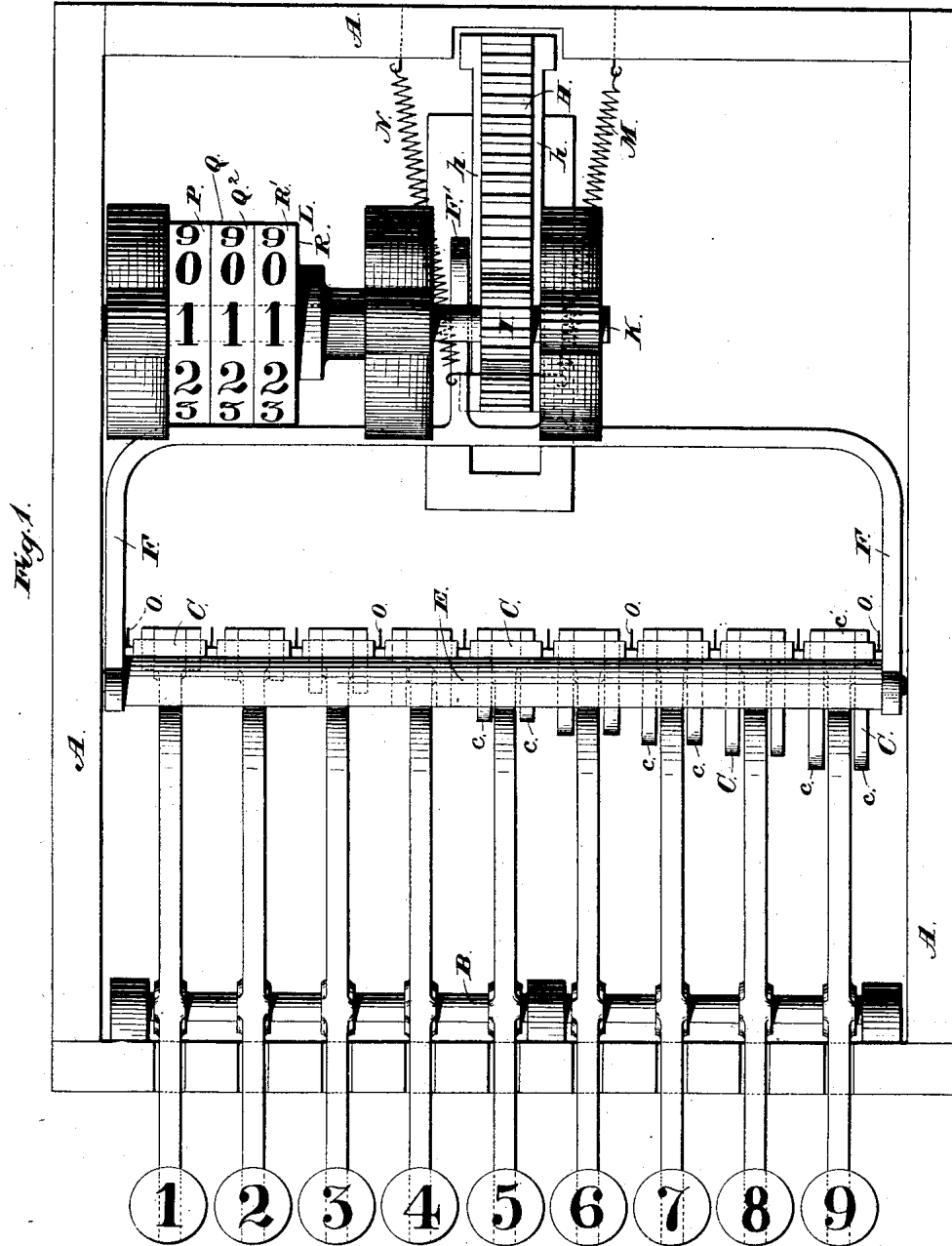


W. C. SNELLING.
ADDING MACHINE.

No. 257,775.

Patented May 9, 1882.



Witnesses.
Jas. E. Hutchinson
J. A. Rutherford

Inventor.
W. C. Snelling
 By his Attorney,
James L. Norris

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Fig. 2.

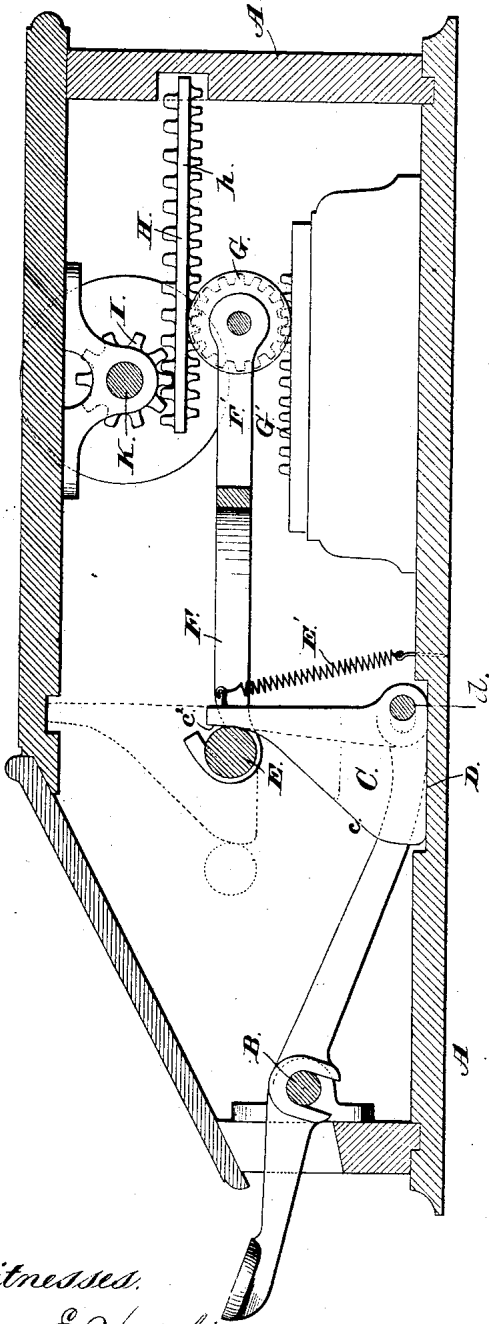
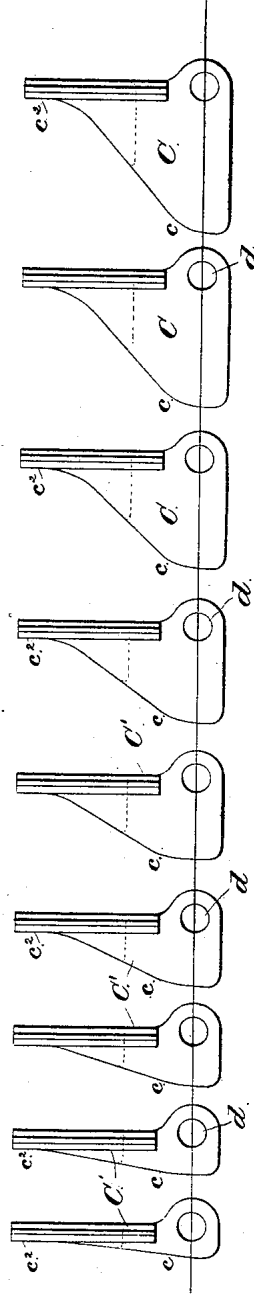


Fig. 3.



Witnesses.

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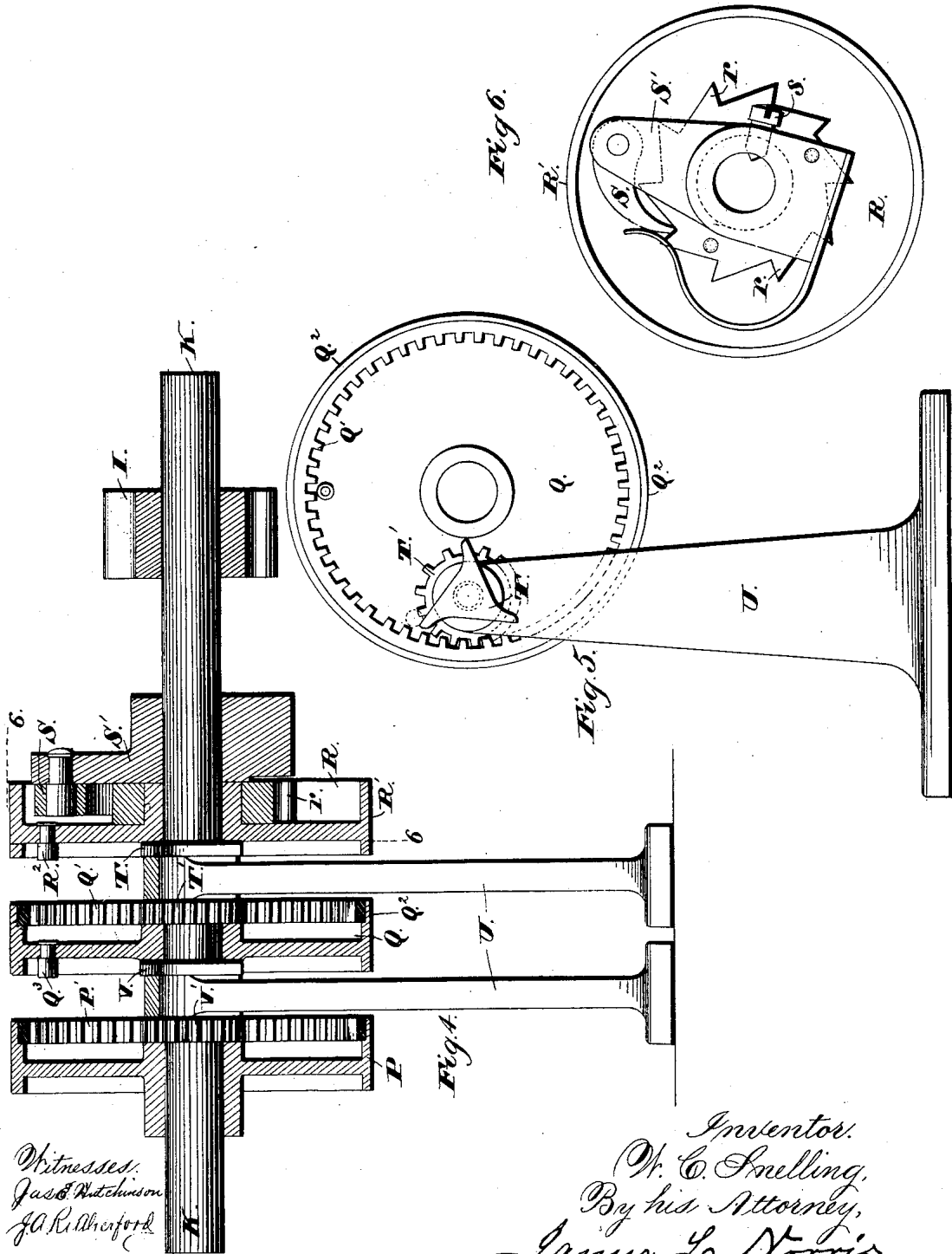
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UNITED STATES PATENT OFFICE.

WALTER C. SNELLING, OF NEW YORK, N. Y., ASSIGNOR TO RASTUS S. RANSOM, OF SAME PLACE.

ADDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 257,775, dated May 9, 1882.

Application filed March 16, 1882. (No model.)

To all whom it may concern:

Be it known that I, WALTER C. SNELLING, a citizen of the United States, residing at New York, in the county and State of New York, have invented new and useful Improvements in Adding-Machines, of which the following is a specification.

The object of the invention is to produce a simple, practical, and efficient machine for adding numbers. The value of such machines is well known. They insure absolute accuracy of addition and require no mental effort or skill on the part of the user. My invention consists in certain improved and novel organizations of apparatus which render the apparatus exceedingly simple and accurate, and which will be fully set forth.

In the accompanying drawings, Figure 1 is a plan view with the upper cover of the frame or case removed. Fig. 2 is a vertical longitudinal section. Fig. 3 shows the cams or inclines, one for each number from 1 to 9, for operating the registering mechanism. Fig. 4 is a side view of the units-wheel and the actuating-pawl on the register-shaft. Fig. 5 is a longitudinal sectional view through the registering mechanism, and Fig. 6 is a cross-section taken on the line 6 6 of Fig. 4.

A indicates the box or casing of the machine. A series of levers numbered from 1 to 9, inclusive, are pivoted on a shaft, B, which has its bearings in the front of the casing. The arms of the levers carrying the numbers project from the front of the box, while their other arms extend inwardly and carry at their extremities cams C. These cams are formed, as shown in Fig. 3, with two sides or parallel cam-edges, *c*, connected by a web or central part, *c'*. The inner ends of the levers are pivoted between these sides at *d*, as shown in Figs. 2 and 3. The cams, it will be noted, are of a somewhat right-angular shape, the point of pivoting to the levers being at or near the right-angle corner, and their bases normally resting in the transverse groove or recess D in the bottom of the frame. The inclined edges *C'* of the arms are on the sides toward the levers and extend from their bases to nearly the top, a short straight or vertical portion, *c''*, being preferably left at that point. A coiled spring,

E', extends from the top of each cam to the bottom of the case, as shown in Fig. 2. A shaft, E, extends across the front of the vertical portion *c''* of the cams, as in Figs. 1 and 2. Suitable friction-rollers, *e*, are arranged upon the shaft, so as to roll in contact with the inclined edges of the cams, as will be presently set forth. This shaft is carried in two arms, F F, which curve inward and backward to the two rear extensions, F' F', thereof. A cog-wheel, G, is mounted between these arms F' F', and gears with a horizontal rack, G', beneath it, which is supported from the bottom of the case. This wheel G also gears with and actuates the traveling or reciprocating rack H, which gears with the cog-wheel I, fast on the end of the shaft K, mounted in bearings in the case of the registering mechanism L. The rack is formed with a flange, *h*, on each side, which run on ways or guides *h'*, which support it as it travels back and forth. Two coiled springs, M and N, extend from the forward end of the rack H to the back of the case, and tend always to hold the rack in and draw it back to its normal position. (Shown in Figs. 1 75 and 2.)

It will be seen that when any one of the numbered levers is depressed its inner end will rise, throwing the inclined edge of its cam against the shaft E. This draws the shaft forward, and with it the cog G, which moves the rack H forward a given distance or number of teeth, thus rotating the cog I on the shaft of the registering mechanism a given number of teeth. The upper teeth of the rack H, which gear with the registering-pinion, are preferably made larger than the lower teeth, which gear with pinion G. The register-wheel I is formed with ten teeth, as will be understood.

The inclined edges *C'* of the cams are so proportioned and regulated relative to the gearing and parts of the machine that the depression of each lever will cause the rack H to travel forward a sufficient distance to indicate the number of that lever on the registering mechanism, as will presently be explained.

Upon reference to Fig. 2 it will be seen that the eye or bearing in the extremity of each lever in which the cam is mounted is somewhat elongated to allow a slight play of the cam 100

therein. Owing to the character of the pivot-connection between the cam and lever, the cam is permitted to rock slightly. The spring which extends from the top of the cam to the bottom of the case keeps the parts under tension, and serves to return the lever to position after it has been struck. I prefer to make the parts in this way, so as to allow a slight play and give elasticity thereto. In dotted lines in Fig. 2, I have shown the position of one of the cams and the shaft E.

The shaft E and the arms F F and F' F' form a bail or frame for transmitting the motion of each lever, as described. When the apparatus is in its normal position, as in Fig. 2, the bail or the shaft F rests upon and is supported in place by the tops of the inclines of the several cams.

In order to insure the more perfect working of the apparatus, I place guides O O between the cams. These guides may extend from the bottom to the top of the case, and serve to retain the cams and ends of the levers in position. The registering mechanism will now be described.

Referring especially to Figs. 4, 5, and 6, a spring-pawl, S, carried by a head, S', which is rigidly set on the shaft K by a screw, s, engages with the teeth *r* on the hub *r'* of the units-wheel R. The teeth *r* are ten in number, and the pawl S rotates the wheel R as many teeth as the number of cogs the wheel I is rotated by the rack H, and this number will be indicated by the number on the face or periphery R' of the units-wheel R. A pin, R², on the face of the wheel opposite the side having the hub *r'* strikes an arm of a three-cornered wheel, T, once in each revolution. This three-cornered wheel is carried by a short shaft mounted in the upright U, and which carries at its opposite end a cog-wheel, T', of fifteen teeth, which gears with the internally-gear-ed rim Q' of the tens-wheel Q, which rim has fifty teeth. Thus one complete revolution of the wheel R will cause a one-third revolution of the three-cornered wheel T, which will move the cog-wheel T' five teeth and rotate the wheel Q one-tenth of its diameter, which rotation will be indicated by one of the ten figures on the periphery of the wheel Q. The hundreds-wheel P is moved one-tenth or one number for each complete rotation of the tens-wheel Q, in the same manner above described, by means of a pin, Q³, a three-cornered wheel, V, a cog-wheel, V', and the internally-gear-ed rim P' of the wheel.

The operation is as follows: Supposing the keys 5 and 6 to be depressed, when the key 5 is struck the cog-wheel I will rotate five

teeth, and this, by means of the pawl S, will partially rotate the units-wheel R, and indicate 5 on its face. The rack H and cog I are now returned to their normal position by the springs M and N, and the machine is ready to count the next number. Now, when the key 6 is struck the cog I will be rotated six teeth. This will move the units-wheel around, making one complete revolution for it and one tooth over. This one tooth will be indicated by the figure 1 on the units-wheel, while the units-wheel in its revolution has caused the pin R² to rotate the three-cornered wheel one-third, and has consequently indicated 1 on the tens-wheel. The face of the register will now indicate 11, the sum of 5 and 6. The operation is precisely the same, the counting continuing until the hundreds-wheel is caused to register. But the three wheels are shown; but the number may be increased, and they may be operated in precisely the same manner to register any desired number.

What I claim, and desire to secure by Letters Patent, is—

1. The combination of the numbered levers, the cams thereon, the operating bail or frame, the gearing, and the registering mechanism, substantially as set forth.

2. The combination of the levers, the cams, the operating-bail, its pinion, the racks G' and H, the register-wheel, the registering mechanism, and a spring for automatically returning the traveling rack to its normal position, substantially as set forth.

3. The combination of the numbered lever, its cam pivoted thereto, the operating bail or frame, and the spring which serves to restore the lever to its normal position, substantially as set forth.

4. The combination of the traveling operating bail or frame, mechanism for imparting to it a series of motions corresponding with and proportioned to a series of numbers, the pinion carried by the bail, the racks, the registering-pinion, and means for automatically returning the parts to normal position after the bail has been operated, substantially as set forth.

5. The combination of the levers, their cams, the operating bail or frame, and the guides in which the cams work, substantially as set forth.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

WALTER COMONFORT SNELLING.

Witnesses:

HENRY E. ROOSEVELT,
EDWARD J. KNAUER.