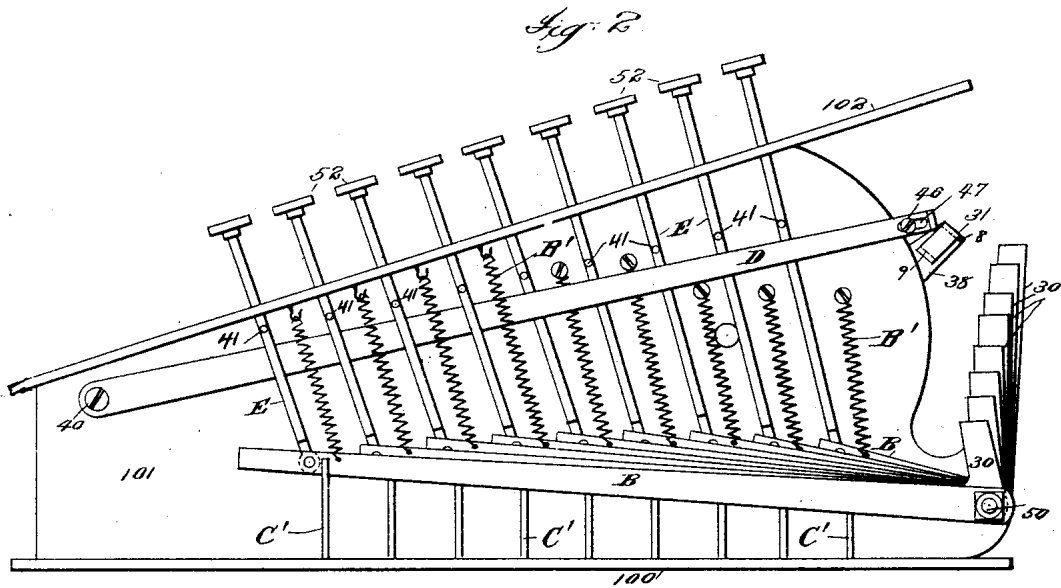
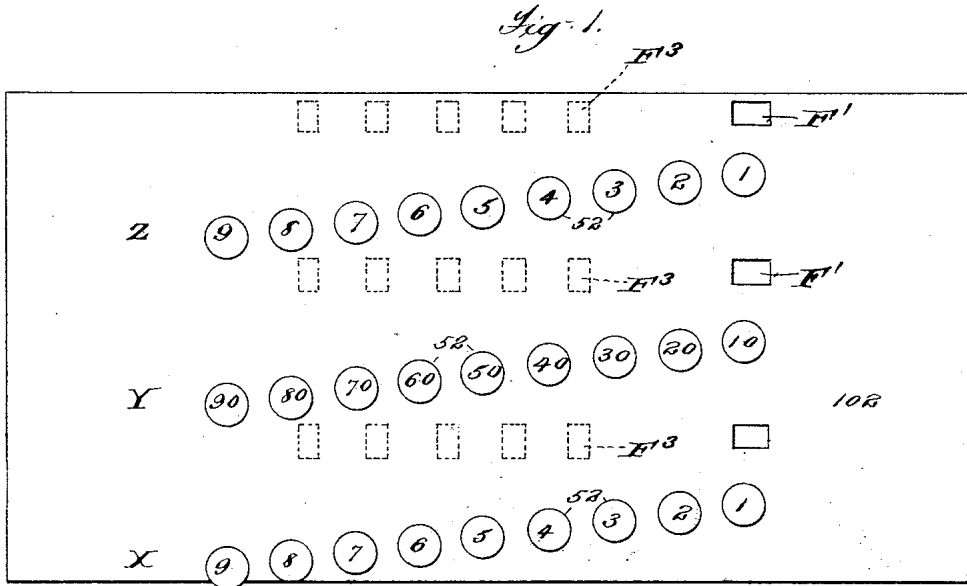


J. B. BENTON.
REGISTER AND CALCULATOR.

No. 511,322.

Patented Dec. 26, 1893.



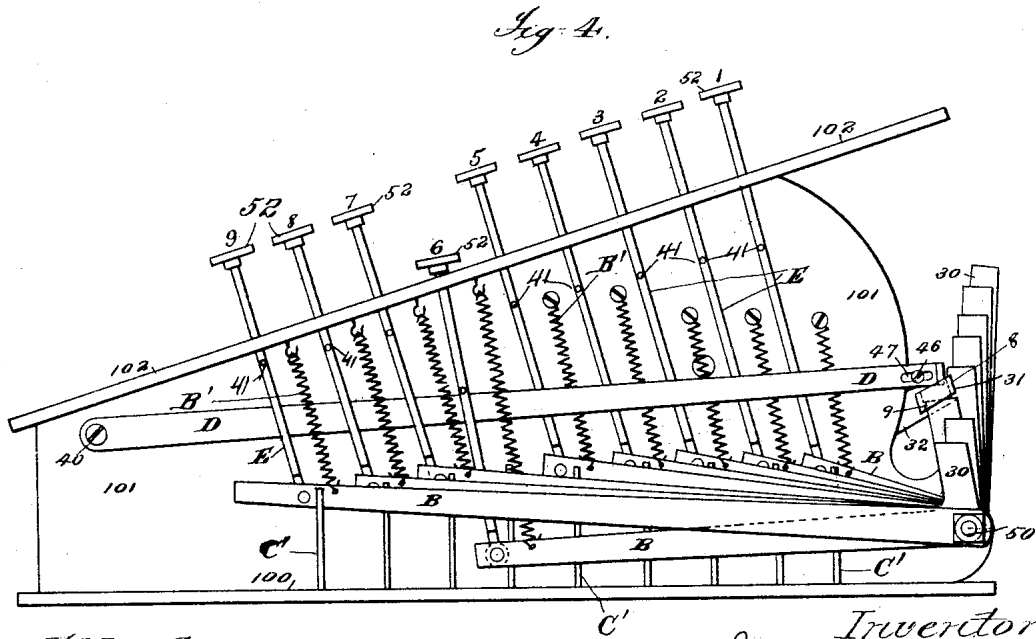
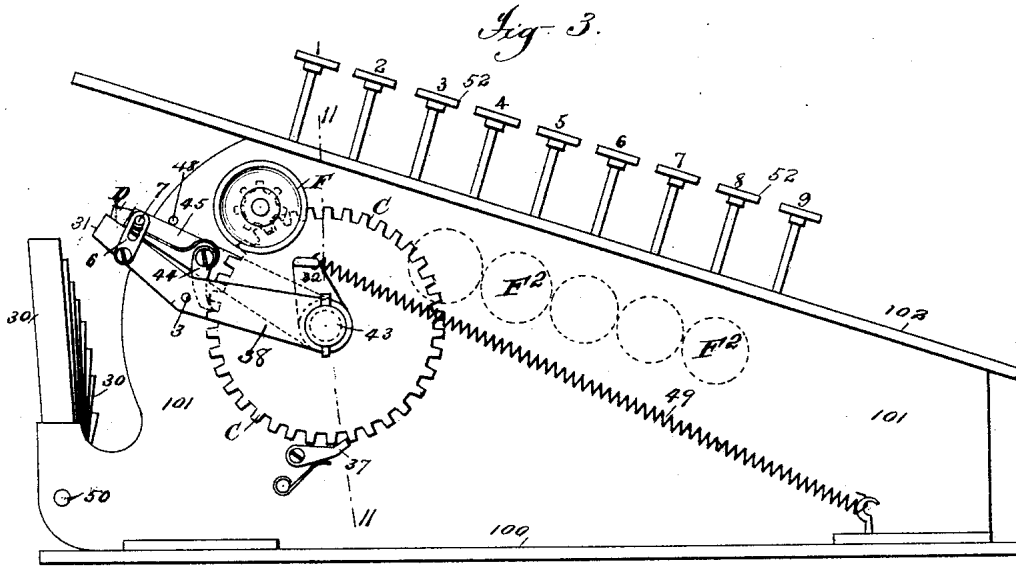
Attest:
Geo. H. Potts
Nellie Marler

Inventor:
John B. Benton
 by *Geo. H. Graham*
 Atty.

J. B. BENTON.
REGISTER AND CALCULATOR.

No. 511,322.

Patented Dec. 26, 1893.



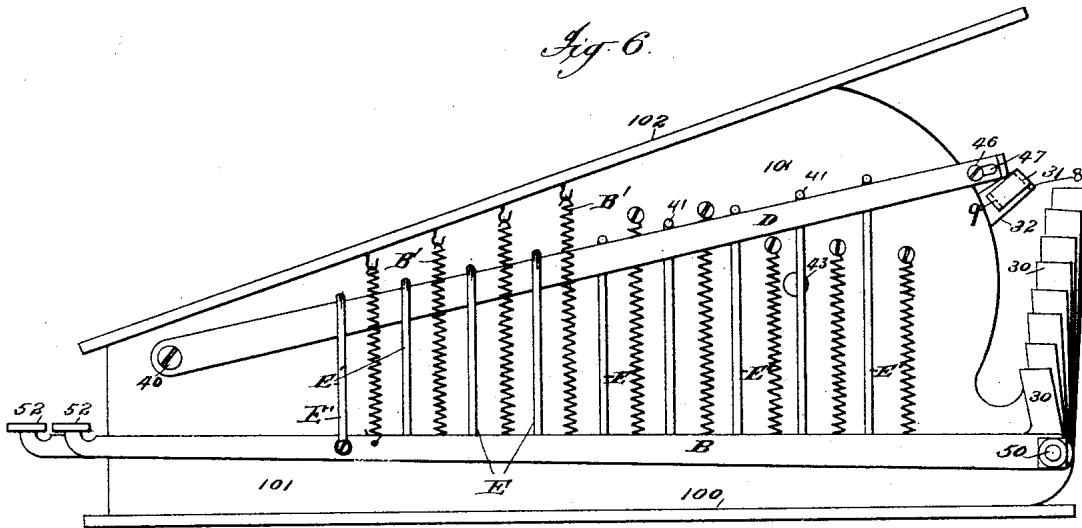
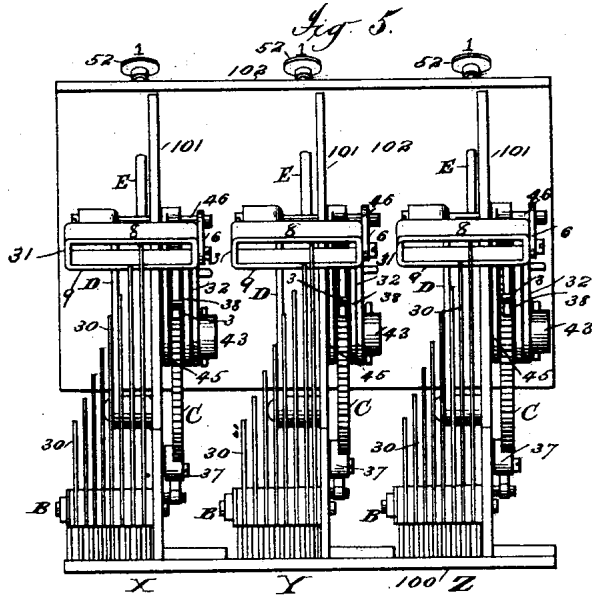
Attest:
Geo. H. Botts
Nellie Marler

Inventor
John B. Benton
 by *Geo. H. Graham*
Atty.

J. B. BENTON.
REGISTER AND CALCULATOR.

No. 511,322.

Patented Dec. 26, 1893.



Attest:
 Geo. H. Kells
 Nettie Marlen

Inventor:
 John D. Benton
 by Geo. H. Graham
 Atty

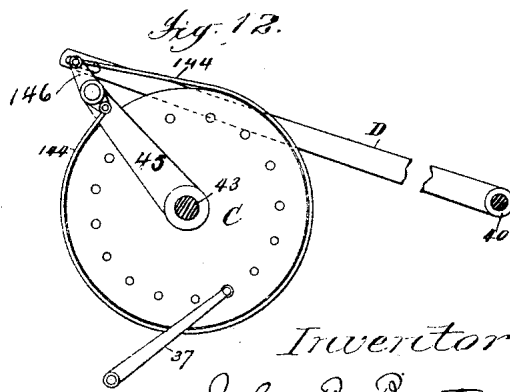
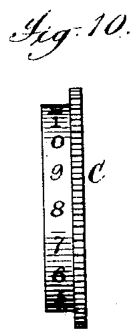
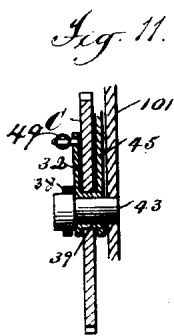
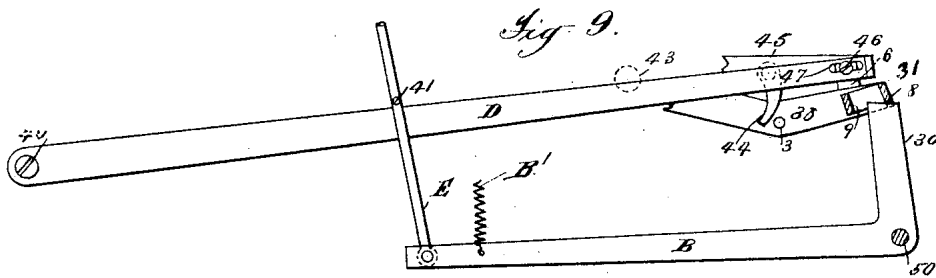
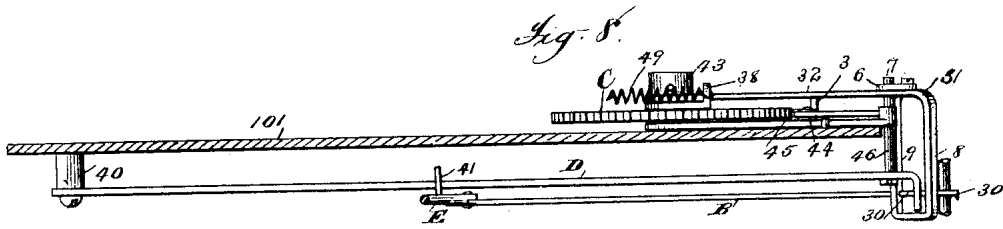
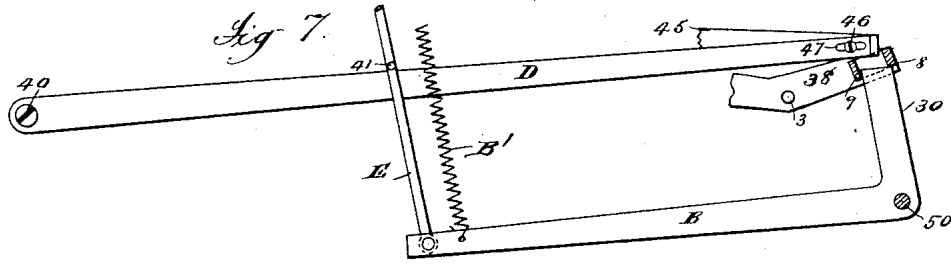
(No Model.)

4 Sheets—Sheet 4.

J. B. BENTON.
REGISTER AND CALCULATOR.

No. 511,322.

Patented Dec. 26, 1893.



Attest:
Geo. H. Potts,
Nettie Marler.

Inventor:
John B. Benton
 by *Geo. H. Potts*
 Atty.

UNITED STATES PATENT OFFICE.

JOHN B. BENTON, OF ELIZABETH, NEW JERSEY, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE NATIONAL CASH REGISTER COMPANY, OF DAYTON, OHIO.

REGISTER AND CALCULATOR.

SPECIFICATION forming part of Letters Patent No. 511,322, dated December 26, 1893.

Application filed November 2, 1889. Serial No. 329,042. (No model.)

To all whom it may concern:

Be it known that I, JOHN B. BENTON, a citizen of the United States, and a resident of Elizabeth, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Registers, of which the following is a specification.

The invention relates to that class of registering machines in which a series of operating keys of different values co-operate with a single registering wheel and turn the same different distances according to their respective values.

The object of the invention is to provide improved means for obtaining the varying movements of the wheel, and also to provide means for insuring accurate movement of the wheel under the operations of different keys and preventing improper or excessive movement of it under quick or violent operations of the machine. Its novelty consists in the new combinations, modes of operation and construction and arrangement of parts, which will be hereinafter set forth and specifically pointed out in the claims.

In the accompanying drawings Figure 1 is a top plan view of the machine; Fig. 2 an end elevation of the right hand side of the machine, with the side plate of the casing removed; Fig. 3 a corresponding view of the left hand side of the machine; Fig. 4 a view corresponding to Fig. 2, with one of the operating keys depressed; Fig. 5 a rear elevation of the machine; Fig. 6 a side elevation of the right hand side of the machine, showing a modification in the construction; Fig. 7 a detail view showing the main actuating lever and associated parts in the position they occupy when one of the operating keys is depressed; Fig. 8 a detail plan view of the same parts and the registering wheel; Fig. 9 a detail view corresponding to Fig. 7, with the parts in the position they occupy just before the operated key reaches the limit of its stroke, or just after it has started backward upon its return stroke; Fig. 10 a detail view of a modified form of registering wheel; Fig. 11 a sectional detail of the registering wheel and associated parts on the line 11—11 of Fig. 3; and Fig. 12 a detail side elevation show-

ing a modified form of registering wheel and connections between it and the actuating lever.

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

The machine may contain as many sets or series of operating keys as are desired, each set of keys and its associated devices constituting a distinct mechanism. In the present instance, as seen in Fig. 1, there are three sets of keys, X, Y, Z, each set containing nine keys, and the keys of each set being numbered to represent the nine digits or multiples thereof in ten, the keys of the set X representing in this instance units of cents, those of the set Y tens of cents, and those of the set Z units of dollars. These keys, under the construction shown in the first five figures of the drawings, consist of stems E passed through and guided in apertures in the top plate 102 of the casing, and provided upon their outer ends with the numbered buttons 52. At their lower ends the keys are pivoted respectively to the front ends of a series of bell-crank levers B hung at their rear ends upon a rod 50 supported by a vertical plate 101 of the framework, the vertical rear ends of the levers above the rod 50 being numbered 30 in the drawings. The front ends of the levers B are held from lateral play by vertical guide pins C' upon the base plate of the machine. It results from this construction that whenever any one of the keys is depressed the vertical arm 30 of its connected bell-crank will be thrown forward, for a purpose hereinafter explained. Pivoted at its front end to a support upon the plate 101 is the main actuating lever D, there being one of these levers for each set of keys and extending rearward beside the stems thereof. The stems of the keys are provided with laterally projecting pins 41 adapted to contact with the lever D when the keys are depressed and carry the lever down with them. These pins will engage the lever at different distances from its fulcrum 40, and consequently the substantially uniform movements of the keys will impart different movements to the lever, the arrangement and adjustment of the parts being such that when-

ever any key is depressed to its limit of movement it will move the lever D just far enough to impart to the registering device a movement sufficient to add upon it the value of such operated key. The keys and the bell-cranks B are yieldingly held in normal position by coiled springs B' connected at their lower ends to the bell-cranks and at their upper ends to the top plate 102 and side plate 101.

The actuating devices for the registering mechanism having been now described, the particular form of that mechanism which has been illustrated in the drawings may now be explained. Loosely mounted upon a stud 43 secured to and projecting laterally from the frame plate 101, Figs. 3 and 5, is a toothed wheel C, which may be either simply a gear wheel meshing with a pinion "F" fast upon the side of the primary wheel F of a train of registering wheels, or may itself be the primary registering wheel as seen in Fig. 10. In the present instance this wheel is not mounted directly upon the stud 43 but upon a sleeve 39, Fig. 11, which is itself loosely mounted upon the stud and has secured to or formed integral with it the rearwardly extending pawl-carrying arm 45 lying between the wheel C and the vertical frame-plate 101. At its opposite end the sleeve 39 carries an upwardly extending arm 32 to which is connected a coiled spring 49, Fig. 3, which yieldingly holds the pawl arm 45 in its normal position against the stop pin 48. The pawl-arm 45 has pivoted to it an actuating pawl 44 pressed against the wheel C by a suitable spring. The rearward end of the pawl-arm 45 is connected to the rearward end of the actuating lever D, upon the opposite side of the frame plate 101, by means of a pin 46 carried by the arm 45 and projecting through a slot 47 in the lever D, Figs. 4 to 9, the slot in the lever D permitting the movements of the ends of the arm 45 and lever D in different arcs.

It is evident that the end of either the lever D or the pawl-carrying arm 45 might be extended laterally to co-operate with the upper ends of the arms 30, but in the present instance I employ a special stop arm for that purpose. This arm 38 is loosely hung upon the stud 43 beside the arm 45 before referred to, and extends rearward into proximity with the front ends of the arm 45 and lever D. It is loosely connected with the arm 45 by means of a slotted link 6 pivoted at its lower end to the arm 38 and having a pin 7 upon the arm 45 passed through the slot in its upper end. This connection between the arms 38 and 45 permits slight independent movement of them and consequently independent movement of the arm 38 and lever D, the latter moving with the arm 45. The arm 38 has secured to or formed integral with its rear end a laterally projecting stop-frame 31, Figs. 2, 5, 7, 8, and 9, which consists of two parallel horizontal bars 8 and 9 and a connecting end bar.

The bar 9 of this frame underlies the end of the lever D so that whenever said lever is depressed the stop-frame is carried downward with it, but in the normal position of the parts the end of the lever D rests slightly above the bar 9 so that the lever has a slight downward movement independent of the stop-frame. This stop-frame co-operates with the upper ends of the arms 30, its position being such that whenever the lever D is depressed by the operation of a key the bar 8 of the frame will contact with the upper end of the arm 30 moved by such key, while the bar 9 will pass downward in front of the upper end of such arm 30 and limit its forward movement, as seen in Fig. 7.

The arm 38 carries a laterally projecting stud or pin 3 which co-operates with the actuating pawl 44 to lock the same in engagement with the wheel C at the end of the registering stroke of the parts and thereby prevent any excess of movement of said wheel due to its own momentum. As seen in Fig. 3 when the parts are in normal position the pin 3 and pawl 44 are not in contact with each other, but when the stop-frame 31 and arm 38 are arrested by contact with the upper end of one of the arms 30, just before the registering stroke of the lever D is completed, the farther downward movement of the lever D, which is permitted by the slot and pin connection with the arm 38 as heretofore explained, will cause the pawl 44 to bear against the pin 3 and be thereby firmly forced into the notch of the wheel C with which it was engaged and held in engagement therewith, so that it will not be possible for the wheel C to move any farther than the pawl itself moves. Inasmuch as it has been explained that the stop arms 30 of the bell-cranks absolutely prevent any excess of movement of the lever D and consequently of the pawl, and inasmuch as the stop pin 3 upon the arm 38 prevents any movement of the wheel C independent of the pawl and actuating lever, it will be readily seen that any overthrow or improper movement of the registering wheel is impossible.

At the beginning of the return upward stroke of the parts the lever D and pawl-arm 45 will be first slightly lifted independently of the arm 38, Fig. 9, (while the pin 7 is traveling through the length of the slot in the link 6,) so that the pawl 44 will be carried away from the pin 3 and will be free to slip idly upward over the teeth of the wheel C, its spring yielding to permit such movement. A stop pawl 37 engaging the wheel C at its lower side prevents backward movement of the wheel.

The arms 30 of the bell-cranks are of such graduated lengths that they will arrest the lever D when it has been given its full proper movement by the depression of the keys, so that no matter how quickly or violently a key may be depressed the lever D will be given only the proper movement.

The numbers upon the adding wheels F are

exposed to view through sight openings F' on the top plate of the casing, Fig. 1, and these wheels may be indirectly geared in a suitable manner to trains of adding wheels F², (shown in dotted lines in Fig. 3,) the numbers upon which wheels may be exposed to view through suitable openings F³ in the top plate of the casing, Fig. 1.

It will be understood that the novel means which I have provided for causing the uniform movements of the keys to transmit different movements to the registering wheel, and also the novel means for positively preventing excessive movement of such wheel, are applicable to other styles of machines than that illustrated in the drawings, and may themselves be considerably varied without departing from my invention. Thus, in Fig. 6 the independent operating keys E are dispensed with and the numbered finger buttons are applied directly to the extended front ends of the bell-cranks B, the latter being connected to the actuating lever D by a series of links E', this modification in construction leaving the general mode of operation of the machine substantially the same as heretofore described.

Again, the particular form of connection between the actuating lever D and registering wheel may be varied while still retaining the means I have provided for producing the different movements of such wheel. In Fig. 12 the lever D is shown connected with the registering wheel by a friction strap 144 which surrounds the wheel and is connected at its opposite ends to the opposite ends of a lever 146 pivoted to an arm 45 hung upon the stud 43 and corresponding to the pawl-carrying arm 45 heretofore described, the outer end of said arm being connected by a slot and pin with the front end of the lever D. When said lever is depressed by the operation of a key the lever 146 will be so rocked upon the arm 45 as to cause the friction strap 144 to grip the registering wheel and turn it as the lever D moves downward; while at the return upward movement of the lever D the lever 146 will be rocked in the opposite direction and the strap 144 loosened and caused to release its grip upon the wheel and slip idly backward over its periphery, a suitable holding pawl 37 engaging recesses in the side of the wheel serving to prevent backward movement of the latter.

Some features of my invention, more particularly the means for producing the varying movement of the wheel from the uniform movement of the keys, are applicable to other machines than registering machines, as for instance in machines in which the wheel to be moved or set is an indicator or type-wheel, instead of a registering wheel, as will be readily understood.

Having thus fully described my invention, I claim—

1. The combination of an actuating lever, a series of keys of different values having

uniform strokes and co-operating with the lever at different distances from its fulcrum, to move the lever different degrees, and a series of independent graduated stops directly connected to the respective keys and set by the operations thereof to positively arrest the lever, substantially as described. 70

2. The combination of an actuating lever, a series of keys of different values having uniform strokes and co-operating with the lever to move it different degrees, and a series of bell-crank stop-levers one for each key pivoted on a common axis and moved by the keys into position to arrest the actuating lever at different points, substantially as described. 80

3. The combination of the actuating lever D, the bell-crank levers B pivoted on the rod 50 and having the stop-arms 30 movable into the path of the lever D, and the series of operating keys of different values for moving the lever D and bell-cranks B, substantially as described. 85

4. The combination of the actuating lever D, the bell-crank levers B pivoted on the rod 50 and having the stop-arms 30, and the sliding keys F connected to the levers B and co-operating with the lever D, substantially as described. 90

5. In a register, the combination of a plurality of key-levers having limiting stops of different lengths, a registering wheel, a pawl-carrying arm, hung upon the axis of the wheel, an arm carrying a guard pin for the pawl also hung upon the axis of the wheel and loosely connected with the pawl-carrying arm, and an actuating lever interposed between the pawl-carrying arm and the key-levers, substantially as described. 95

6. In a register, the combination of a plurality of key-levers having limiting stops of different lengths, a registering wheel, a pawl carrying arm, hung upon the axis of the wheel, an arm carrying a guard pin for the pawl, also hung upon the axis of the wheel and loosely connected with the pawl-carrying arm, an actuating lever, and a plurality of arms connecting the key-levers with the actuating lever, substantially as described. 100

7. In a register, the combination of a plurality of key-levers having limiting stops of different lengths, an auxiliary limiting stop composed of a pair of strips 8, 9, and an actuating lever, substantially as described. 105

8. In a register, the combination of a plurality of key-levers having limiting stops of different lengths, an auxiliary limiting stop composed of a pair of strips 8, 9, an actuating lever, and a plurality of arms connecting the key-levers with the actuating lever, substantially as described. 110

9. The combination, with the toothed wheel C, of the pawl-arm 45 carrying the pawl 44, the arm 38 loosely connected to the arm 45 and having the projection 3 co-operating with the pawl, and a stop for limiting the movement of the arm 38, substantially as described. 115

120

10. The combination, with the toothed wheel
C, of the pawl-arm 45 carrying the pawl 44,
the arm 38 connected to the arm 45 by the
slotted link 6 and pin 7 and provided with the
5 projection 3 co-operating with the pawl 44,
and a series of graduated stops for limiting
the movement of the arm 38, substantially as
described.

Signed at New York, in the county of New
York and State of New York, this 22d day of 10
August, A. D. 1889.

JOHN B. BENTON.

Witnesses:

EDWD. K. ANDERTON,
GEO. H. GRAHAM.