

No. 703,330.

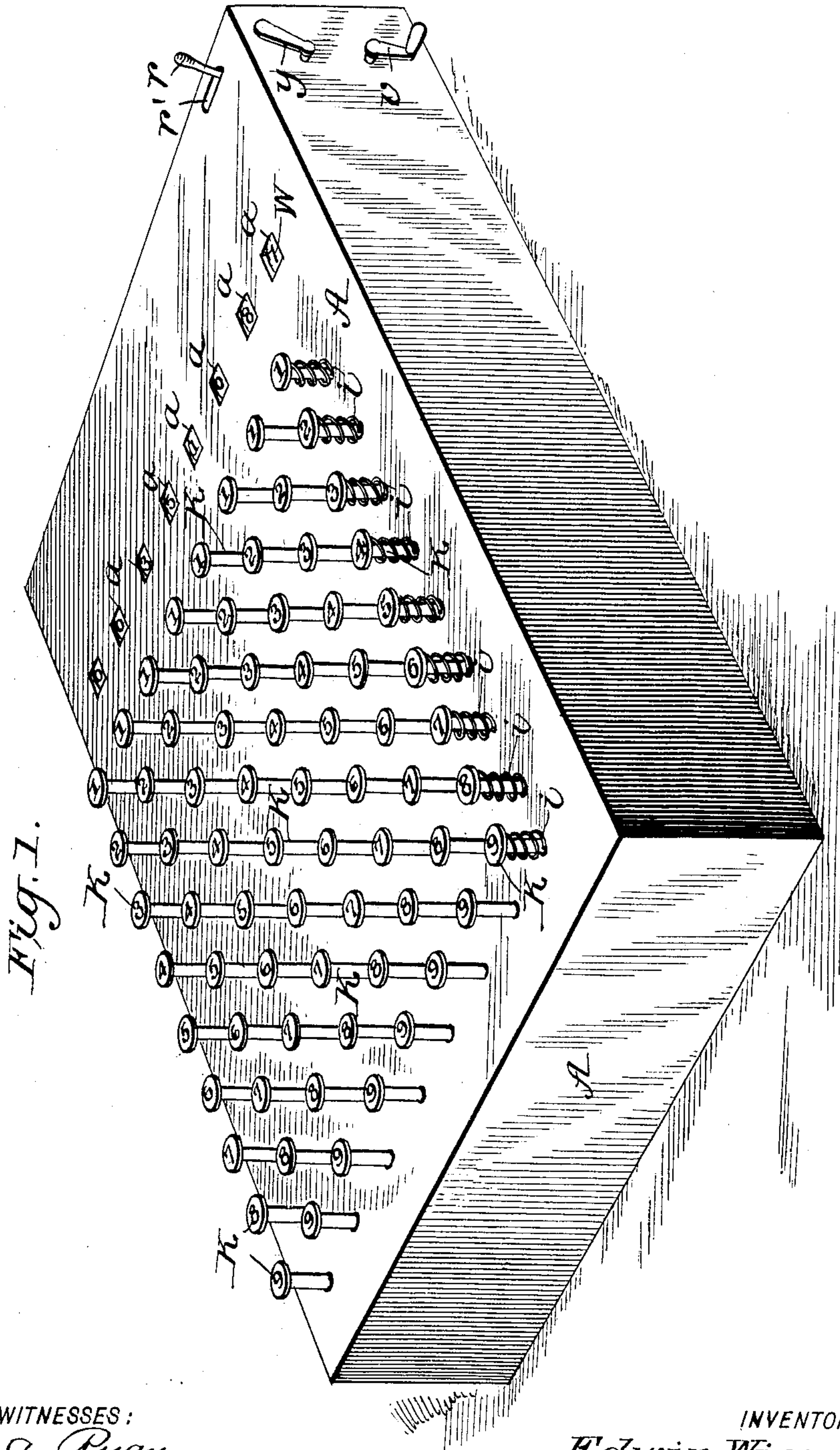
Patented June 24, 1902.

E. WISWALL.
ADDING MACHINE.

(Application filed Mar. 13, 1902.)

(No Model.)

3 Sheets—Sheet 1.



WITNESSES:
Jos. A. Ryan
Edw. W. Ryan

INVENTOR
Edwin Wiswall.
BY *Munn & Co.*
ATTORNEYS

No. 703,330.

Patented June 24, 1902.

E. WISWALL.
ADDING MACHINE.

(Application filed Mar. 13, 1902.)

(No Model.)

3 Sheets—Sheet 2

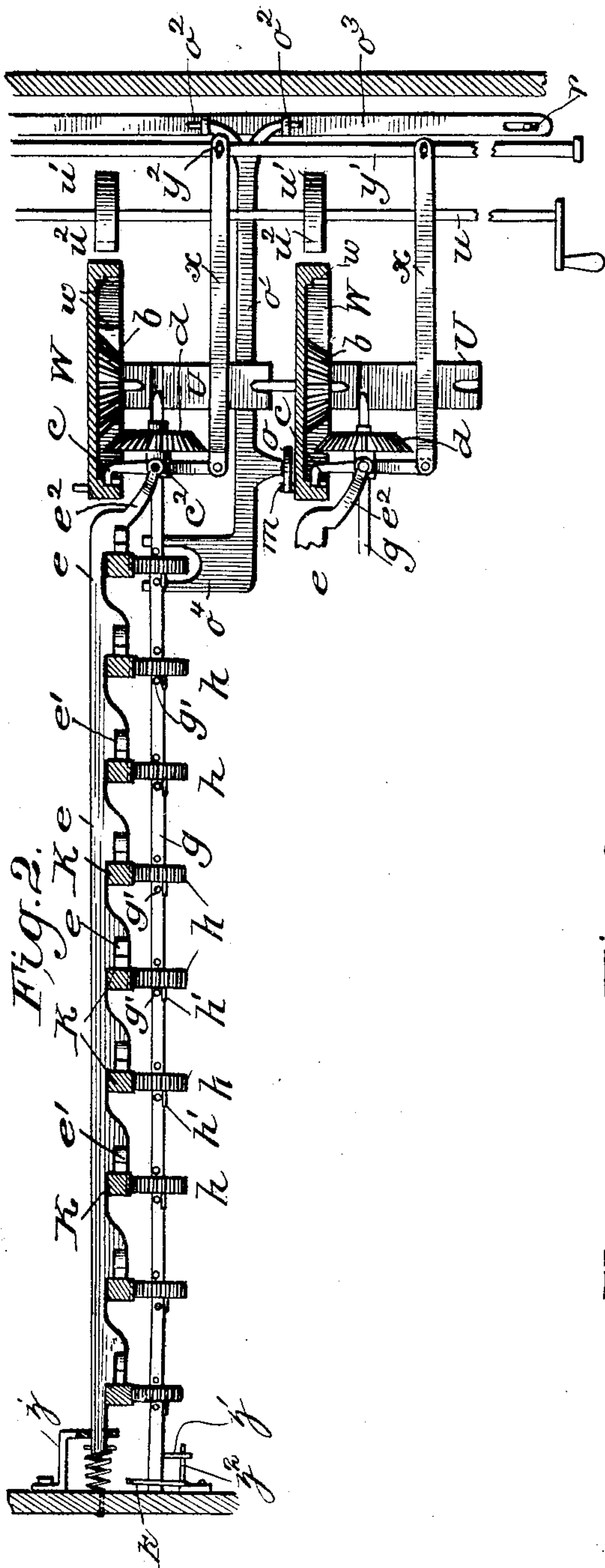
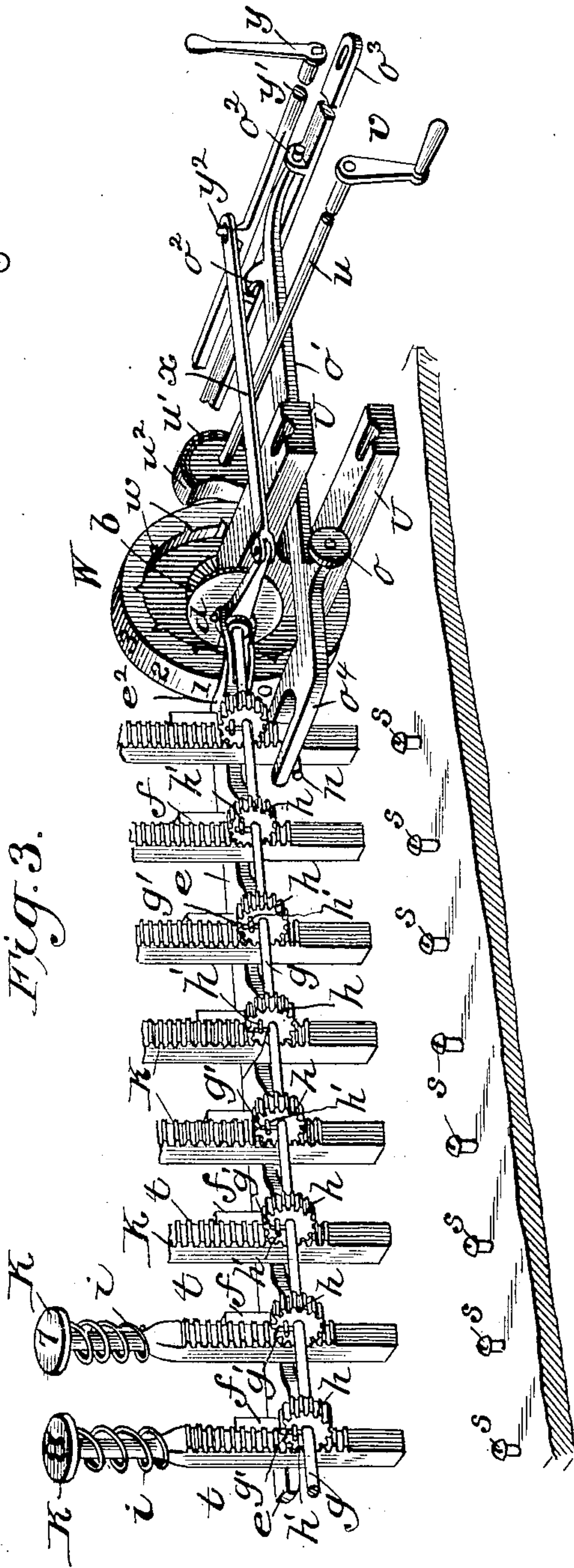


Fig. 2.

Fig. 3.



WITNESSES:

Jos. A. Ryan
Edw. W. Byrre

INVENTOR

Edwin Wiswall,
BY Munn & Co.
ATTORNEYS

No. 703,330.

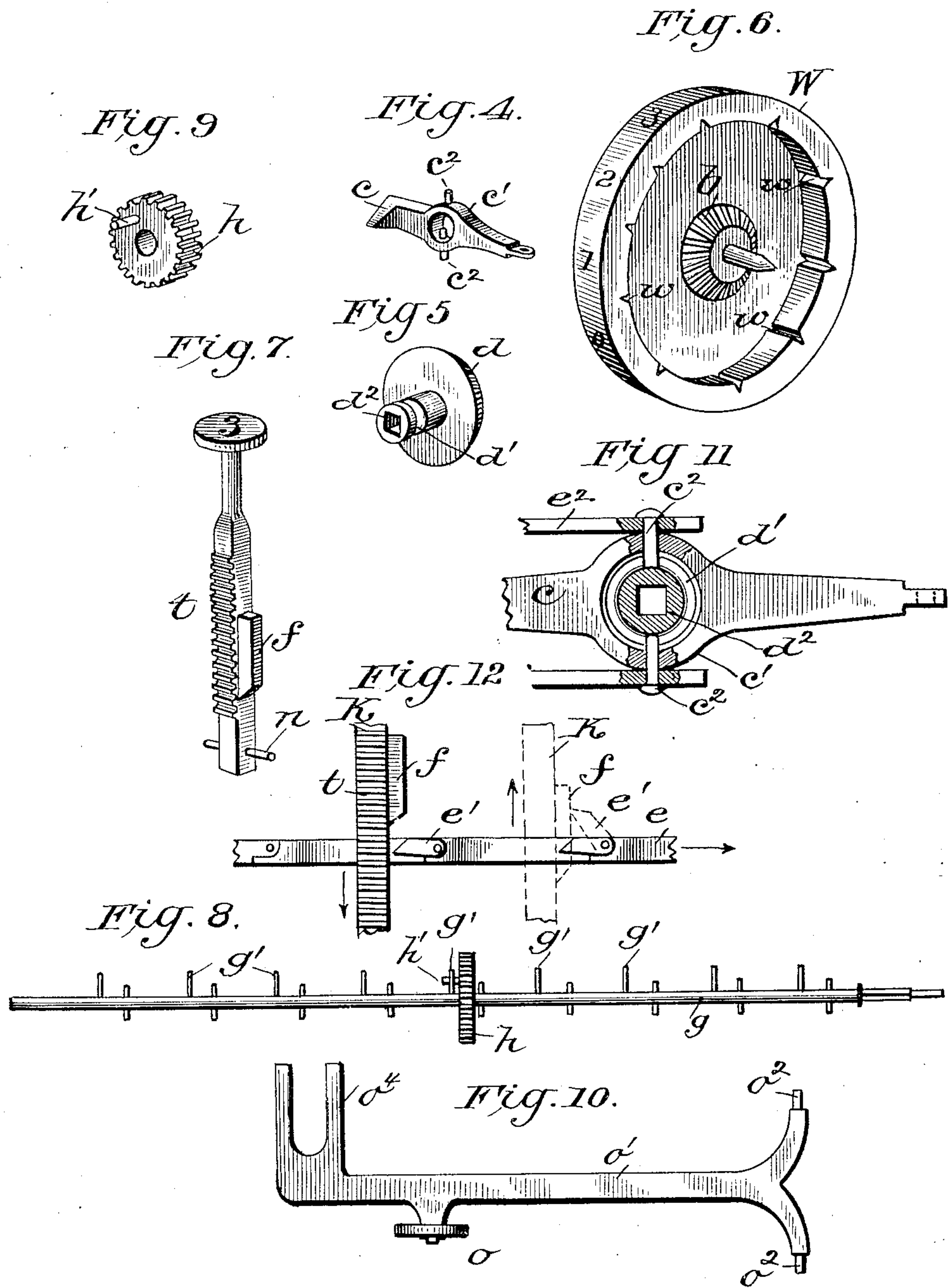
Patented June 24, 1902.

E. WISWALL.
ADDING MACHINE.

(Application filed Mar. 13, 1902.)

(No Model.)

3 Sheets—Sheet 3.



WITNESSES:
Jos. A. Ryan
Edw. W. Byrn

INVENTOR
Edwin Wiswall.
BY *Munn & Co.*
ATTORNEYS

UNITED STATES PATENT OFFICE.

EDWIN WISWALL, OF ISLAND, ILLINOIS.

ADDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 703,330, dated June 24, 1902.

Application filed March 13, 1902. Serial No. 98,006. (No model.)

To all whom it may concern:

Be it known that I, EDWIN WISWALL, of Island, in the county of Lawrence and State of Illinois, have invented a new and useful
5 Improvement in Adding-Machines, of which the following is a specification.

My invention is in the nature of a novel form of adding-machine, which will also aid in solving problems in subtraction, multipli-
10 cation, and division; and it consists in the peculiar construction and arrangement of parts, which I will now proceed to describe with reference to the drawings, in which—

Figure 1 is a perspective view of the ex-
15 terior case and keyboard. Fig. 2 is a sectional plan view of a portion of the operative mechanism, showing a complete set of devices for a single denomination. Fig. 3 is a perspective view of such set of devices, and
20 Figs. 4, 5, 6, 7, 8, 9, 10, 11, and 12 are detached views of various details.

Referring to Fig. 1, A represents the outer casing, which is of rectangular form and preferably about ten inches long, eight inches
25 wide, and four inches deep. There are mounted to work vertically through this casing nine keys K for each denomination of figures, marked "1," "2," "3," "4," "5," "6," "7," "8," "9," one series for units, another
30 for tens, another for hundreds, another for thousands, and so on as high as may be desired. These keys are normally held up by spiral springs i , and their depression adds the number shown on their faces to the add-
35 ing-wheels within, as will be hereinafter described. When any key is depressed, an adding-wheel is made to revolve beneath the top of the casing, bringing into view at the openings a the number on the key or
40 the sum of that and the number previously showing at said opening. There is one of these openings a and an adding-wheel for each vertical series of keys, and these openings and their subjacent wheels represent the dif-
45 ferent order or denominations of figures.

The adding-wheel is shown at W in Figs. 2, 3, and 6. It consists of a broad-faced wheel having a laterally-projecting flange at its periphery. On the peripheral face of this
50 wheel are equally distributed the ten digits, and on the inner surface of the flange are a

corresponding number of notches w . There is also at the hub of the wheel inside of the flange a rigidly-attached bevel-wheel b , by which it is turned. Each wheel revolves in-
55 dependently, but each wheel is acted upon by each one of the row of vertical keys immediately below it or in the same plane therewith, but each key imparts a different throw to that wheel, depending for the length of that
60 throw upon the number which that key represents—that is to say, key "1" will turn the wheel one space, key "4" will turn it four spaces, key "6" will turn it six spaces, and so on. These wheels when not in operation are
65 locked stationary by a locking-catch c , Fig. 4, which at one end has a tooth that engages one of the interior notches w of the wheel, as shown in Fig. 2. This catch at its opposite end is
70 jointed to a bar x , and in the middle said catch is made with a central yoke c' . (See Fig. 11.) This yoke has two diametrical pins c^2 c^2 , whose inner ends protrude into the yoke and play in a circular groove d' on the
75 hub d^2 of a bevel-wheel d , Figs. 5 and 11, forming a gimbal-jointed fulcrum. This hub has a square hole through it and it, slides longitudinally on the squared portion of a shaft
80 g , which extends longitudinally down from each adding-wheel. The purpose of the yoke-shaped catch is twofold, one is to lock and
unlock the adding-wheel and the other is to engage the bevel-wheel d with the bevel-wheel
85 b of the adding-wheel.

Alongside of the shaft g (see Fig. 2) there
85 extends a parallel bar e , which is constructed and arranged to be acted upon by every one of the nine keys of that denomination to first
unlock the adding-wheel and then immediately connect it with actuating devices which
90 turn it the requisite number of spaces. This is accomplished as follows: Each key (see Fig. 7) is formed with a series of rack-teeth t on one side and a cam projection f on another
side. This cam projection is arranged to bear
95 as the key descends against a pivoted block e' , Fig. 12, on the parallel bar e and give an end-wise movement to said bar. This bar e has at its upper end forked branches e^2 e^2 , which
are jointed to the diametrical pins c^2 c^2 of the
100 locking-catch c . When this bar e is pushed endwise by the descent of any one of the nine

keys which belong to it, the first action is (see Fig. 2) to throw the locking-catch *c* out of the notch of the adding-wheel, thereby releasing it, and following this the yoke *c'* forces the bevel-wheel *d* into engagement with the bevel-wheel *b* of the adding-wheel. Following this movement the teeth *t* of the key engage a small gear-wheel *h* on the shaft *g* and turning the latter cause through the engaged wheels *d b* the adding-wheel to be rotated. The small gear-wheels *h* correspond in numbers to the keys, and said wheels are loose on their common shaft *g*, but have each a laterally-projecting pin *h'*, (see Fig. 9,) which strikes against a pin *g'* on the shaft to turn it. These wheels *h* rotate freely on the shaft *g* between pairs of pins, as shown in Fig. 8, and after the shaft *g* has been turned the proper distance it is brought back again by a spiral spring *k*, Fig. 2. The distance that the adding-wheel is turned by any one key is determined by a series of adjustable stop-screws *s*, one of which is placed immediately below each one of the keys, as seen in Fig. 3, and each of which screws is a different distance from the lower end of the key to allow it a greater or less descent. Thus the screw on the right of Fig. 3 is just far enough below that key to stop its descent after it has turned the adding-wheel one space, the second one allows the second key to descend a little farther, so as to turn the adding-wheel two spaces, and so on. In this way each key is made to transfer to the adding-wheel the number of units for which it stands.

The object of the pivoted blocks *e'* on bar *e* is as follows: When a key descends, (see Fig. 12,) its cam *f* strikes the block *e'* and forces the bar *e* forward to unlock the adding-wheel and engage its driving-gears, and when the cam *f* passes entirely below the pivoted block *e'* the bar *e* is drawn back by a spring *z*, Fig. 2. Then when the key rises, as shown in dotted lines in Fig. 12, its cam *f* lifts the pivoted block *e'* and has no effect on the bar *e*.

To cause a wheel of one denomination to carry to the one of the next higher denomination after it has made a complete revolution, each adding-wheel *W* is provided on its side next the higher denomination with a pin *m*, (see Figs. 2 and 10,) and once at each revolution of such wheel the pin is made to act upon a roller *o*, carried by a lever *o'*. This lever has at one end two legs *o² o²*, which are hinged to a slide-bar *o³*, and its other end is turned at right angles and is forked at *o⁴* and straddles the lower part of the first key and rests just above a cross-pin *n* of that key, (see Figs. 7 and 3,) so that when the lever *o'* is forced down by the pin *m*, acting upon the roller *o*, the lever is made to pull down the first key of the next higher denomination, which turns the adding-wheel of that denomination one space or carries one. In the end of the slide-bar *o³* there is a slot, (seen in Figs. 2 and 3,) through which there passes an upright lever

r, Figs. 1 and 2, that extends upward through transverse slot *r'* in the top of the case. By throwing this lever to one side in the slot *r'* the slide-bar *o³*, with the lever *o'*, may be shifted sidewise far enough to cause the roller *o* to be out of range of the pin *m*, thereby permitting the operator to readjust the numbers recorded by a wheel without disturbing the one of the next higher order. The slide-bars *x* are at one end slotted to admit through them short arms *y²* on a rock-shaft *y'*, which is arranged transversely to the case, and outside of the case has crank-arms *y*. (See Figs. 1, 2, 3.) By rocking this shaft *y'* through this crank-arm the bar *x* is moved endwise sufficiently to release the catches *c* from the adding-wheels without coupling together the bevel-wheels. The adding-wheels are thus left free to be readjusted to zero. For this purpose the said adding-wheels are simultaneously turned backward, as follows: A shaft *u* is journaled in bearings in the case and has rigidly-attached friction or brush wheels *u'* secured to it immediately opposite and in the same plane with the adding-wheels, so that the peripheries of these friction-wheels will bear against the peripheries of the adding-wheels and turn them all back to zero whenever the shaft *u'* is turned. As the wheels before being readjusted may not all stand in position to show the same numeral at *a* of Fig. 1, it is obvious that some of the wheels may require to be turned farther backward than others, and for this purpose several turns of the shaft *u* may be required. The contact of the brush-wheels *u'* with the adding-wheels, however, is light, and the adding wheel or wheels which in the backward movement first reach the zero position are stopped there by their pins *m* striking the pulleys *o* and remain stationary, while the subsequent backward turning of the other adding-wheels is effected by the brush-wheels, the brush-wheels moving freely with a sliding friction over the stationary wheels. By continuing the rotation of shaft *u* sufficiently it will be seen that all the adding-wheels are finally brought back to the zero-point, in which they are stopped by their pins *m*, resting against the pulleys *o*. The crank *v* of the shaft by which it is turned lies outside of the case in convenient position, as seen in Fig. 1. To prevent these friction-wheels from retarding the normal rotation of the adding-wheels when in operation, said friction-wheels are on one side cut away, as seen at *u²*, so that when this portion of their surfaces is turned toward the adding-wheels the friction-wheels do not touch the adding-wheels.

To prevent the shaft *g* from turning too far back, suitable stop devices are provided—such, for instance, as a pin *z'* (see Fig. 2) on the shaft, which strikes a pin *z²* on the casing.

The pivots or bearings of the adding-wheels and shafts *g* are carried in a series of U-

shaped bearing-blocks U with detachable top plates for retaining the pivots or journals in their seats.

On each side of the case of the adding mechanism there is a row of figures opposite the keys to facilitate the working of problems in subtraction and division.

My adding-machine may be made of any suitable material and of any convenient size, and the parts of the machine may be so arranged in the case as to have the adding-wheels at the bottom or below the keys, if desired, without any material change in organization.

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

1. An adding-machine comprising adding-wheels, an actuating-shaft for each wheel arranged at right angles to the axis of the adding-wheel and a lock-releasing and gear-engaging bar, arranged parallel to said shaft, and a set of nine keys operating at right angles to the shaft and releasing-bar with a different throw upon the shaft for each key and an equal action upon the parallel bar for each key substantially as described.

2. An adding-machine comprising a series of adding-wheels of different denominations, shafts at right angles to the axes of the adding-wheels, nine gear-wheels for each shaft, a series of nine depressible keys bearing teeth adapted to engage the nine gear-wheels and having also cam projections, and a parallel push-bar having projections acted upon by the keys, and devices for unlocking the adding-wheels and engaging their actuating-gears, said devices being operated by the push-bar substantially as described.

3. An adding-machine having each adding-wheel provided with an actuating-shaft for turning it arranged at right angles to the axis of the adding-wheel, and a lock-releasing and gear-engaging bar arranged parallel to said shaft, a set of nine keys operating at right angles to said shaft and bar and upon both of the same, and a set of stops located beneath the keys and at a distance below them varying in proportion to the value of the keys substantially as described.

4. In an adding-machine of the kind described, the combination with a series of spring-seated depressible keys; of an actuating-shaft for the adding-wheels having small gear-wheels on said shaft corresponding to the keys and a lock-releasing and gear-engaging bar for the adding-wheel arranged parallel to said shaft and having a corresponding set of bearings for each key, the said keys being located between the said shaft and parallel bar substantially as described.

5. In an adding-machine of the kind described, the combination of a series of spring-seated depressible keys each having teeth on one side and a cam projection on another, a shaft having a series of loose gears on the

same provided with means for loosely connecting them to the shaft, a parallel push-bar with bearing-surfaces for the cams, the said bearing-surfaces being made as articulated blocks to turn in one direction but not in the other, the said shaft and parallel bar being connected with the adding-wheel substantially as described.

6. In an adding-machine, the combination of an adding-wheel having a laterally-projecting flange with locking-notches in its inner edge and a rigid bevel-gear at its hub, a second bevel-gear adjustable on an axis at right angles to that of the adding-wheel, a rotary shaft carrying said adjustable bevel-gear, a locking-catch for the adding-wheel having a yoke connected by gimbal-joints to the adjustable bevel-gear and a push-bar for shifting said locking-catch substantially as described.

7. In an adding-machine, the combination with the adding-wheel having a series of locking-notches opening toward the center of the wheel and a bevel-gear at the center; of a locking-catch and an adjustable bevel-gear both mounted to move together to unlock the wheel and engage its driving-gear by the same movement substantially as described.

8. In an adding-machine of the kind described, the carrying mechanism comprising a projection from the adding-wheel, and a movable member acted upon thereby, said member being extended to and made to act upon the first of the series of keys of the next denomination so as to depress the said key at each complete revolution of the adding-wheel of lower denomination substantially as described.

9. In an adding-machine of the kind described, the carrying mechanism comprising an adding-wheel having a lateral projection, a hinged bar having a roller acted upon by said projection and a right-angularly-projecting fork at the end, and a depressible key connected to the adding-wheels as described and having a pin or bearing upon which said fork rests substantially as described.

10. In an adding-machine of the kind described, the combination of the adding-wheel having lateral projection, a hinged bar arranged to be acted upon by said projection and loosely connected to the first of the series of keys to depress it, and a sliding supporting-bar for said hinged arms arranged to be adjusted to separate the hinged arms from the range of action of the adding-wheels substantially as described.

11. The combination with the adding-wheel having notches on the inner periphery of its flange; of a locking-catch having a gimbal fulcrum in the middle, a bar pivoted to the outer end of said catch and a rock-shaft with arms connected to all of said bars for simultaneously unlocking all the adding-wheels substantially as shown and described.

12. In an adding-machine, the combination

with the series of adding-wheels bearing numbers on their faces and means for stopping them at zero on the backward movement; of a corresponding series of friction-wheels arranged in the same plane and bearing respectively upon the peripheries of said adding-wheels, said friction-wheels being cut away on one side so as to be out of contact with the

adding-wheels when in one position, and to simultaneously turn and set the adding-wheels when rotated substantially as described.

EDWIN WISWALL.

Witnesses:

DANIEL LEACH,
CHARLES MCORR.