

(No Model.)

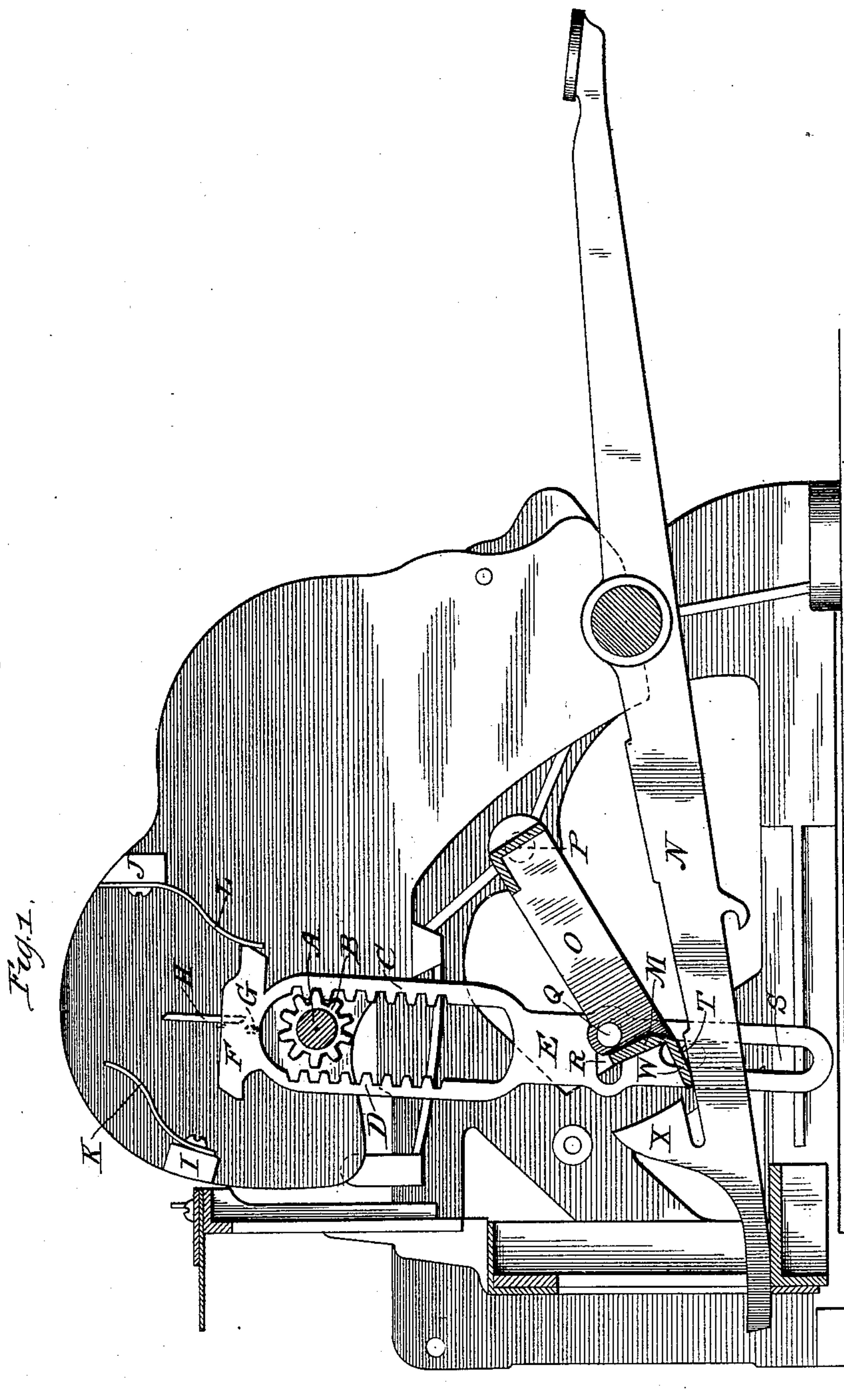
2 Sheets—Sheet 1.

T. CARNEY.

COMPLETE STROKE MECHANISM FOR CASH REGISTERS.

No. 482,161.

Patented Sept. 6, 1892.



Witnesses:  
Wm. L. Humm  
J. M. Rhein.

Thomas Carney, Inventor;  
By Edward Rector  
his Atty.

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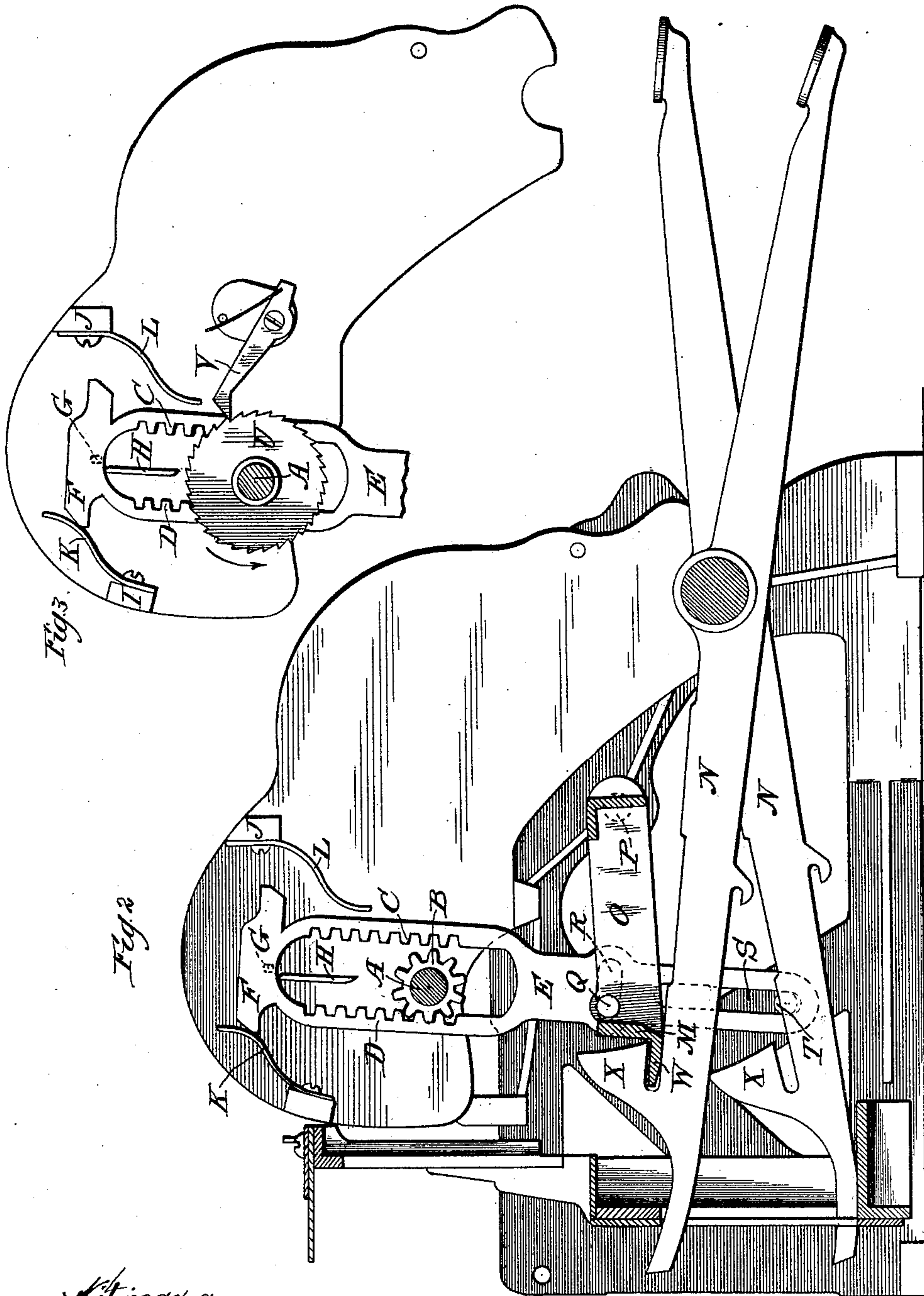
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Witnesses:  
Wm. J. Heming  
J. M. Rheem.

Inventor  
Thomas Carney  
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his Attorney.



# UNITED STATES PATENT OFFICE.

THOMAS CARNEY, OF DAYTON, OHIO, ASSIGNOR TO THE NATIONAL CASH REGISTER COMPANY, OF SAME PLACE.

## COMPLETE-STROKE MECHANISM FOR CASH-REGISTERS.

SPECIFICATION forming part of Letters Patent No. 482,161, dated September 6, 1892.

Application filed May 21, 1892. Serial No. 433,839. (No model.)

*To all whom it may concern:*

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

My invention consists, primarily, in a novel combination of devices for converting reciprocating into rotary motion, and, secondly, in the application of such devices to a cash-register or similar machine, for the purpose hereinafter explained.

In the accompanying drawings, Figure 1 is a vertical section of a cash-register, showing the application thereto of my novel means for converting the reciprocating motion of the operating-keys into rotary motion in a shaft or other revoluble part: Fig. 2, a view corresponding to Fig. 1, with the parts in a different position; Fig. 3, a detail showing the application of a ratchet and pawl to the revoluble shaft of Figs. 1 and 2, for a purpose to be explained.

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

A represents a revoluble shaft suitably journaled in the framework and having fast upon it a pinion B. Upon opposite sides of this pinion are two rack-bars C D, carried by a reciprocating plate E and adapted to alternately mesh with the pinion B. In this instance the upper ends of the rack-bars are united by an integral cross-plate F, though it is not essential that their upper ends should be connected.

Projecting from the farther side of the plate F in the views shown in the drawings is a pin or lug G, adapted to co-operate with a rib or guide H upon the adjacent side plate of the frame. Secured to lugs I J upon said side plate of the frame are two curved springs K L, adapted to co-operate with the opposite ends of the plate F, in the manner to be described.

The plate E and rack-bars are capable of slight oscillatory motion in addition to their reciprocating movements to permit the racks to be alternately engaged with the pinion.

With the parts in the position shown in Fig. 1 the lifting of the plate E and rack-bars will

cause the rack C to turn the pinion B and shaft A in the direction of the arrow. As the rack-bars approach their upper limit of stroke the left-hand end of the plate F will engage the spring K and be thereby pressed toward the right, the engagement of the lug G with the left-hand side of the rib H preventing movement of the plate and rack-bars in that direction, however, until the lug has cleared the upper end of the rib. This it does just at the end of the upward stroke of the rack-bars, so that the latter are then thrown to the right by the spring K, to the position shown in Fig. 2, and the rack D engaged with the pinion B. During the downward stroke of the rack-bars the rack D will turn the pinion and shaft in the same direction in which they had been turned by the rack C during the upward movement of the bars. When the parts approach their lower limit of stroke, the right-hand end of the plate F will engage the spring L and be thereby pressed toward the left, the engagement of the lug G with the right-hand side of the rib H preventing movement in this direction, however, until the lug clears the lower end of the rib, whereupon the rack-bars will be thrown to the left again into the position shown in Fig. 1 and the rack C re-engaged with the pinion. In this manner the reciprocating movements of the rack-bars are converted into rotary movement in the pinion and shaft. The rack-bars may be given their reciprocating movements by any suitable means and in any suitable manner, depending upon the purpose for which and the relations in which my invention is employed. In the use of it in a cash-register the rack-bars are given their reciprocating movement by what is commonly called the "vibrating frame," which consists of a bar of any suitable shape extending across and resting upon the series of keys and adapted to rise and fall with them. In the machine illustrated in the drawings this cross-bar M, extending across and resting upon the upper sides of all of the key-levers N near their rear ends, is hung by side arms O at its opposite ends to the side frames of the machine at P, so that whenever the front end of any key-lever is depressed this bar will be lifted, and when the key is released the bar will drop back



with the rear end of the lever, its return being assisted by a suitable spring, if desired. A pin Q, projecting from the right side of the arm O at the right end of the bar M, extends through a transverse slot R in the plate E, which carries the rack-bars, so that whenever the bar M is lifted by the operation of one of the key-levers the rack-bars will be lifted by it, and when the bar M drops back to normal position the rack-bars will be carried downward with it. The lower end of the plate E has in it a longitudinal slot S, in which fits a stud T, projecting inward from the side frame of the machine and by which the plate E is partially supported in position and guided in its movements.

My invention is employed in the machine shown in the drawings as part of a mechanism for insuring the full strokes of the operated keys, and to that end I combine with it a ratchet U, Fig. 3, which is fast on the shaft A and with which co-operates a pawl V, which prevents any backward movement of the ratchet. The employment of this ratchet and pawl prevents any retrograde movement of the rack-bars in either direction. Thus if the rack-bars are started upward with the parts in the position shown in Fig. 1 they cannot move downward until they have been given their full upward stroke and the rack C been disengaged from the pinion B and the rack D engaged with it, and when the bars begin their downward movement, with the rack D in mesh with the pinion, they cannot move upward until they complete their full downward stroke and the rack D is disengaged from the pinion and the rack C re-engaged with it. Inasmuch as the plate E carries the vibrating frame with it in each direction the ratchet and pawl insure full upward and downward strokes of this frame, and I compel the operated keys to make full strokes in each direction without any retrograde movement by coupling each of them to the vibrating frame as soon as the key is displaced from normal position. It is not a new idea to couple the operated keys to such a vibrating frame nor to combine with such frame a ratchet and pawl or other suitable device for compelling the full movement of the frame in each direction, and in carrying out my invention the keys may be coupled to such frame in any usual or suitable manner.

In the drawings I have illustrated a method which is commonly employed in many of such machines now in use. The cross-bar M of the vibrating frame is provided with a rearwardly-projecting flange W, resting upon the upper sides of the keys immediately in front of the open mouths of hooks X, formed thereon. Inasmuch as the rear edge of the flange W moves in the arc of a circle whose radius is much shorter than that of the circle in which the hooks X move, the arcs of the two circles intersect each other at a point a short distance above the normal position of the rear edge of the flange, and it results from this

that whenever the front end of any key-lever is depressed and its rear end lifted the flange W will enter the open mouth of the hook X on such key and the key thereby become hooked or coupled to the vibrating frame and obliged to move with it until it has completed its upward stroke and returned to substantially normal position. It will thus be seen that when the front end of any key-lever has been depressed far enough for its rear end to become coupled to the vibrating frame such key cannot make any retrograde movement, but must be given its full stroke in each direction.

It is evident that in the employment of my invention in a cash-register in the manner and for the purpose above described the shaft A performs no duty, except to support the pinion B and afford a rigid connection for the latter with the ratchet U. Where my invention is employed for the sole purpose of insuring full strokes of the operated keys, therefore, the pinion B may be loose on the shaft A or any other suitable support, and the ratchet U be secured directly to the side of the pinion or upon the hub or sleeve which carries the pinion. My invention may, however, be employed in a cash-register for other purposes than to compel the full strokes of the operated keys.

The engagement of the pawl V with the ratchet U compels the full strokes of the various parts in both directions, and this is generally desirable; but where it is not essential this feature of my invention may be employed to insure a full stroke of the parts in one direction only. The ratchet-disk in such case will be provided with teeth upon one-half only of its periphery.

While I have shown the plate E, rack-bars C D, and top plate F formed of one integral piece, it is evident that they need not be so formed. The sole purpose of the plate F is to co-operate with the springs K L and afford a support for the lug G. Such being the case, the upper ends of the rack-bars might themselves be shaped and arranged to co-operate with the springs and the lug G be placed upon the upper end of one or the other of the bars.

Having thus fully described my invention, I claim—

1. The combination of a revoluble pinion, two reciprocating racks adapted to alternately engage the pinion, means for shifting the racks at the opposite ends of their strokes to disengage one rack from the pinion and engage the other with it, means for holding the racks in their shifted positions, a ratchet revoluble with the pinion, and a pawl co-operating with the ratchet, substantially as described.

2. The combination of a series of operating keys, a movable bar common to all of the keys, to which bar the keys become attached when operated, a revoluble pinion, two reciprocating racks actuated by said movable bar and



adapted to alternately engage the pinion, means for shifting the racks at the ends of their strokes to disengage one rack from the pinion and engage the other with it, means  
 5 for holding the racks in their shifted positions, a ratchet revoluble with the pinion, and a pawl co-operating with the ratchet, substantially as and for the purpose described.

3. The combination of a series of operating-  
 10 keys, a movable bar common to all of the keys, to which bar the keys become attached when operated, a revoluble pinion, two reciprocating racks actuated by said movable bar and adapted to alternately engage the pinion,  
 15 means for shifting the racks at the ends of their strokes to disengage one rack from the pinion and engage the other with it, a projection moving with the racks and co-operating with a fixed guide-rib for holding the racks  
 20 in their shifted positions, a ratchet revoluble with the pinion, and a pawl co-operating with the ratchet, substantially as and for the purpose described.

4. The combination of a series of operating-  
 25 keys, a movable bar common to all of said keys, a revoluble pinion, two reciprocating racks actuated by said movable bar and adapted to alternately engage the pinion, means for shifting the racks at the ends of their strokes to  
 30 disengage one rack from the pinion and engage the other with it, and means for holding the racks in their shifted positions, whereby the successive operations of the keys will rotate the pinion in the same direction, substantially as described.

5. The combination of a series of operating-  
 keys, a movable bar common to all of said keys, a revoluble pinion, two reciprocating racks actuated by said movable bar and adapted to  
 40 alternately engage the pinion, means for shifting the racks at the ends of their strokes to disengage one rack from the pinion and engage the other with it, and a projection moving with the racks and co-operating with a fixed  
 45 guide-rib to hold the racks in their shifted positions, substantially as described.

6. The combination of the reciprocating racks C D, interposed pinion B, ratchet U, moving with the pinion, pawl V, springs K L,  
 5c rib H, and projection G, carried by the racks and co-operating with the rib H, substantially as described.

7. The combination of the revoluble shaft A, the pinion B, fast thereon, the reciprocating

ing plate E, carrying the racks C D upon opposite sides of the pinion B, the cross-plate F, connecting the upper ends of the racks, the springs K L, co-operating with the plate F, the rib H, and the projection G on the plate F co-operating with the rib H, substantially as described.

8. The combination of the revoluble shaft A, the pinion B and ratchet U fast thereon, the pawl V, the reciprocating plate E, carrying the racks C D on opposite sides of the  
 65 pinion, the plate F at the upper ends of the racks, the springs K L, the rib H, and the projection G on the plate F co-operating with the rib H, substantially as described.

9. The combination of the pinion B, the reciprocating plate E, carrying the racks C D on opposite sides of said pinion, the plate F at the upper ends of the racks, the springs K L, the rib H, the projection G on the plate F co-operating with the rib H, the key-levers  
 75 N, and the vibrating cross bar or frame common thereto and connected to the plate E, substantially as described.

10. The combination of the pinion B, the ratchet U, moving therewith, the pawl V, the  
 80 reciprocating plate E, carrying the racks C D on opposite sides of the pinion B, the plate F at the upper ends of the racks, the springs K L, the rib H, the projection G on the plate F co-operating with the rib H, the vibrating  
 85 cross bar or frame, and the series of key-levers adapted to be coupled to said bar when displaced from normal position, substantially as described.

11. The combination of the revoluble shaft  
 90 A, the pinion B, and ratchet U fast thereon, the pawl V, the reciprocating plate E, carrying the racks C D on opposite sides of the pinion B and provided at its lower end with the longitudinal slot S, embracing the stud T on  
 95 the frame, the plate F at the upper ends of the racks, the springs K L, the rib H, the projection on the plate F co-operating with the rib H, the series of key-levers N, provided with hooks X, and the vibrating frame having  
 100 the flange W co-operating with said hooks and provided, also, with a pin Q, engaging the transverse slot R in the plate E, substantially as described.

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Witnesses:

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