No. 876,196. PATENTED JAN. 7, 1908.

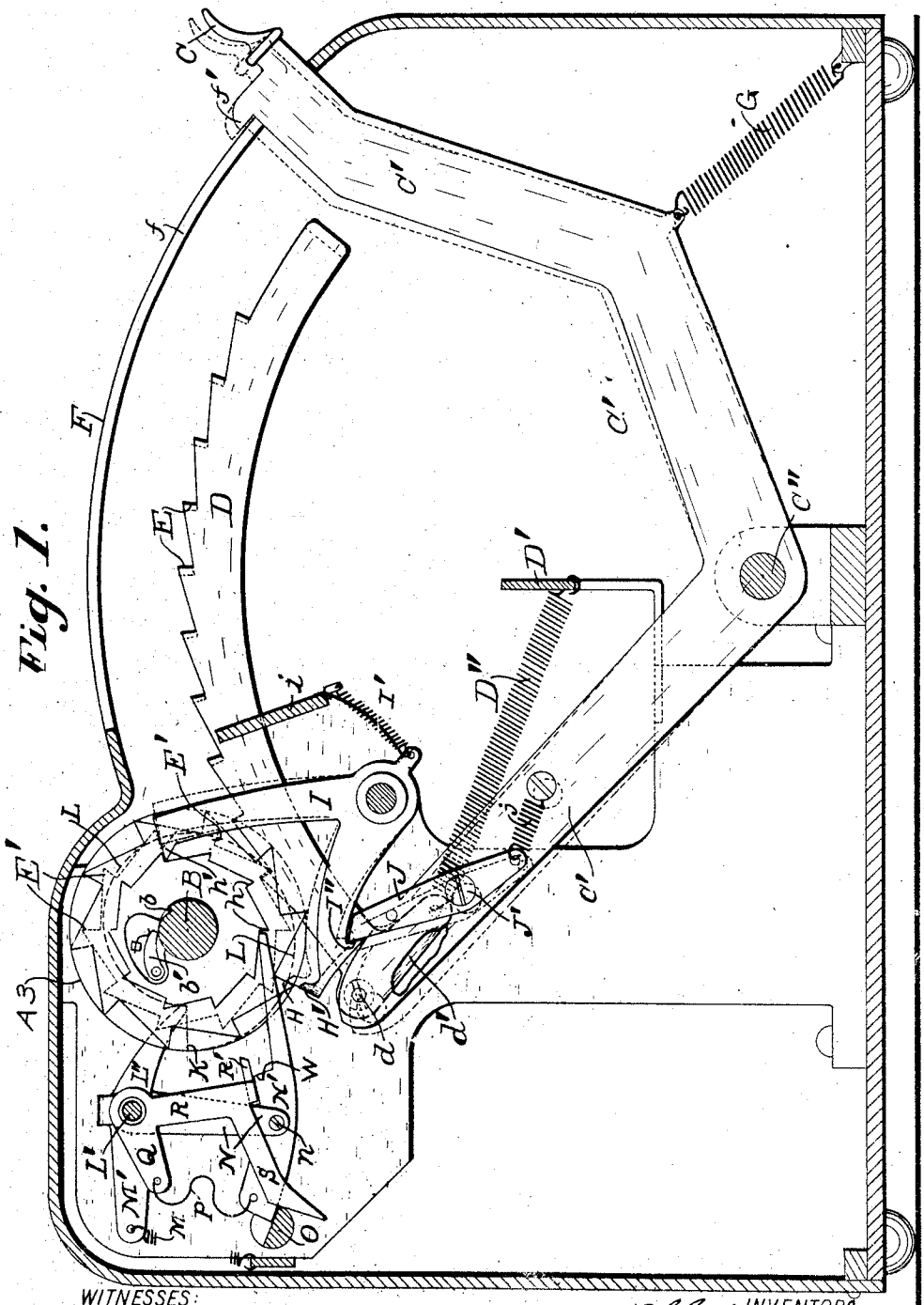
A. J. KLUMB & A. W. KRAHN.

ADDING MACHINE.

APPLICATION FILED JULY 29, 1905.

4 SHEETS—SHEET 1.

Fig. 1.



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4 SHEETS—SHEET 2.

Fig. 2.

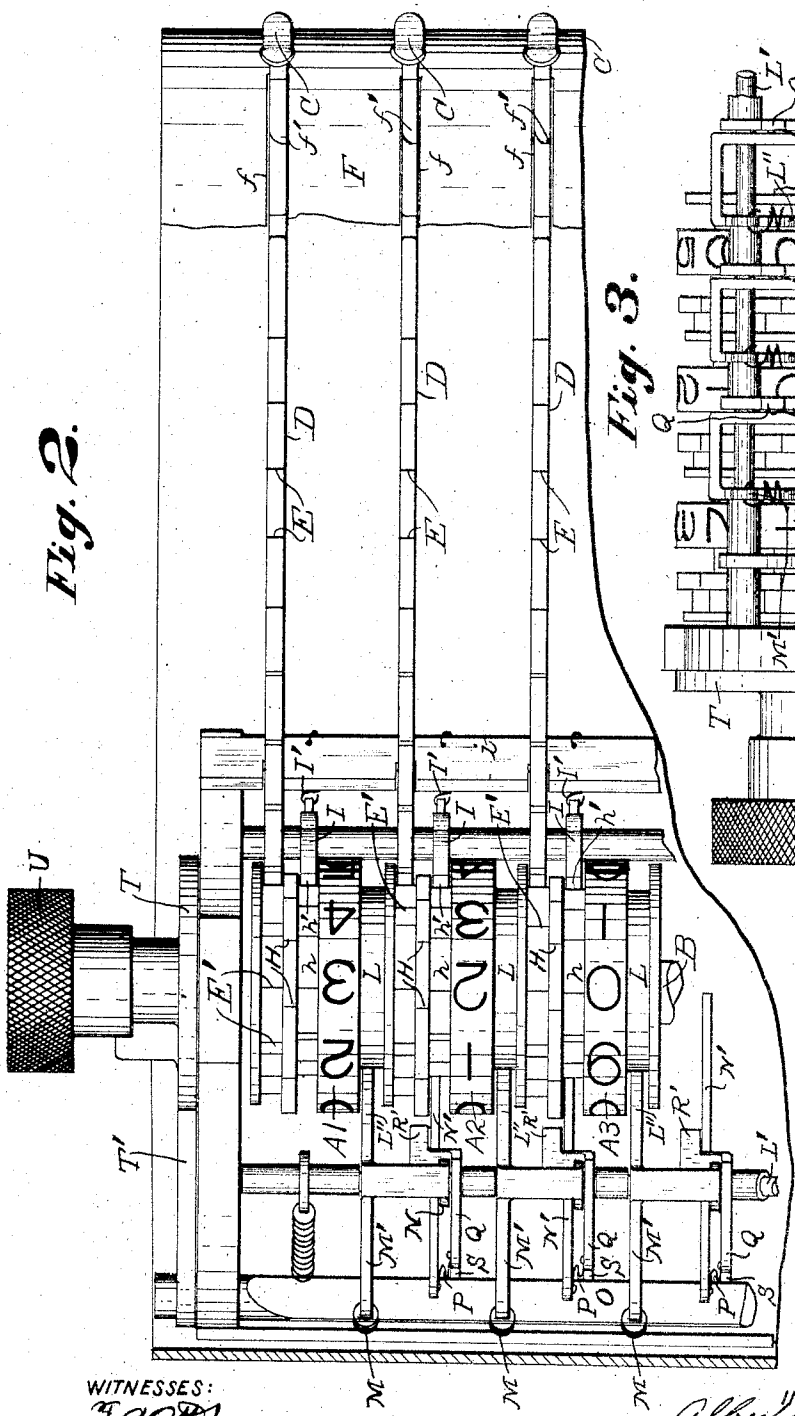
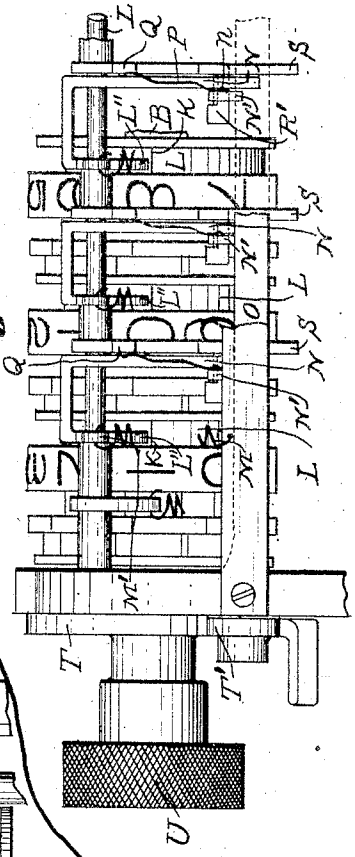


Fig. 3.



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4 SHEETS—SHEET 3.

Fig. 4.

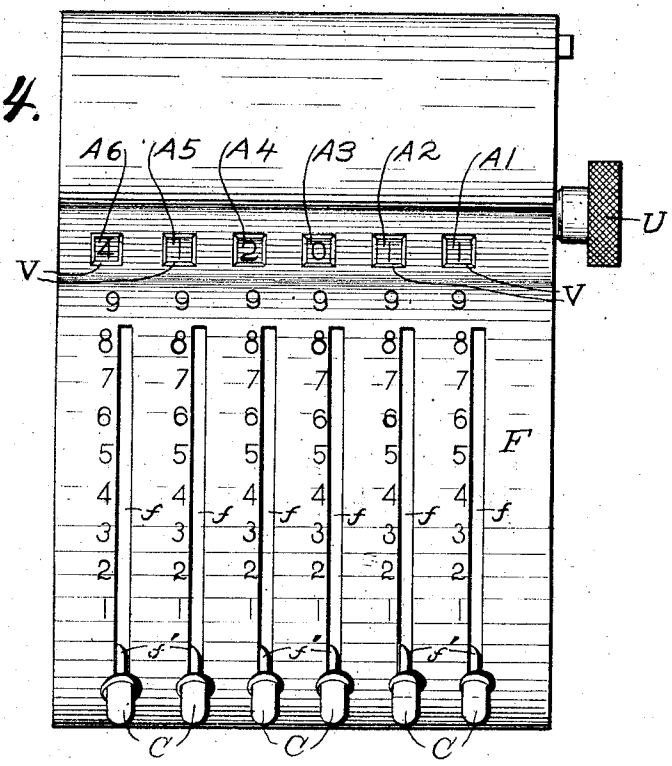
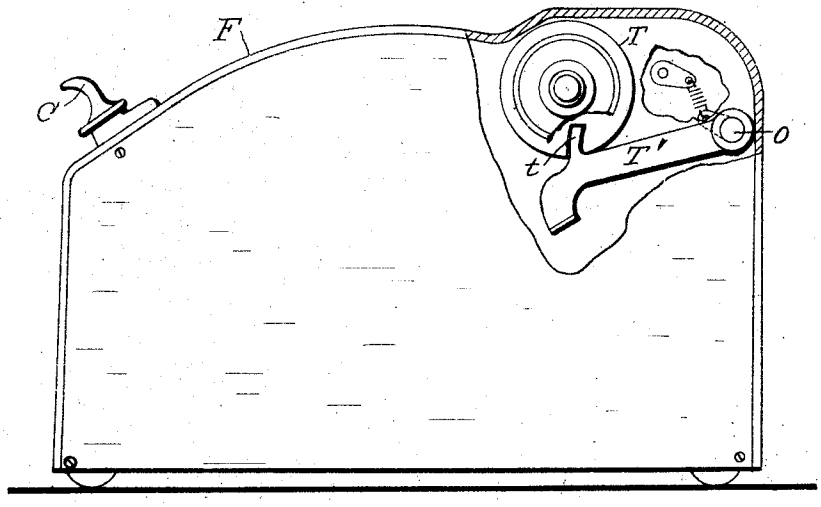


Fig. 5.



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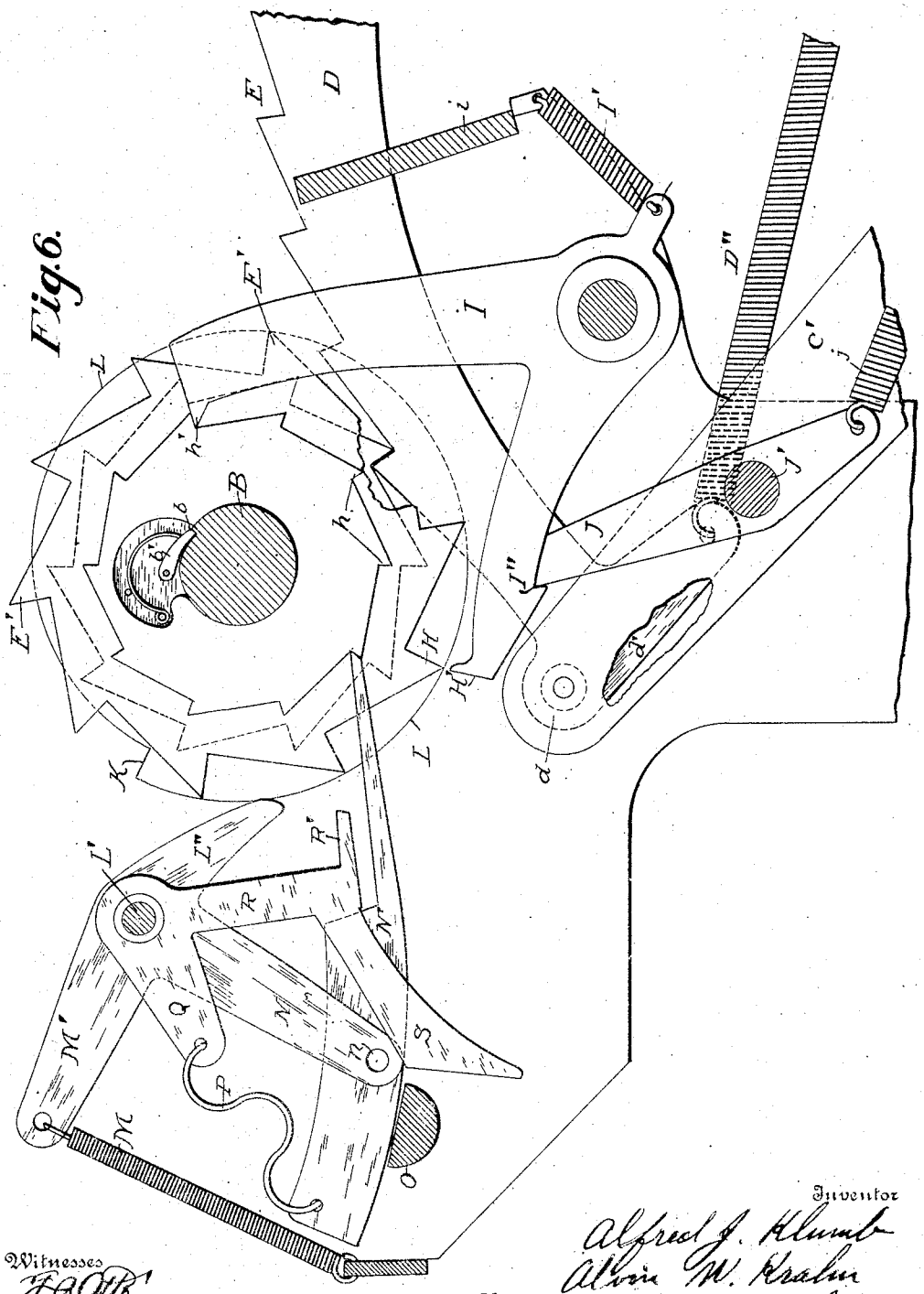
4 SHEETS—SHEET 4.

Fig. 6.



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UNITED STATES PATENT OFFICE.

ALFRED J. KLUMB AND ALVIN W. KRAHN, OF MILWAUKEE, WISCONSIN.

ADDING-MACHINE.

No. 876,196. Specification of Letters Patent. Patented Jan. 7, 1908.

Application filed July 29, 1905. Serial No. 271,731.

To all whom it may concern:

Be it known that ALFRED J. KLUMB and ALVIN W. KRAHN, citizens of the United States, residing at Milwaukee, county of Milwaukee, and State of Wisconsin, have invented new and useful Improvements in Adding-Machines, of which the following is a specification.

Our invention relates to improvements in adding machines.

The object of our invention is to provide a compact simple structure of few parts and correspondingly light weight which can readily be carried from place to place, whereby the machine is adapted for use by lumber scalers and others, whose duties require that the computing process be performed at different points.

In the following description reference is had to the accompanying drawings, in which

Figure 1 is a vertical sectional view of our invention drawn between two of the registering wheels. Fig. 2 is a plan view of a portion of the machine with a portion of the casing removed. Fig. 3 is a detail view in rear elevation of some of the transferring mechanisms in their relation to the registering wheels. Fig. 4 is a general plan view of my invention. Fig. 5 is a general side view with the casing partially broken away, illustrating the releasing lever of the resetting mechanism. Fig. 6 is an enlarged view drawn to the same plane as Fig. 1, but showing the transferring mechanism as it appears preparatory to a transferring stroke, while in Fig. 1, it is shown at the end of such stroke. In Fig. 6 one of the ratchet teeth E′ is preferably broken away to show the engagement of the teeth E with the ratchet member E′.

Like parts are identified by the same reference characters throughout the several views.

The registering wheels A^1 to A^6 inclusive are each provided with digits ranging from zero to nine inclusive, and each of these registering wheels is mounted to rotate independently in one direction on a shaft B. The shaft B is provided with notches *b* in which a dog *b′* carried by each registering wheel is adapted to drop once during each revolution, so that by turning the shaft, all the registering wheels may be brought into a uniform relation to each other, and the wheels reset at zero. Each of the wheels may be independently operated from a key C by means of an elbowed lever C′ pivoted to the frame at C″ and having a segmental rack D pivoted at *d* to the inner end of the lever C′. The rack D is provided with a downwardly projecting arm *d′*, which is connected with a frame bar D′ by a spring D″. The reactionary pull of this spring lifts the rack bar D upwardly and brings its teeth E into yielding engagement with the teeth E′ of the ratchet hub carried by the corresponding registering wheel.

It will be observed that the rack D projects forwardly from the pivot pin *d* into close proximity with the front end of the elbowed lever C′. The bar curves in an arc described from the pivot C″ of the elbow lever C′ and a key board F covering the rack bars is provided with slots *f* through which the levers C′ project. The key board is provided with a row of digits for each lever ranging from one to nine inclusive and corresponding in relative position with the teeth E of a rack bar D and with the digits on the respective registering wheel. The lever C′ is normally in zero position. It carries an index *f″* which is brought into registry with a digit on the key board (representing the number to be added) by swinging the lever C′ on its pivot C″. The motion of the lever in such cases is communicated to move the rack bar D backwardly. When the lever is released, the reaction of a spring G retracts the lever and the teeth E of the rack bar engage and actuate the ratchet and corresponding registering wheel. Each of the registering wheels is provided with a hub having three ratchet members. The ratchet teeth E′ are engaged by the teeth E of rack bar D. Ratchet teeth H on the hub are adapted to be engaged by a stop H′ designed to prevent over-rotation and operated as hereinafter explained. Ratchet teeth *h* are adapted to be engaged by a stop dog *h′* carried by an elbow lever I and actuated by a spring I′, connected with a cross bar *i*, which also operates as a spacer for the rack bars D. The teeth *h* are also engaged and actuated by a transferring mechanism as hereinafter explained. All the teeth are rigidly connected with the hub of the corresponding registering wheel, the movement of which is thereby controlled.

The stop H′ is carried by one arm of the elbow lever I. This arm of the elbow lever is provided with a projecting tooth I″ which is struck by a bar J pivoted to the lever C′ at J′, and arranged, and held by a spring *j* in a position, to strike the tooth I″ during the final return stroke of the lever C′, whereby

the dog H′ is momentarily pushed into a position to engage one of the teeth H and check the momentum of the registering wheel and ratchets. When the bar J has pushed the stop H′ into this position, as indicated by dotted lines in Fig. 1, it snaps past the tooth I″ to the position in which it is shown in full in said figure. When the lever C′ is again actuated, the bar J swings upon its pivot until it clears the tooth I″ and then moves rearwardly with the lever and reassumes its normal relation thereto, so that it will again strike the tooth I″ on its return stroke. The spring I′ normally holds the dog H′ out of engagement with the ratchet teeth.

Any suitable transferring mechanism may be employed. In the construction shown, each of the registering wheels is provided with a cam disk L. A lever pivoted on a suitable shaft L′ has one arm L″ projecting into engagement with the cam L, whereby, as the cam is rotated with the registering wheel, the arm L″ is pushed backwardly by the cam, and then released suddenly as it clears the shoulder K of the cam, whereupon the lever reacts under the pull of the spring M connecting the arm M′ of the lever with the frame of the machine. Another arm N of the lever carries a pawl N′ pivotally connected with the arm N at *n* and adapted to engage the teeth *h* on the hub of the next succeeding registering wheel. The rear end of the pawl N′ moves slidingly on a guide bar O and a spring P presses downwardly on this end of the pawl, whereby the other end is held in contact with the ratchet teeth *h*.

It will be observed that the spring P connects the rear end of the pawl N′ with an arm Q of a swinging stop bar R, the latter having a hook shaped member R′ adapted to be swung into the path of the teeth H on the corresponding hub of a registering wheel. During the reactionary movement of the cam actuated lever under the reaction of the spring M, a shoulder W on the pawl N′ momentarily engages the member R′ and swings it into position to catch one of the teeth H and stop the rotation of the ratchet hub, thus limiting the movement of the registering wheel under the impulse imparted by the pawl N′. The spring P presses upon the arm Q with sufficient tension to restore the stop member R′ to normal position when a member S, connected with the bar R, is brought in contact with the guide bar O.

In operation, the right hand column of digits on the key board F represents units; (see Fig. 4), the next columns, tens; the next, hundreds, etc. Assuming that the number 654 is to be added, the lever C′ corresponding with the hundreds column will be moved until its index registers with the digit 6 on the key board. The lever corresponding with the tens column will be moved up until its index registers with the digit 5 on the key board. The right hand lever is moved up until its index registers with the number 4 on the key board. Each of the levers returns to normal position as soon as released under the reactionary pull exerted by the springs G and D″. The levers may be actuated in any desired order.

The shaft B, on which the registering wheels are mounted, is provided with an end disk T having a notch therein adapted for the reception of a catch *t* on a spring actuated lever T′ at one side of the machine. When it is desired to reset the registering wheels, this lever T′ is depressed and the shaft turned by means of a knob U thereon, whereupon the dogs *b′* of the several registering wheels drop into the notches *b* in the shaft and lock the registering wheels to the shaft, so long as the shaft is turned in the direction of registering wheel movement. This movement is continued until the zero marks on all the registering wheels are brought to the sight apertures V in the casing, whereupon the catch *t* reëngages in the notch of the disk T and locks the shaft against further movement. The dogs *b′* and notches *b* are formed to release the registering wheels when the latter are independently advanced by the actuating lever C′ or by the transferring mechanism.

Having thus described our invention what we claim as new and desire to secure by Letters Patent is,

1. In a machine of the described class, the combination with a registering wheel, a ratchet hub connected therewith, a segmental rack bar in operative relation to the ratchet hub, and an actuating lever for operating the rack bar; of a pivotal stop adapted to engage teeth on the ratchet hub, but normally held out of engagement therewith; and a swinging device carried by said actuating lever, adapted to engage said stop during the retractive movement of the lever, whereby said stop is pushed into position for engagement with teeth on the ratchet hub; said swinging device being arranged to release said stop at the completion of such lever movement.

2. In a machine of the described class, the combination with a registering wheel provided with a ratchet hub; an actuating lever provided with a segmental rack bar adapted to communicate motion to the registering wheel through the ratchet hub; an oscillatory stop normally out of position for engagement with teeth on said ratchet hub, but arranged to be moved into the path of such teeth; a stop actuating member pivotally mounted on the actuating lever; a spring, controlling the normal position of said stop actuating member; and a projection on said stop adapted to be engaged by the stop actuating member when the lever is swung; said member being adapted to engage and pass said projection with

yielding pressure thereon during the movement of the lever, whereby said stop is momentarily pushed into position for engagement with teeth on the ratchet hub.

3. In a machine of the described class, the combination with a registering wheel provided with a ratchet hub; an actuating lever provided with a segmental rack bar adapted to communicate motion to the registering wheel through the ratchet hub; an oscillatory stop normally out of position for engagement with teeth on said ratchet hub, but arranged to be moved into the path of such teeth; a stop actuating member pivotally mounted on the actuating lever; a spring controlling the normal position of said stop actuating member; and a projection on said stop adapted to be engaged by the stop actuating member when the lever is swung; said member being adapted to engage and pass said projection with yielding pressure thereon during the movement of the lever, whereby said stop is momentarily pushed into position for engagement with teeth on the ratchet hub; together with another stop normally in contact with the teeth of the ratchet hub and adapted to prevent backward rotation.

4. In a machine of the described class, the combination of a lever having an intermediate pivotal fulcrum, and two upwardly divergent arms; a rack bar pivotally connected with one of said arms, and extending in the direction of the other arm; a ratchet member in operative relation to the rack bar; and a registering wheel operatively connected with the ratchet member; together with means for applying yielding pressure to the rack bar in the direction of the ratchet member.

5. In a machine of the described class, a key board provided with a series of slots, and having digits thereon arranged in rows substantially parallel to the slots; operating levers, one extending through each slot, and provided with an index for registry with the digits; registering wheels operatively connected with the levers; and springs for retracting the levers; said levers being normally at the outer ends of the slots and each set of digits being arranged on the key board in numerical order and increasing in value inwardly from the levers in normal position.

6. In a machine of the described class, the combination with a set of registering wheels; of a trip actuated transferring mechanism; and a swinging stop normally in inoperative position, and adapted to be engaged by the transferring mechanism and swung momentarily to operative position during the transferring stroke; said transferring mechanism being adapted to release the stop on the completion of its stroke and said stop being arranged to return automatically to normal position.

In testimony whereof I affix my signature in the presence of two witnesses.

ALFRED J. KLUMB.
ALVIN W. KRAHN.

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