

(No Model.)

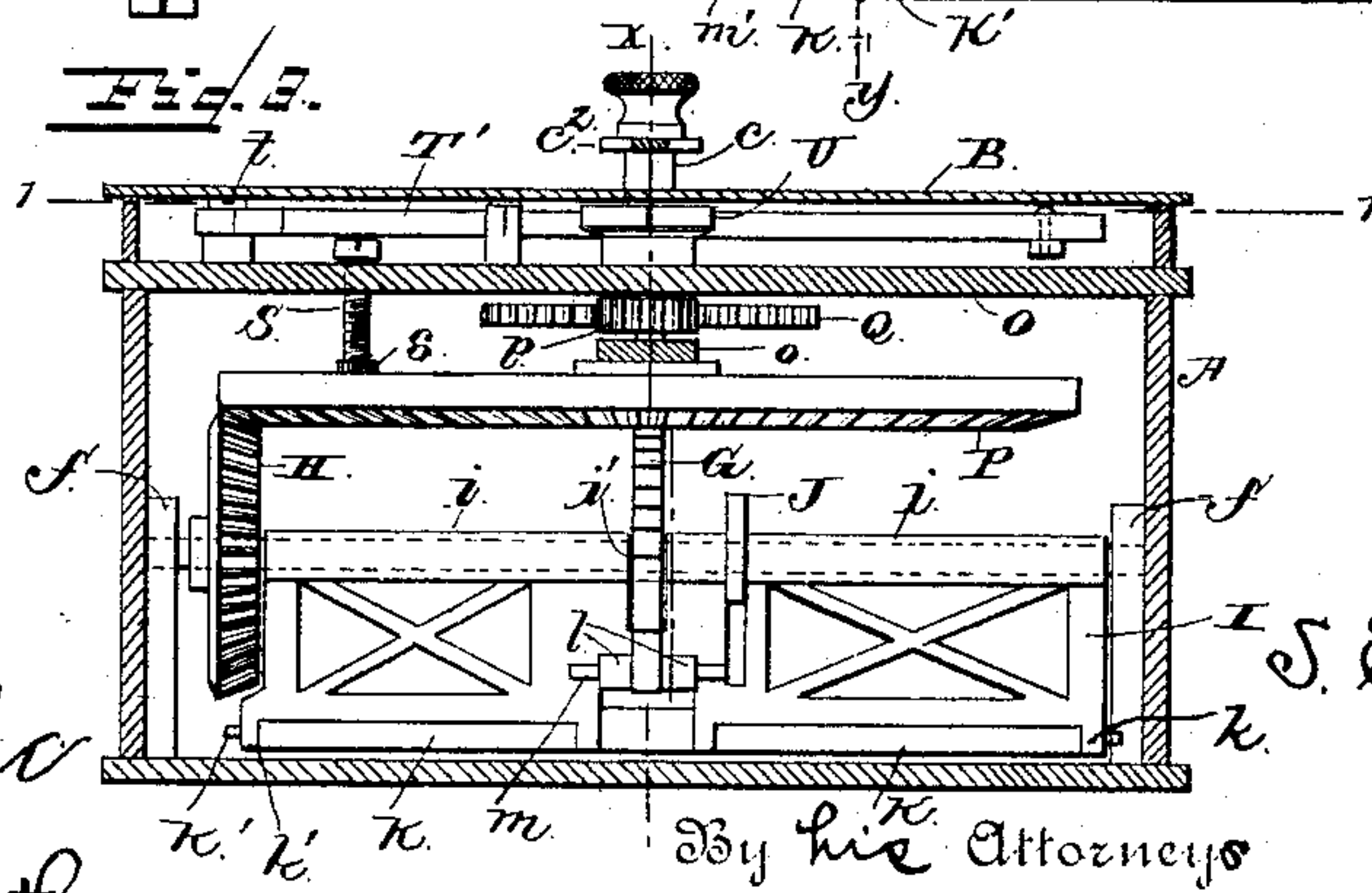
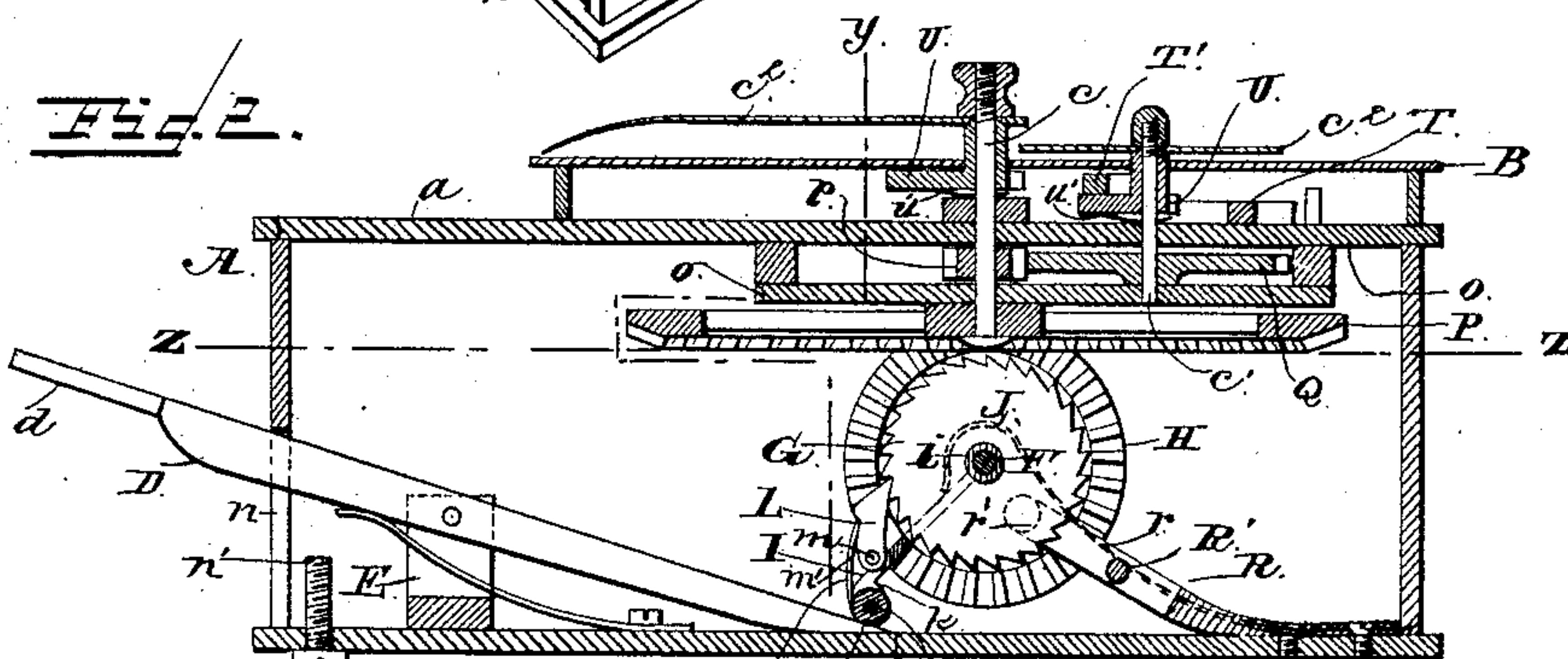
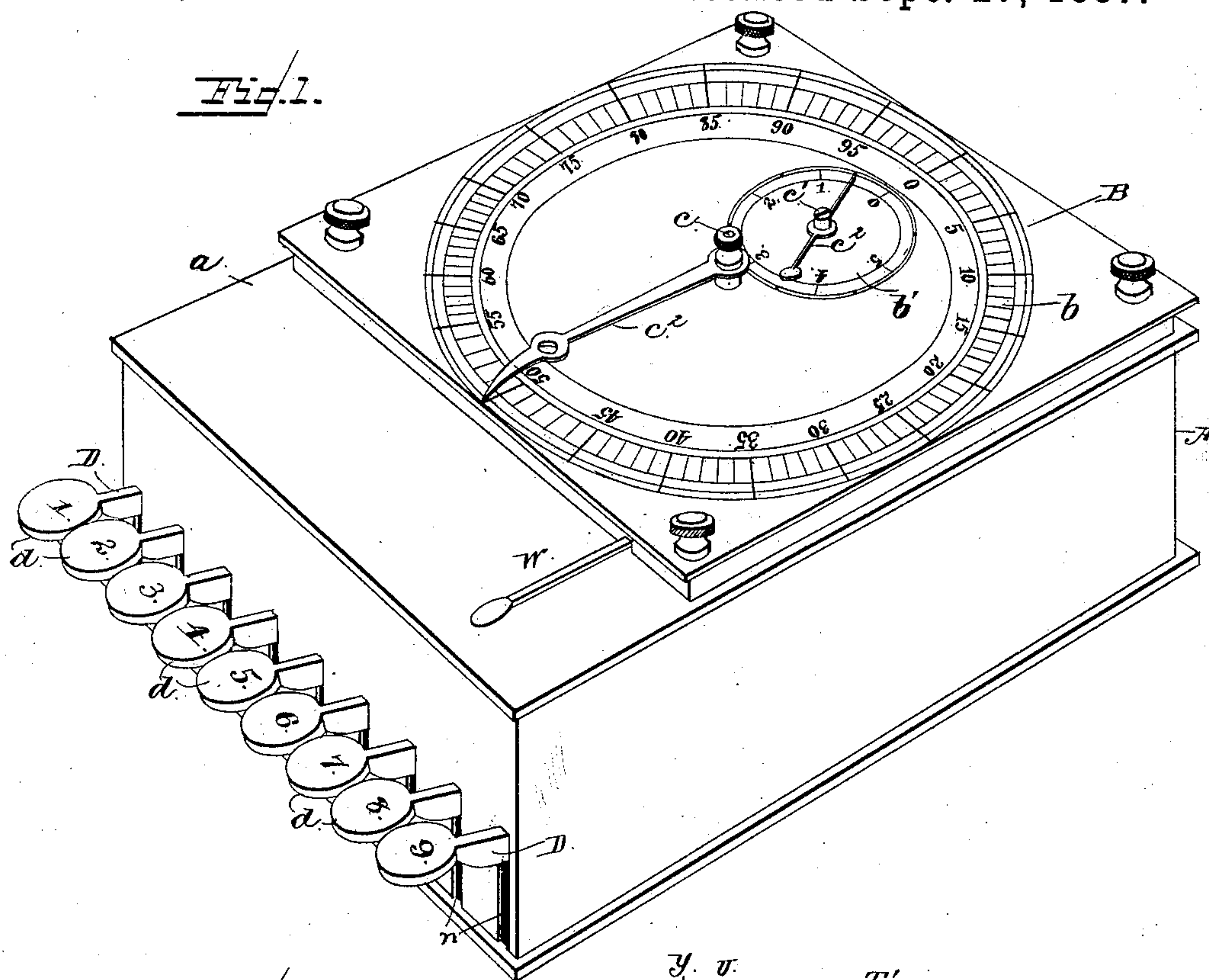
2 Sheets—Sheet 1.

S. E. AUSTIN.

ADDING MACHINE.

No. 370,719.

Patented Sept. 27, 1887.



Witnesses

M. E. Cowles
D. Bernhart

Inventor

J. E. Austin

By his Attorneys

C. A. Snowdon

(No Model.)

2 Sheets—Sheet 2.

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Fig. 4.

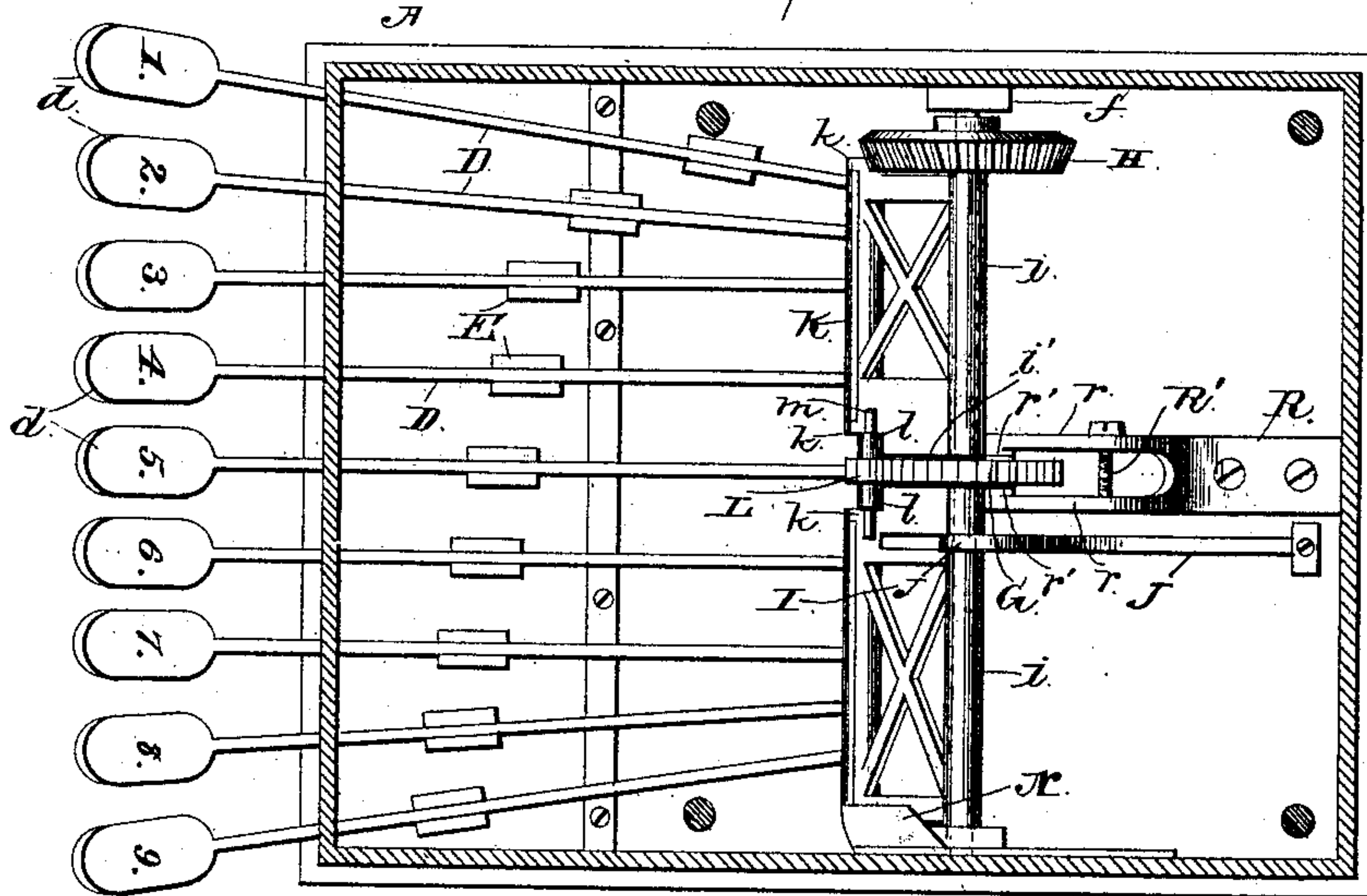


Fig. 5.

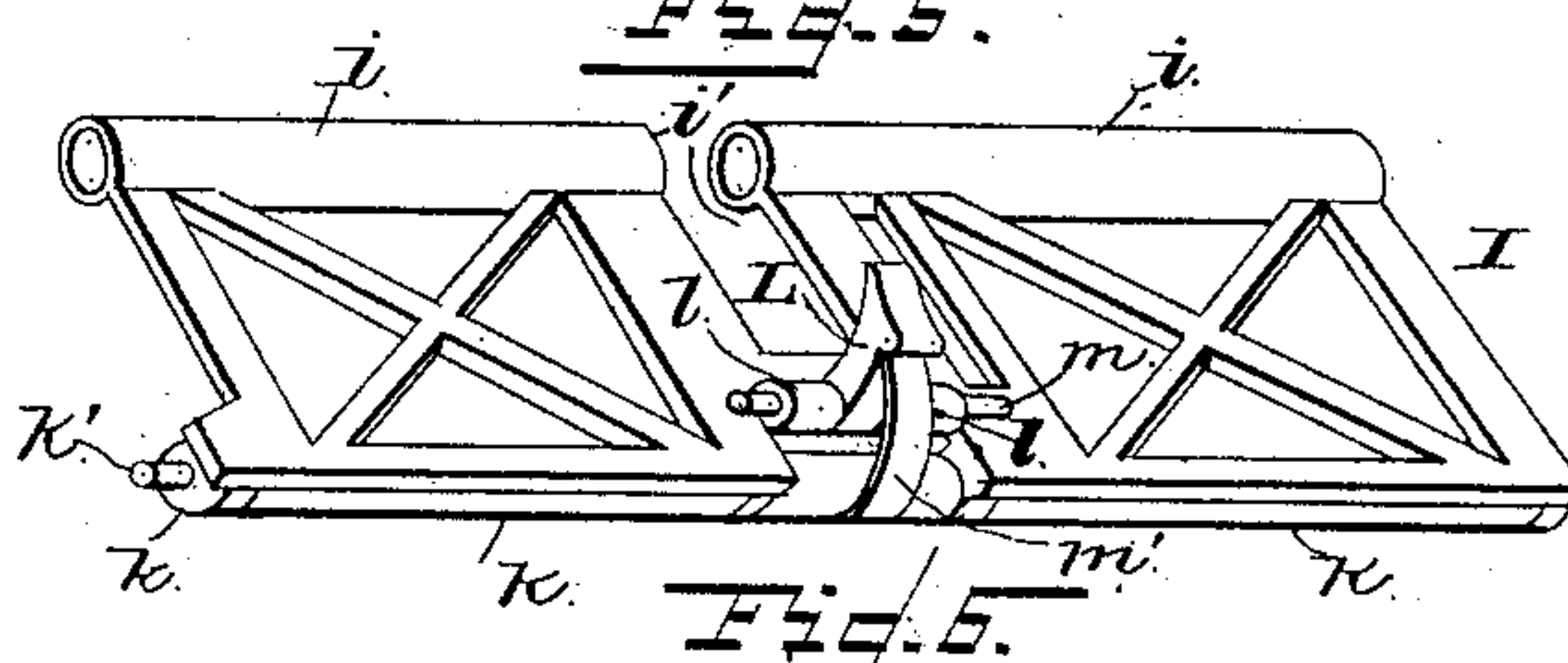
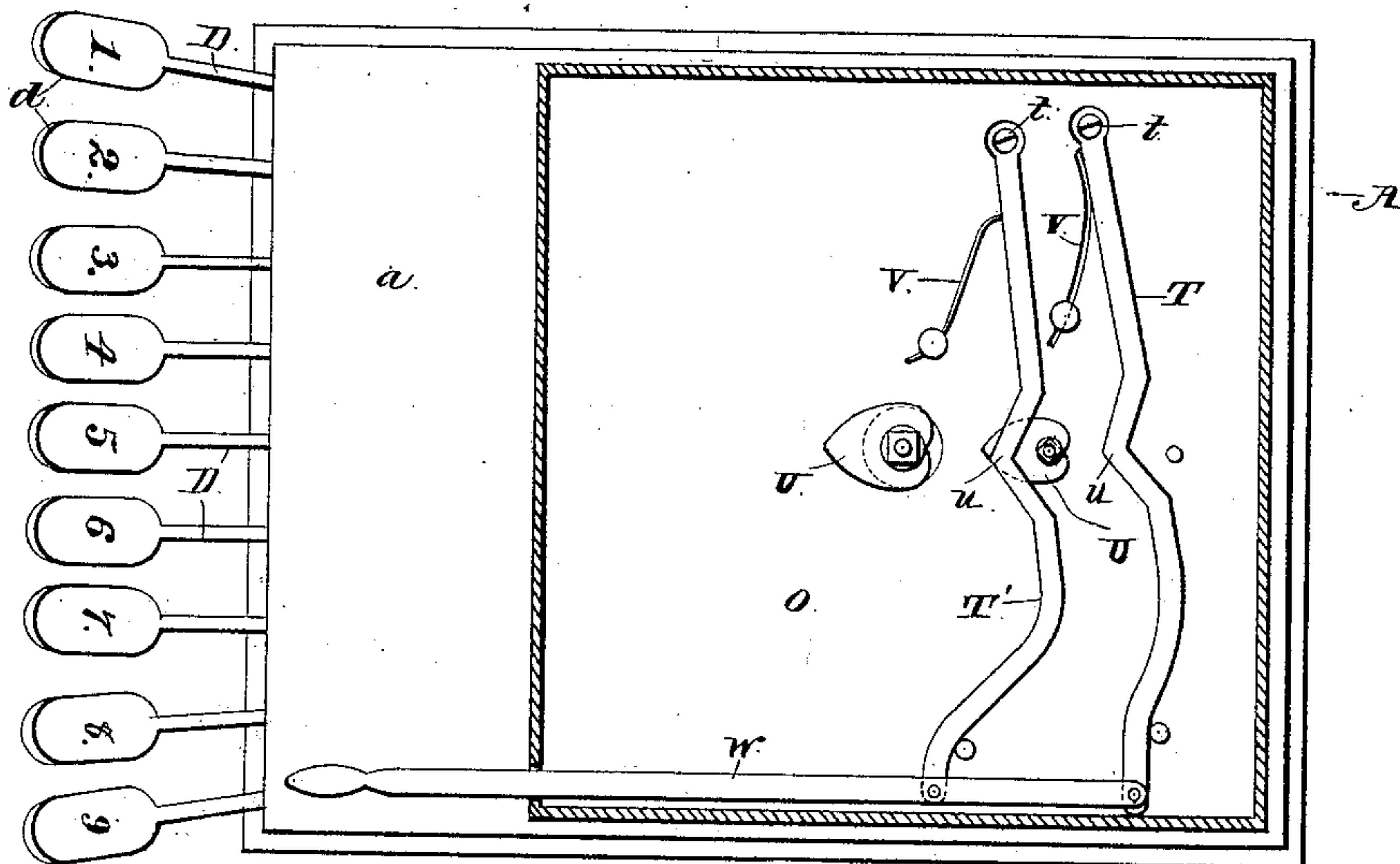


Fig. 6.



Witnesses

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UNITED STATES PATENT OFFICE.

SAMUEL E. AUSTIN, OF FORT VALLEY, GEORGIA.

ADDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 370,719, dated September 27, 1887.

Application filed September 16, 1886. Serial No. 213,685. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL E. AUSTIN, a citizen of the United States, residing at Fort Valley, in the county of Houston and State of Georgia, have invented a new and useful Improvement in Adding-Machines, of which the following is a specification.

My invention relates to improvements in adding-machines; and it consists in the peculiar combination and novel construction and arrangement of the various parts for service, substantially as hereinafter fully set forth, and particularly pointed out in the claims.

The primary object of my invention is to provide an improved adding-machine for accurately and rapidly adding together columns of figures, which shall possess superior advantages in points of simplicity, durability, and strength of construction, efficiency of operation, and cheapness of manufacture.

A further object of my invention is to provide improved means for instantly arresting the rotation of the hands arbor or shaft when one of the finger-levers is released, so that the said arbors are prevented from moving too far to indicate upon the dial the sum of the column of figures to be added together, which is liable to produce the wrong sum total; to provide improved means for simultaneously returning the tens and hundreds hands to zero by the single movement of the lever, and, finally, to provide an improved swinging yoke, which is arranged in the path of a series of finger-levers to be actuated by either one of the said levers and without undue friction and wear on the parts in contact, all as more fully hereinafter described.

In the drawings hereto annexed, which illustrate an adding-machine embodying my invention, Figure 1 is a perspective view of the device. Fig. 2 is a vertical longitudinal sectional view thereof on the line xx of Fig. 3, and Fig. 3 is a vertical transverse sectional view on the line yy of Fig. 2. Fig. 4 is a horizontal sectional view on the line zz of Fig. 2. Fig. 5 is an enlarged perspective view of the swinging yoke detached from the device, and Fig. 6 is a horizontal sectional view on the line 1 1 of Fig. 3.

Referring to the drawings, in which like letters of reference denote corresponding parts in all the figures, A designates the inclosing

shell or casing of my improved adding-machine, which is square, rectangular, or of any other desired form, and which has a cover or top plate, a , removably secured thereto in any suitable manner, upon which is affixed or secured a dial, B, which is divided by suitable marks and characters up to any number—as, for instance, a hundred. This scale b , which, for the sake of convenience, I will term the “units-scale,” is arranged near the outer edges of the dial, and within the units-scale is arranged a smaller scale, b' , which serves to indicate the hundreds, as will be very readily understood. At the center of each of the units and hundreds scales b and b' , respectively, are arranged vertical shafts or arbors c c' , and these shafts carry suitable hands or pointers, c^2 , which traverse around their respective scales to indicate the numeral or ordinal thereon when the finger levers or keys are depressed, as more fully described hereinafter.

D designates a series of keys or levers, which are arranged at one end of the machine, and which project outwardly from beyond the inclosing case or shell at one end, and have finger-pieces d formed thereon or secured thereto, so that the operator can have ready access thereto to manipulate them. There are nine of these levers or keys employed, although the number can be increased or multiplied, as desired, and each one of these keys or levers has a numeral indorsed or stamped thereon. Thus, for instance, the key at the left-hand end of the machine has the numeral 1 stamped thereon, the next key the number 2, and so on throughout the series up to 9. These keys can all be arranged in the same plane, or substantially so, as indicated in the accompanying drawings, or they can be arranged at different heights, so that the operator is not likely to strike two of the keys at one operation, which is liable to cause a miscalculation.

The keys are all of substantially the same length; but they are pivoted at different points of their length in suitable posts or standards, E, which are arranged in a vertical position within the inclosing case or shell, and are rigidly affixed thereto. These standards or posts are arranged out of line with each other, the post in which the key or lever 1 is pivoted being arranged in front and to one side of the post in which the lever 2 is pivoted, and the

post of the lever 2 is arranged in like manner with relation to the post of lever 3, and so on throughout the series of keys or levers.

F designates a rock-shaft, which is arranged transversely across the machine, within the inclosing case or shell thereof and above and in rear of the inner ends of the levers or keys *d*, which are housed and concealed within the said shell, and this shaft is journaled at its extremities in the upper ends of vertical standards or posts *f*, which are affixed to the bottom of the shell in any suitable manner. This shaft carries a rabbet-wheel, G, at its middle, and at one end a bevel gear-wheel, H, is secured thereto, the functions of which wheels will be hereinafter more fully described; and a swinging yoke, I, is loosely connected or swiveled on the said shaft, and is capable of vertical movement independently of the motion of the shaft. This swinging yoke is normally arranged in an inclined position with relation to the shaft, and at its lower free edge the yoke bears or impinges upon the inner ends of the pivoted keys or levers D. The free end of the swinging yoke is thus arranged in the path of the inner ends of the keys, and the yoke is adapted to be elevated by the said inner ends of the levers or keys impinging upon the free end of the yoke when the outer ends of the keys or levers are depressed by the operator in manipulating the machine. The levers elevate the free end of the swinging yoke to different heights. Thus the lever 1 will only actuate the yoke for a very short distance, while the lever 2 will raise it twice the distance, and the lever 3 will elevate it thrice the distance, and so on throughout the series of keys or levers.

The swinging yoke is provided at its upper edge with enlarged portions or hubs *i*, which have transverse aligned openings, through which the shaft F passes to support one end of the yoke in place, and at its middle the yoke has a transverse slot, *i'*, in which the ratchet-wheel G of the said shaft rotates or works. The yoke is instantly returned to its normal position in the path of and in contact with the inner ends of the keys or levers by means of spring J, which is coiled around the shaft F and one of the hubs of the yoke, and one end of this spring is connected to the yoke, while the other end thereof is connected to the base or bottom of the shell or case A, by a screw or rivet, or in any other suitable manner.

At its lower free end the swinging yoke is provided with projecting lugs or ears *k*, which are provided with transverse openings, which are arranged in line with each other, and between these lugs or ears of the swinging yoke are arranged frictional rollers K, which are loosely journaled on a common pin or shaft, K', which passes through all of the rollers and the transverse aligned openings in the ears or lugs. The inner ends of the keys or levers impinge upon the said friction-rollers, which are free to move or revolve on their shaft, and

thus reduce the wear and friction on the parts, and thereby increase the durability of the machine and render its operation more easy. 70

L designates a pawl, which is arranged at its lower end between perforated lugs *l* on the swinging yoke, and through one end of this pawl and the perforated lugs passes a pin or shaft, *m*, which pivotally supports the pawl on the swinging yoke. The pawl is thus carried by and elevated with the yoke when the latter is actuated by one of the keys or levers, and the free end of the pawl is adapted to take into one of the series of teeth on the ratchet-wheel to rotate the latter and move the shaft F simultaneously with the elevation of the free end of the swinging yoke, the distance which the ratchet and the shaft F are rotated depending upon the elevation of the yoke and the pawl carried thereby. This pawl is arranged in line with the ratchet which it is designed to actuate, and its free end is normally pressed or impelled toward the ratchet, so as to engage the teeth thereof when the machine is at rest and be ready for instant use, by means of a spring, *m'*, which is secured at one end to the pawl and impinges and rides upon the periphery of one of the friction-rollers carried by the free lower end of the swinging yoke, as clearly shown in Fig. 2. The upward movement of the swinging yoke is limited when the lever of the highest ordinal, 9, acts thereon by a stop, ear, or lug, N, which is affixed to one of the sides of the inclosing shell or casing, and which is arranged in the path of the yoke, as shown. The outer ends of the levers or keys are passed through vertical slots *n*, formed in the front wall of the inclosing case or shell, and each of the said levers or keys comes in contact with the upper end of a regulating-screw, *n'*, which is fitted in the base of the case and arranged within the inclosing-shell in a series transversely thereof and at the front end. It will thus be seen that when the lever 1 is depressed the swinging yoke will be elevated only a slight distance, which will cause the pawl on the yoke to feed the ratchet forward one tooth and thus rotate the shaft F but slightly. When the key or lever 2 is depressed, the pawl will rotate the ratchet two teeth, or move the shaft F twice the distance. When the key or lever 3 is depressed, the pawl feeds the ratchet forward three teeth, and so on throughout the series, the levers elevating the free end of the swinging yoke to different heights, according to their order, and the pawl feeding the ratchet forward, according to the elevation of the yoke by which it is carried, as will be very readily understood. 125

O designates an intermediate or supporting plate, which is arranged beneath the top or cap plate of the machine, and out of contact therewith, to form or leave an intermediate space or chamber, said intermediate plate being secured to the cap-plate. The units-hand arbor or shaft passes through these intermediate and cap plates, as well as the hundreds-hand arbor or shaft, as shown, and the units-hand

arbor also passes through a bracket-plate, *o*, which is affixed to the lower under side of the intermediate plate, while the hundreds-hand arbor does not pass through the said bracket, 5 but is merely journaled therein.

To the lower extremity of the units-arbor is affixed or secured a large bevel gear-wheel, *P*, which meshes with and is rotated by the smaller bevel gear-wheel, *H*, on the shaft *F*, and to the 10 said arbor of the units-hand is affixed a small pinion, *p*, which is arranged above the bracket-plate and gears with a gear-wheel, *Q*, that is also arranged above the bracket-plate, and which is affixed to the lower end of the arbor 15 of the hundreds-hand. It will thus be seen that the shaft *F* is geared to the arbors of the hundreds and units hands, so that the parts are operated simultaneously and automatically, and the hundreds-hand arbor is only partially 20 rotated to denote one hundred on the scale *b'* of the dial at each complete revolution of the arbor of the units-hand, as is obvious.

In a calculating-machine constructed by me embodying my present invention, I have found 25 the following proportions of parts to give good results, to wit: The ratchet-wheel *G* is made two inches in diameter and having sixty (60) teeth; the bevel-gear wheel *H*, two and three-eighths ($2\frac{3}{8}$) inches in diameter, with a corresponding 30 number of teeth, (60); the large bevel gear-wheel *P*, three and fifteen-sixteenths ($3\frac{15}{16}$) inches in diameter and with one hundred (100) teeth; the large spur gear-wheel *Q* carried by the hundreds-hand arbor, two and one-eighth ($2\frac{1}{8}$) 35 inches in diameter with one hundred (100) teeth, and the spur gear-pinion *P* on the units-hand arbor one-fourth ($\frac{1}{4}$) of an inch in diameter, and with ten (10) teeth.

I do not desire to strictly confine myself to 40 the relative sizes and proportions of parts hereinbefore mentioned, and would have it understood that I enumerate the same merely to aid a mechanic in constructing the machine.

R designates a brake device which is inclosed 45 within the inclosing shell or casing, and is affixed to the base of the machine. The brake comprises a flat piece of metal, which is bifurcated to provide two parallel spring-arms, *r*, which are arranged on opposite sides of the 50 ratchet-wheel, and which are adapted to impinge upon the same to prevent the wheel and shaft to which it is connected from being rotated too far under the impulse imparted thereto by the pawl of the swinging yoke. The 55 free ends of these spring-arms are provided with shoulders or contact-points *r'*, which press upon the sides of the ratchet-wheel, and these arms are connected by means of a regulating-screw, *R'*, which passes through one 60 arm and screws into a threaded opening of the other arm, whereby the tension or force which the yielding arms of the brake exert upon the ratchet-wheel can be regulated to permit of the free rotation of the ratchet, while at the 65 same time performing its necessary function, and to compensate for the wear upon the parts due to friction.

S designates regulating-screws, which work in suitable threaded openings of the intermediate plate, and these screws depend from the 70 said plate, and have their lower extremities covered and protected by a soft yielding substance, *s*, preferably felt, which is forced by the screws upon the flat upper side of the large gear-wheel *P*, to arrest the rotation of the said 75 wheel and prevent it from moving too far under the impulse imparted to the shaft *F* and the gear-wheel carried thereby.

The operation of my invention will be readily understood from the foregoing description, 80 taken in connection with the drawings, by those skilled in the art to which my invention appertains.

T T' designate shifting-levers for returning 85 the hundreds and units hands to zero simultaneously after each column of figures have been added up. Each of these levers is pivoted at one end to the intermediate plate of the machine, as at *t*, and the levers are arranged 90 between the cap and the intermediate plates, so that they are concealed and hid from view and protected from dust, &c. The levers are provided with angular or curved operating-bends *u* at an intermediate point of their 95 length, near the middle, and these operating-bends are adapted to impinge upon the periphery of a cam, *U*, one of which is fitted on both the units and hundreds hands arbors or shafts, and each of these cams 100 has a spring, *U'*, on its under side, which impinge upon a collar on the shaft or arbor, so that the cams will rotate therewith. These cams are preferably of the class known as "heart-shaped" cams, and they are arranged 105 on their arbors in the paths of the shifting-levers, so that when the levers are forced laterally their operating bends or portions *u* will impinge upon the cams and return the latter, and the arbors by which they are carried, to their normal positions and the hands 110 on the arbors to zero on both the scales *b b'* of the dial *B*. The shifting-levers *T T'* are normally forced away from the cams upon which they are designed to act by means of flat springs *V*, which are secured at one end to 115 the intermediate plate of the machine by means of a screw or the like, while their opposite ends are free to impinge upon the levers, whereby the arbors and the cams fitted thereto can be rotated by the other mechanism of the 120 device to add up columns of figures without interference or hindrance from the shifting-levers. The shifting-levers are connected at their free ends to an operating rod or lever, *W*, which is pivotally connected to the levers 125 for the purpose of operating them simultaneously to return both of the arbors or shafts of the units and hundreds hands to their normal positions after the operator has finished adding up the columns of figures, and this rod or 130 lever extends through the case or shell of the machine at a suitable point, so as to be within convenient reach of the operator.

I am aware that changes and modifications

in the form and proportion of parts can be made without departing from the spirit or sacrificing the advantages of my invention, and I would therefore have it understood that I do not confine myself to the exact construction herein shown and described as an embodiment of my invention.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an adding-machine, the combination of the levers or keys fulcrumed at different points of their length to be capable of elevation to different heights, a shaft, F, the hand arbor or arbors geared to the said shaft, a swinging yoke pivotally supported at or near one end, and having its free end arranged in the path of the inner ends of all the levers, to be actuated by any one of the same, and pawl-and-ratchet mechanism intermediate the yoke and the shaft F, for feeding the latter proportionately to the movement of the yoke, as and for the purpose set forth.

2. In an adding-machine, the combination of a series of independent keys or levers pivoted at different points intermediate of their length in fixed posts, a shaft, the arbor geared thereto, a swinging pivoted yoke arranged in an inclined position, and having its free end arranged in the path of the keys, a spring secured at one end to the case of the machine, and having its free end connected with the yoke to normally return its free end into contact with the inner ends of the levers, and pawl-and-ratchet mechanism intermediate the yoke and shaft for feeding the latter, substantially as described.

3. In an adding-machine, the combination of the keys or levers, a shaft carrying a vertical ratchet-wheel, a swinging yoke actuated by the levers, a pawl pivoted on the yoke and normally engaging the ratchet-wheel, and a brake device arranged in rear of the shaft and fixed at one end to the case of the machine, the free end of the brake being curved upwardly and bifurcated to form the yielding independent arms, which are arranged on opposite sides of the ratchet-wheel, the free ends of the arms having the contact-points, that impinge upon the sides of the ratchet-wheel, and a regulating-screw connecting the yielding arms at an intermediate point of their length and drawing the same together with equal force, as and for the purpose described.

4. In an adding-machine, the combination of a series of posts or standards arranged out of line with each other, a series of keys or levers of substantially uniform length and pivoted in the posts at intermediate points of their length, a swinging yoke carrying friction-rollers at its lower end, upon which the inner ends of the keys impinge, a shaft on which the yoke is journaled, pawl-and-ratchet mechanism intermediate of the yoke and shaft, a spring connected with the yoke for returning it into contact with all of the levers or keys after its

elevation by one of them, and an arbor carrying a hand or pointer, geared to the shaft, substantially as described.

5. In an adding-machine, the combination of a shaft, the keys, a swinging yoke actuated by the keys, pawl-and-ratchet mechanism intermediate of the yoke and shaft, the arbors geared to the shaft through the intermediate wheels, H P, a fixed bracket-plate above the gear-wheels, and the regulating-screw S, working in the fixed bracket-plate, and having its contact-point covered by a yielding substance and pressing on a plane-surface of the gear-wheel P to arrest the rotation of the same, as and for the purpose set forth.

6. In an adding-machine, the combination, with the arbors, of the cams carried thereby, an independent lever for each cam normally arranged out of the path of the same, and a single operating-rod connected to all the levers to simultaneously operate the same, as and for the purpose set forth.

7. In an adding-machine, the combination, with the hands-arbors, of the cams carried thereby, the independent levers each pivoted at one end, and having the operating-bend at an intermediate point of its length, the springs for normally holding the levers and their operating bends out of the path of the cams, and a single operating-rod pivotally connected to the free ends of the levers, as and for the purpose described.

8. In an adding-machine, the combination, with the wheel P, of the regulating-screw S, having its contact-point fitted with felt or equivalent material, as at s, for the purpose set forth, substantially as described.

9. In an adding-machine, the combination, with a hands-arbor, of a cam affixed thereto, a pivoted shifting-lever arranged at one side of the arbor, and having an operating-bend formed at an intermediate point of its length, and a spring bearing against the said lever at a point beyond its pivot to normally hold its operating-bend out of the path of the cam and thereby permit the latter and the arbor to be rotated without hinderance from the lever, as and for the purpose described.

10. In combination with the gear-wheel P of an adding-machine, the pointer actuated by the rotation of said wheel P, the keys, and intermediate mechanism between the keys and the wheel P, to move the wheel by the touch of the keys, and the regulating-screw S, having its contact-point covered with felt, which felt covering is pressed by the screw on a plane-surface of the gear-wheel P to serve as a brake to arrest the rotation of the same, as set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

SAMUEL E. AUSTIN.

Witnesses:

CHARLES W. HANDY,
JOHN H. SIGGERS.