the set indicator to indicating position, substantially as described.

9. The combination of a series of indicator supports movable both vertically and laterally, a series of springs yieldingly holding them against lateral movement, a series of keys for moving the supports laterally against the stress of such springs, to set them for movement to indicating position, and means actuated by the keys for lifting the set indicators to indicating position, substantially as described.

10. The combination of a series of indicator supports movable both vertically and laterally, a series of springs yieldingly holding them against lateral movement, a series of keys for moving the supports laterally against the stress of such springs, to set them for movement to indicating position, and a reciprocating plate or frame actuated by the keys for lifting the set indicators to indicating position, substantially as described.

11. The combination of an indicator support, a key for setting said support for movement to indicating position, a spring or yielding contact piece between the key and support, and means actuated by the keys for moving the set indicator to indicating position, substantially as described.

12. The combination of an indicator support, a key carrying a spring or yielding contact piece adapted to engage the support when the key is operated and set it for movement to indicating position, and means actuated

by the key to move the set indicator to indicating position, substantially as described.

13. The combination of a series of indicator supports, a series of keys operating through intermediate springs or yielding contact pieces to set the respective indicators for movement to indicating position, and a movable plate or frame actuated by the keys for moving the set indicators to indicating position, substantially as described.

14. The combination of a series of indicator supports, a series of keys carrying springs or yielding contact pieces adapted to engage the supports when the keys are operated and set them for movement to indicating position, and a movable plate or frame actuated by the keys for moving the set indicators to indicating position, substantially as described.

15. The combination of a series of indicator supports movable both vertically and laterally, a series of springs for yieldingly holding said supports against lateral movement, a series of keys carrying springs or yielding contact pieces adapted, when a key is operated, to engage the corresponding support and set it for movement to indicating position, and a movable plate or frame actuated by the keys for moving the set indicators to indicating position, substantially as described.

16. The combination of a series of indicators, a lifting plate or frame for moving the same to indicating position, a series of keys for setting the respective indicators, a frame common to and moved by said keys, and a rack and pinion connection between the two frames for reciprocating them in opposite directions upon the operation of a key, substantially as described.

17. The combination of a series of indicator supports movable both vertically and laterally, a reciprocating lifting plate or frame for moving the same vertically, a series of keys for moving them laterally to set them for movement by the lifting frame, a movable frame common to and movable by the keys, and a rack and pinion connection between said frame and the lifting plate or frame for reciprocating them in opposite directions at the operation of a key, substantially as described.

18. The combination of a series of indicator supports movable both vertically and laterally, a series of springs yieldingly holding them against lateral movement, a reciprocating lifter frame or plate for moving them vertically, a series of keys for moving them laterally against the stress of their springs, to set them for movement by the lifter frame, a movable frame common to and actuated by the keys, and a rack and pinion connection between said frame and the lifter plate or frame for reciprocating them in opposite directions upon the operation of a key, substantially as described.

19. The combination of a series of indicator supports movable both vertically and laterally, a series of springs yieldingly holding

them against lateral movement, a reciprocating lifting plate or frame for moving them vertically, a series of keys carrying springs or yielding contact pieces adapted to engage the supports and move them laterally against the stress of their springs, to set them for movement by the lifting frame, a movable frame common to and actuated by the keys, and a rack and pinion connection between said frame and the lifting plate or frame for reciprocating them in opposite directions upon the operation of a key, substantially as described.

20. The combination of a series of indicators, a lifting plate or frame for moving them to indicating position, a series of keys for setting them for movement by said frame, a rotary shaft and connections between the same and the lifting plate or frame for reciprocating the latter, and means intermediate the keys and shaft for rotating the latter by the operations of the keys, substantially as described.

21. The combination of a series of indicator supports movable both vertically and laterally, a reciprocating lifting plate or frame for moving the same vertically, a series of keys for moving them laterally to set them for movement by the lifting frame, a rotary shaft and connections between the same and lifting plate or frame for reciprocating the latter, and means intermediate the keys and shaft for rotating the latter upon the operations of the keys, substantially as described.

22. The combination of a series of indicator supports movable both vertically and laterally, a series of springs yieldingly holding them against lateral movement, a reciprocating lifting plate or frame for moving them vertically, a series of keys for moving them laterally against the stress of their springs, to set them for movement by the lifting frame, a rotary shaft and connections with the lifting plate or frame for reciprocating the latter, and means intermediate the keys and shaft for rotating the latter upon the operations of the keys, substantially as described.

23. The combination of a series of indicator supports movable both vertically and laterally, a series of springs yieldingly holding

them against lateral movement, a reciprocating lifting plate or frame for moving them vertically, a series of keys carrying springs or yielding contact pieces adapted to engage the supports and move them laterally against the stress of their springs, to set them for movement by the lifting frame, a rotary shaft and connections with the lifting plate or frame for reciprocating the latter, and means intermediate the keys and shaft for rotating the latter upon the operations of the keys, substantially as described.

24. The combination of a series of vertically reciprocating indicator supports passed through apertures in two fixed guide plates, the apertures in the lower plate permitting lateral movement of the support, a reciprocating lifting frame for moving the supports vertically, a series of keys for moving them laterally into position for engagement by the lifting frame, and means intermediate the keys and said frame for reciprocating the latter, substantially as described.

25. The combination of a series of vertically reciprocating indicator supports passed through apertures in two fixed guide plates, the apertures in the lower plate permitting lateral movement of the supports, springs applied to said supports to yieldingly hold them against lateral movement, a reciprocating lifting frame for moving the supports vertically to indicating position, a series of keys for moving them laterally into position to be engaged by said frame, and means intermediate the keys and frame for reciprocating the latter, substantially as described.

26. In an indicating machine, the combination of a series of key levers representing different values and a series of corresponding indicators carried upon vertically sliding rods and arranged to be lifted into view upon the return or negative strokes of said levers.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 23d day of November, A. D. 1891.

WILLIAM KOCH.

Witnesses:

ROBT. A. KELLAND,
CHAS. HANIMANN.