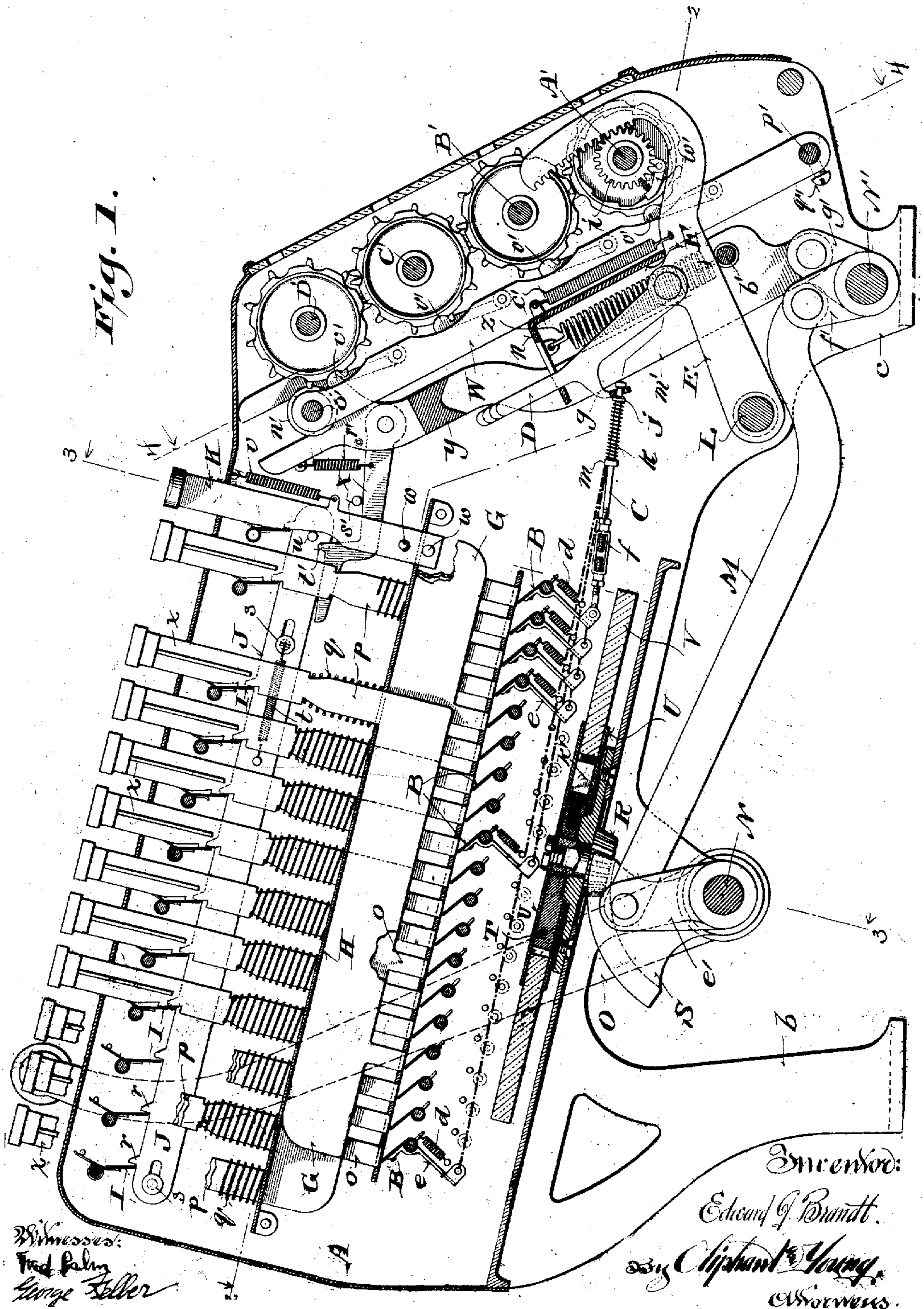


No. 889,353.

E. J. BRANDT.
CALCULATING MACHINE.
APPLICATION FILED JUNE 6, 1907.

PATENTED JUNE 2, 1908.

7 SHEETS—SHEET 1.



No. 889,353.

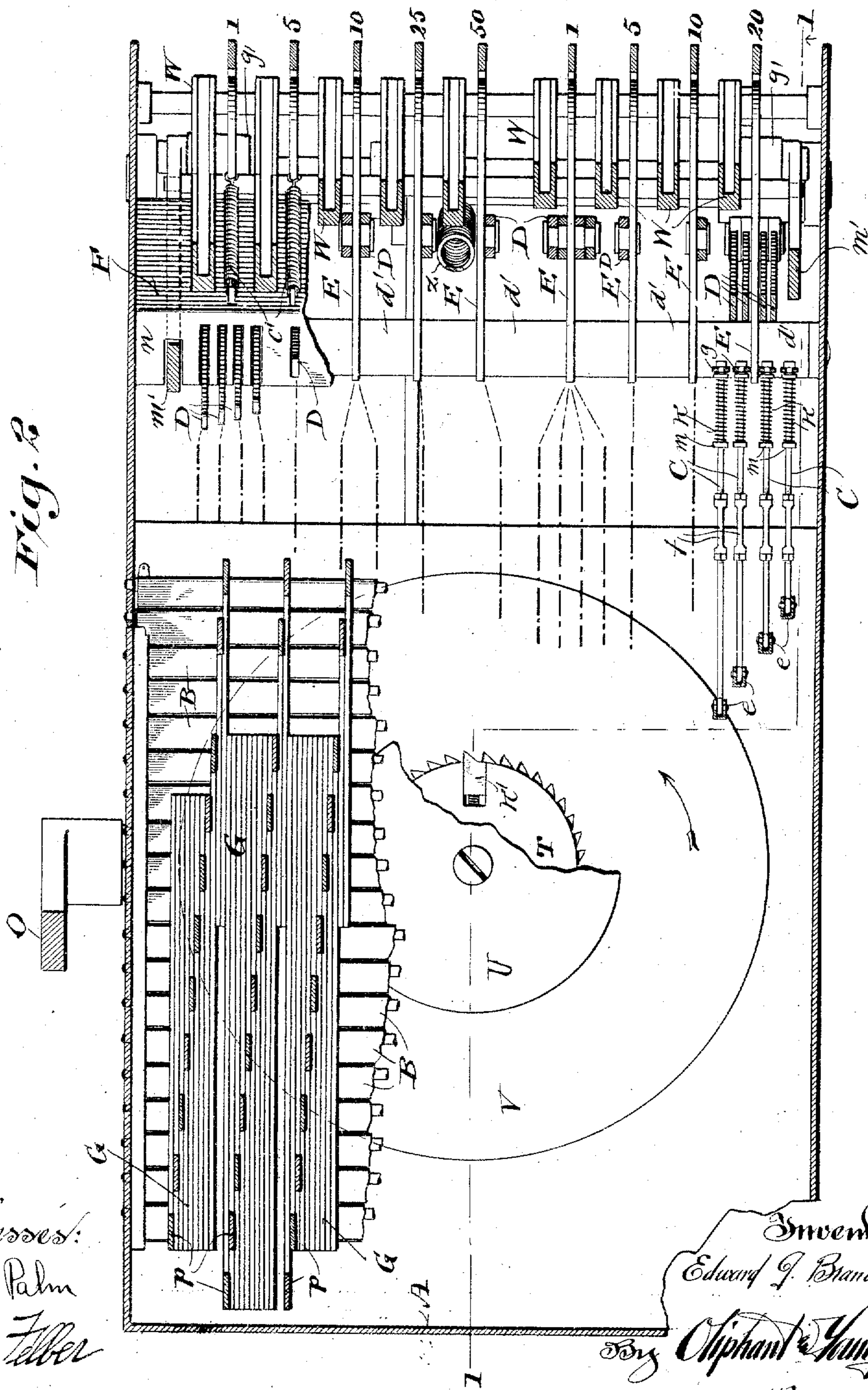
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CALCULATING MACHINE.

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7 SHEETS—SHEET 2.



Witnesses:
Fred Palm
George Fisher

Inventor
Edward J. Brandt
By Oliphant & Young,
Chicorewers.

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7 SHEETS—SHEET 3.

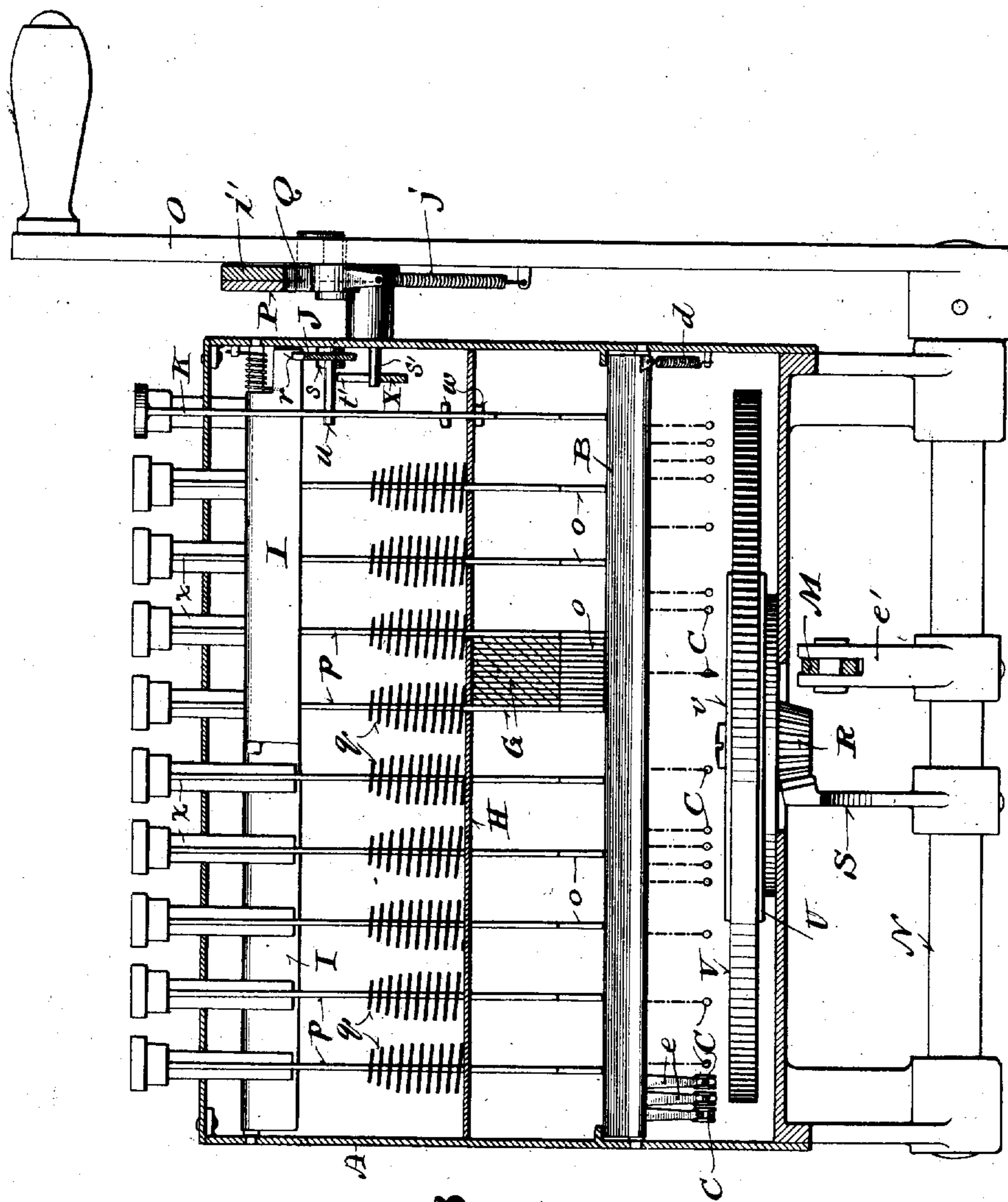


Fig. 3

Witnesses:
Fred Palm
George Felber

Inventor:
Edward J. Brandt.
By *Clifton Young*,
Attorney.

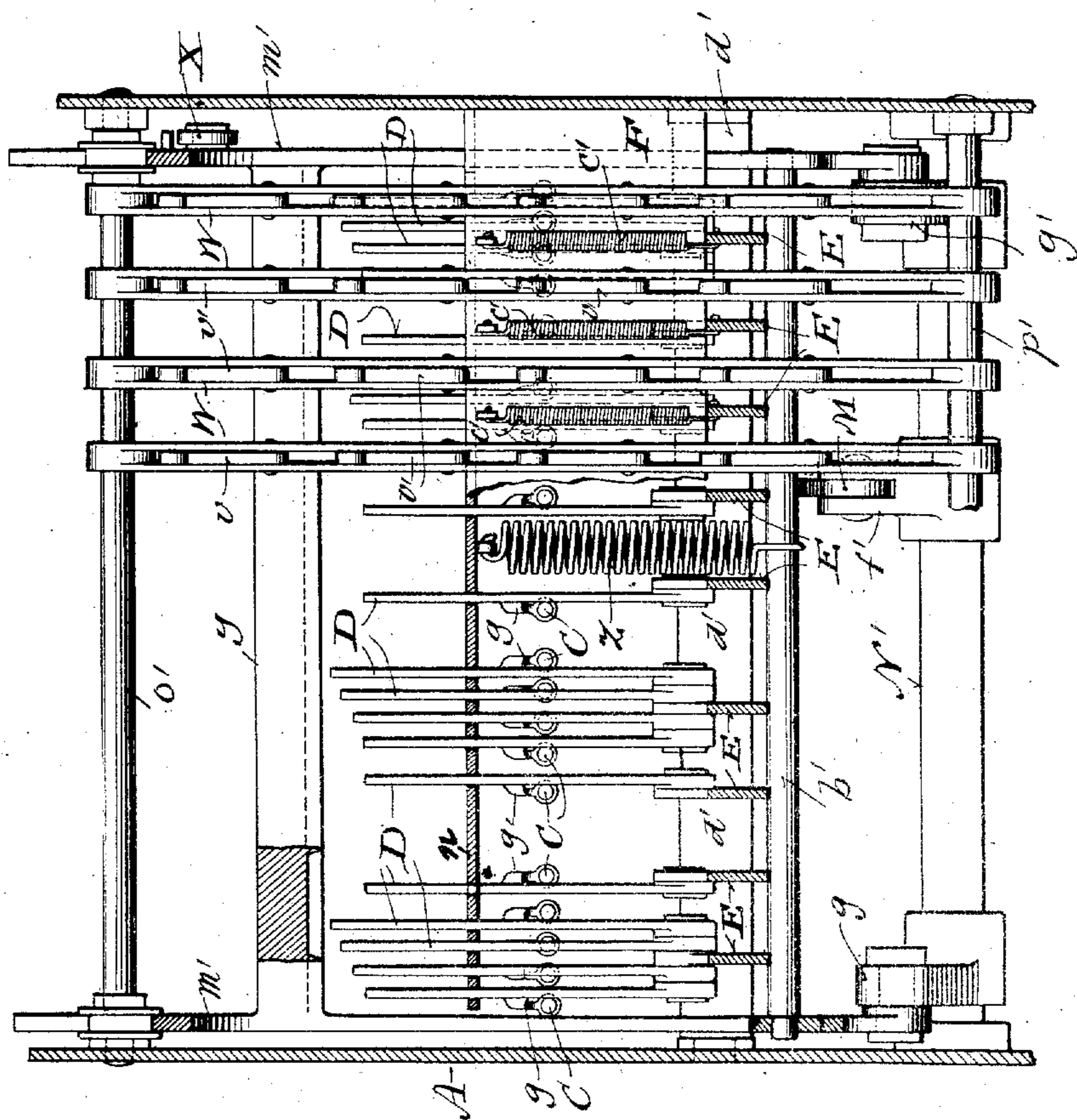
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7 SHEETS—SHEET 4

Fig. 4.



Witnesses:
Fred Palm
Eugene Felber

Inventor:
Edward J. Brandt.
By *Cliphart & Young*
Attorneys.

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7 SHEETS—SHEET 5.

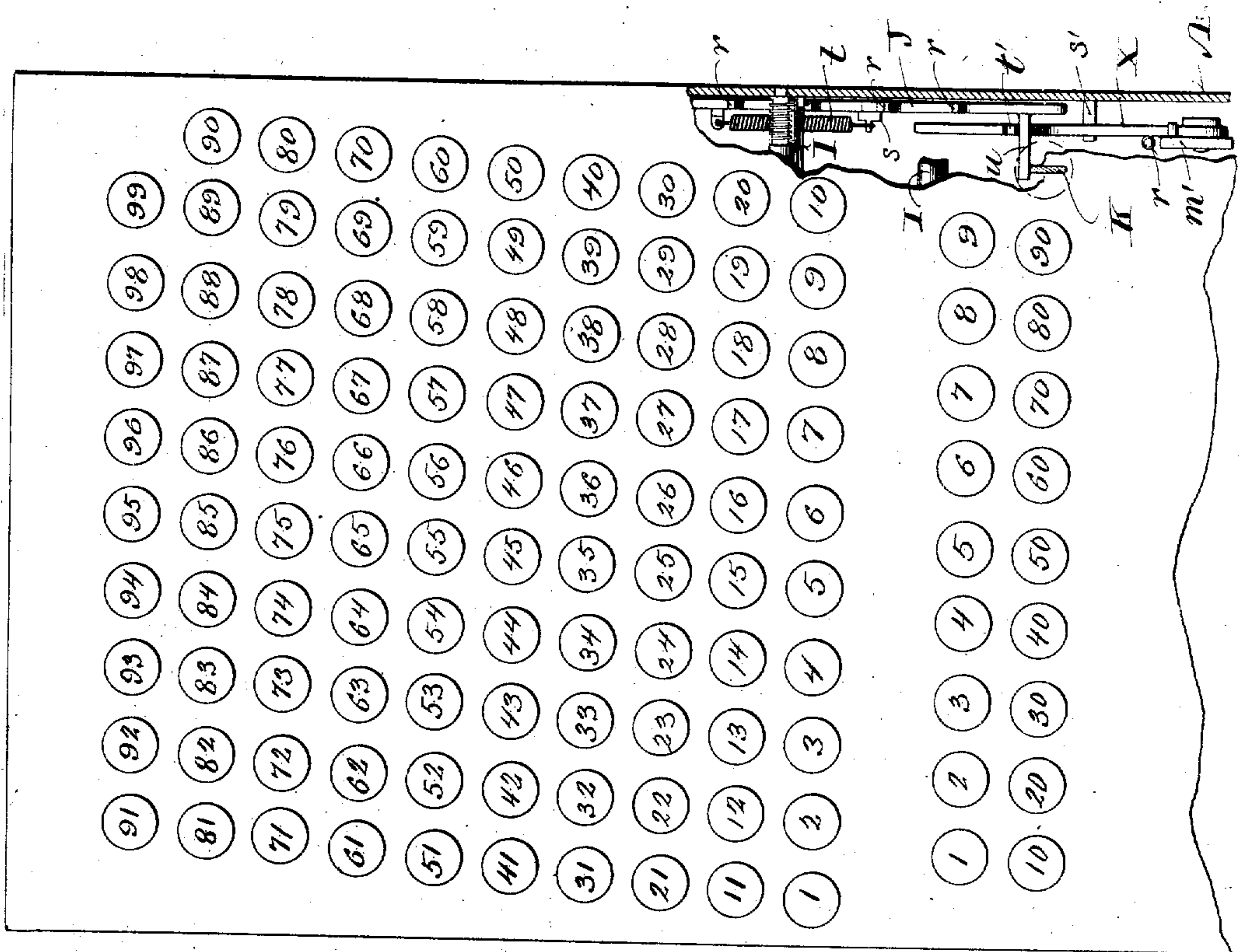


Fig. 5.

Witnesses:
Fred Palm
George Feller

Inventor:
Edward J. Brandt.
By *Clifford & Young*
Attorneys.

No. 889,353.

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7 SHEETS—SHEET 8.

Fig. 6.

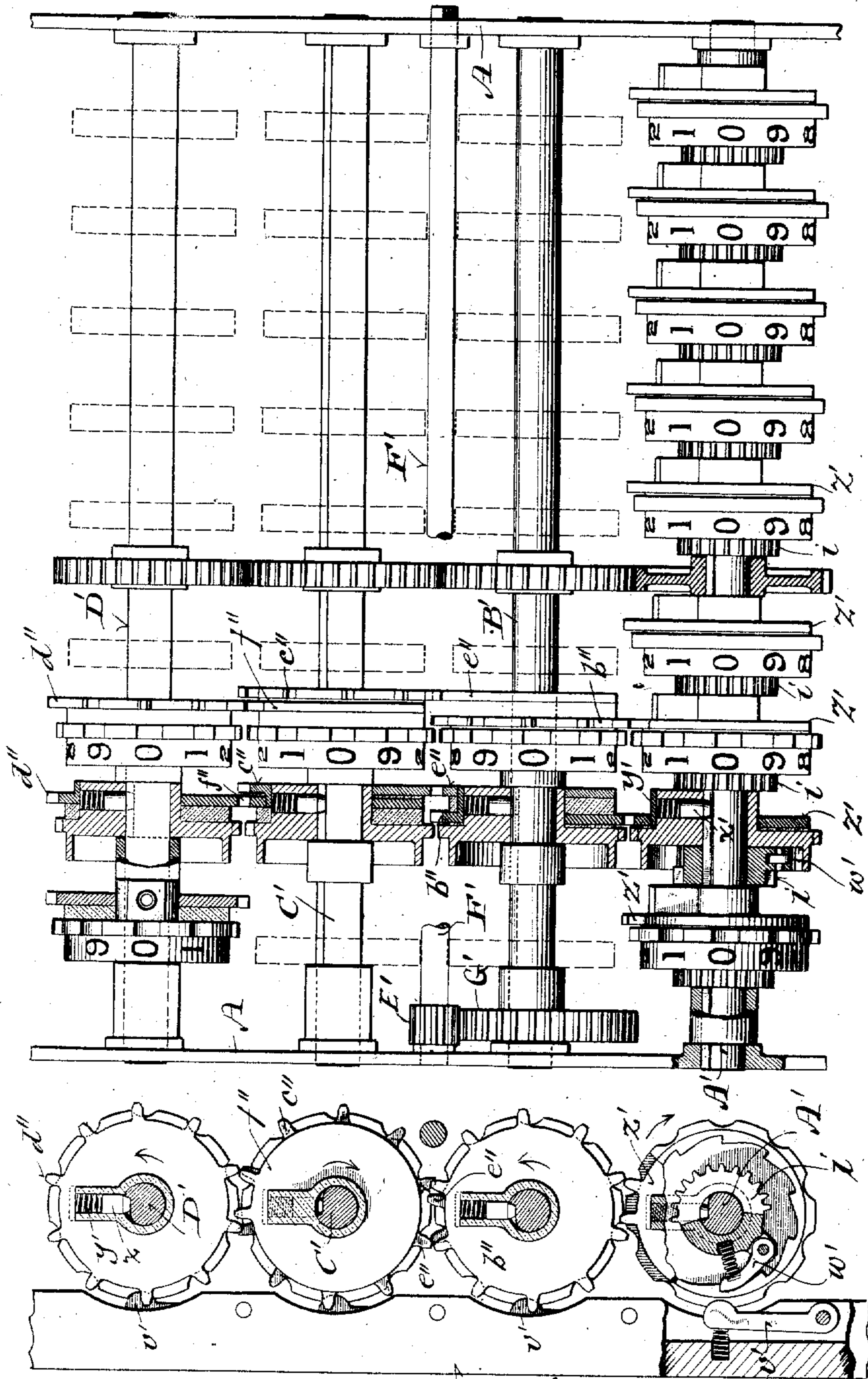


Fig. 7

Witnesses:

Frederick Palm
George Faber

Inventor:

Edward J. Brandt.
By Cliphant & Young,
Attorneys.

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PATENTED JUNE 2, 1908.

7 SHEETS—SHEET 7.

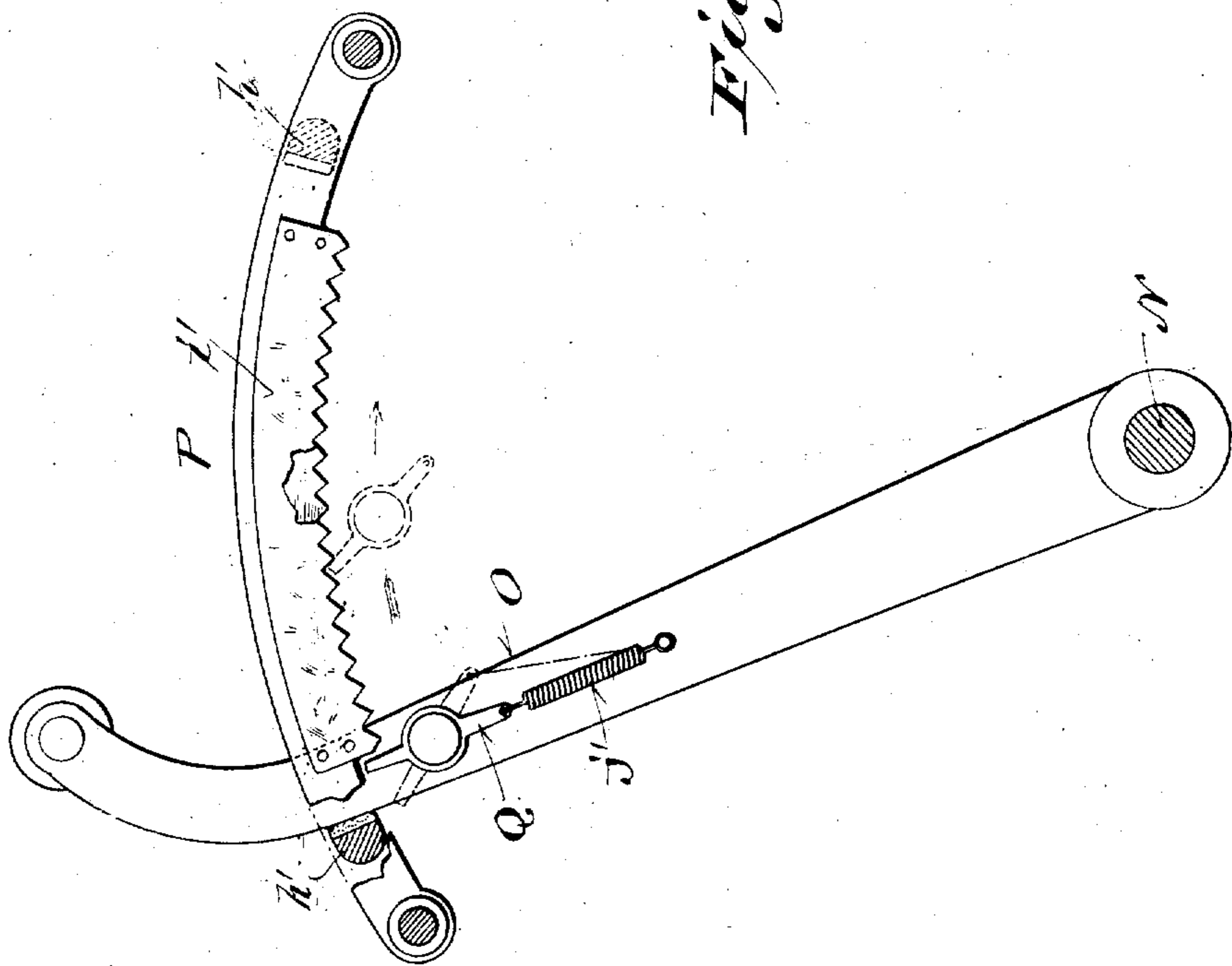


Fig. 8

Witnesses:
Fred Palm
George Felber

Inventor
Edward J. Brandt.
By *Cliphant & Young,*
Attorneys

UNITED STATES PATENT OFFICE.

EDWARD J. BRANDT, OF WATERTOWN, WISCONSIN.

CALCULATING-MACHINE.

No. 889,353.

Specification of Letters Patent.

Patented June 2, 1908.

Application filed June 5, 1907. Serial No. 377,332.

To all whom it may concern:

Be it known that I, EDWARD J. BRANDT, a citizen of the United States, and resident of Watertown, in the county of Jefferson and State of Wisconsin, have invented certain new and useful Improvements in Calculating-Machines; and I do hereby declare that the following is a full, clear, and exact description thereof.

10 The invention consists in what is herein shown, described and claimed; its object being to provide simple, economical and efficient machines for calculating the number of parts of predetermined varying value in a
15 currency requisite to the discharge of a payroll or section of same. In other words, to accurately determine the least number of bills and pieces of money necessary in the payment of a sum total by varying predetermined fractional divisions of the same.

20 Figure 1 of the accompanying drawings represents a vertical longitudinal section of a calculating machine in accordance with my invention, the same being indicated by lines
25 1—1 in the figure next in order; Fig. 2, a horizontal section of the machine at different elevations indicated by line 2—2 in Fig. 1, certain duplicated parts being indicated by dotted lines; Figs. 3 and 4, transverse section
30 views of the machine respectively indicated by lines 3—3 and 4—4 in Fig. 1, Fig. 5, a plan view of the key portion of the machine partly broken away and in section; Fig. 6, a partly
35 section front elevation of the register portion of the machine, duplicated parts of same being indicated by dotted lines; Fig. 7, a sectional view indicated by line 7—7 in Fig. 6, and Fig. 8, a side elevation of a detail of the machine.

40 Referring by letter to the drawings, A indicates a casing and *b, c*, its legs. Journaled in the sides of the casing are a series of rockers B each of which has a lug in connection with a controlling spring *d* that is also in connection with an adjacent side of the casing.
45 A crank *e* of each rocker is shackled to one end of a rod C in sections joined by a turnbuckle *f* to regulate its length. The other end of the rod extends through an eye of a hook-branch *g* of an arm D in pivotal connection with a lever E having a segmental rack-end in mesh with a pinion *i* loose on an arbor
50 constituting part of a multiple-wheel register-mechanism hereinafter more particularly described. The forward end of each rod is preferably upset or otherwise headed and to

obviate necessity for fine adjustment, said rod is provided with a washer *j* that opposes the rear of the adjacent arm-branch *g* and is in turn opposed by a spring *k* abutting a rod-collar *m*, there being restricted movement of the companion arm D in a slot of a flange *n* of a plate F fastened to the sides of the casing aforesaid.

60 The rockers B are actuated by feet *o* of a series of edgewise plates G each provided with a shank *p* guided in slots of a partition H and the major portion of the casing-top. Each plate-shank engages a spiral-spring *q* abutting the partition H and caught at its
65 upper end in edge-notches of said shank. The several shanks are also edge-notched for the engagement of spring-controlled swing-latches I journaled in the casing-sides, and each latch is in the path of one of a series of
70 teeth *r* of a slide J having longitudinal guide-slots engaging casing-studs *s*, a spring *t* controlling the slide being secured to a lateral lug of same and one of said studs. A push-key K, guided in slots of the partition H and
75 casing-top, has an edge thereof provided with a cam-notch with which a lug *u* of the slide J is normally engaged, and a spring *v* is employed in connection with said key and casing top to suspend the former. To limit its
80 movement in either direction the key K is provided with stops *w* above and below the aforesaid partition.

85 Push-buttons are employed in connection with the shanks *p* of the plates G, and the stem *x* of each button is preferably in detachable cross-engagement with the companion plate-shank, the casing-top being correspondingly slotted to guide said stem and shank. As shown in Fig. 5, the push-buttons in the lowermost row are indexed "10" and multiples of ten in regularly ascending
90 numerical order as high as "90", those in the next row are indexed "1" to "9" in like order, beginning in each instance at the left of the operator facing the machine, and the remaining push-buttons are indexed "1" to "99" inclusive beginning at the left of the lower row of the group. The push-buttons in the lower group of two rows indicate dollars and those in the group of ten rows indicate cents.

95 When a plate G is depressed, by an operation of its companion push-button, the foot or feet *o* of said plate will tilt a like number
100 of rockers B to move the companion arm or arms D in link-rod connection therewith out

of normal position into the path of the head-bar γ of a reciprocative frame, the upper end of each arm being preferably convex and the underside of said bar concave to provide for automatic centering of said arm when the engagement of same and said bar is effected. The reciprocative frame is supported in normal position by a spiral-spring z suspended from the flange n of the plate F aforesaid, the lower end of this spring being connected to a rod b' of said frame, which rod is in opposition to the rack-levers E under the same, and each of these levers is in connection with a suspension spring c' attached to a lug of said plate. The throw of each rack-lever is in proportion to the length of the arm D in connection therewith that is for the time being swung in the path of the head-bar γ of the reciprocative frame, there being four arms of varying length in independent pivotal connection with some of said rack-levers, which levers are indexed in Fig. 2, "20" "10" "5" "1" for dollars and "50" "25" "10" "5" "1" for cents. All these rack-levers are fulcrumed on a stationary rod L and spaced apart by sleeves d' on said rod.

A rock-shaft N is provided with a crank e' connected by a link-bar M with a crank f' of another rock-shaft N' and other cranks g' of the latter rock-shaft are connected to the lower ends of the sides of the reciprocative frame aforesaid. Fast on an outer end of the shaft N is an operator's crank O , and this crank has its play between preferably cushioned stops h' projecting laterally from a segmental rack P in offset connection with a side of the casing A , this rack being preferably faced with a correspondingly toothed muffler i' of indurated fiber, leather or other suitable material. In pivotal connection with the crank O is an oscillative detent Q one end of which is connected to a spring j' attached to a lug of said crank. The other end of the detent is clear of the rack P when the crank O is on full stroke in either direction and then parallel to said crank. Initial movement of the crank from either limit of its throw, results in an automatic engagement of the detent with the rack, against the resistance of the spring j' , at which time the position of said detent is such that a completion of the throw of said crank must be effected before it can be moved again in the opposite direction, this double-acting detent being an important feature of the machine, in that it compels proper use of the crank O by the operator.

The bottom of the casing A is provided with a bearing for the hub of a pinion R in mesh with a rack-crank S fast on the shaft L , and fast on said hub is a disk T intermediate of annular plates U held to revolution therewith and projecting therefrom. A spring-controlled clutch-dog k' is guided in a radial recess of the disk T , and surrounding said

disk between the plates U is another disk V the central aperture of which is ratchet-toothed for the engagement of said clutch-dog. Throw of the crank O toward the operator imparts rotary motion to the disks T , V , then in slip-clutch connection. When said crank reaches its limit of throw, the disk T is stopped, but the disk U is free to continue its movement due to acquired momentum. The crank O being released for automatic return to normal position, the disk T has rotary motion reverse to that of the disk U , the clutch-dog k' slipping on the ratchet-teeth of the latter disk to retard the motion. The rotary disk-mechanism is a governor by which to regulate the movements of the crank O and parts therewith, whereby unpleasant and detrimental jarring of the machine as a whole is avoided.

The upper ends of the sides m' of the aforesaid reciprocative frame are forked and guided on anti-friction rollers n' , these rollers being mounted on a suitably arranged stationary rod o' , which rod and another stationary rod p' are engaged with the ends of channel-bars W each of which is fastened to the lower one of said rods by a set-screw q' or other suitable means. In spring-supported pivotal connection with one of the frame-sides m' is a lever X suspended by a spring r' in connection with it and said frame side. An inclined upper edge portion of this lever abuts a stop s' and a forward upper tooth t' of said lever obtrudes back of the lug u on the slide J when the reciprocative frame is swung down. On return of the frame to normal position, the lever X operates to push the slide J to effect a release of any of the plates G and parts in connection therewith that may have been previously depressed.

In pivotal connection with each channel-bar W are a series of detents v' engageable with notches of adjacent multiplying register-wheels hereinafter more particularly described, whereby said wheels are prevented from overrunning. The register-wheels are loose on parallel arbors A' , B' , C' , D' , for which suitable bearings are provided, and the arbor A' is the one on which the pinions i aforesaid are mounted. A spring-controlled pawl w' in pivotal connection with the hub of each of the pinions is engageable with inner ratchet-teeth of an annular character flange of the companion register-wheel, and confined in a radial housing-lug of each register-wheel is a stop-pin x' and a controlling spring y' for same. This stop-pin is at times engageable with a cam-groove in the adjacent arbor longitudinally thereof but said groove in no-wise prevents the step-by-step rotary movement of the register-wheels on said arbor.

Each register-wheel on the arbor A' is provided with a tappet-ring z' , and constitutes the units-wheel of one of a series of independent multiplying register mechanisms in the

machine. The tens register-wheels are on the arbor B' and each of same is provided with a spur-gear ring b'' with which the tappet of the companion units registering-wheel is intermittently engaged. Similar gear-rings c'', d'' are provided in connection with the hundreds and thousands register-wheels, respectively and the tens and hundreds register-wheels are also provided with tappet-rings e'', f'', respectively. The tappet-ring e'' has intermittent engagement with a gear-ring c'' and the tappet-ring f'' has like engagement with a gear-ring d'', said rings being suitably spaced on the hubs of their companion register-wheels, as clearly illustrated in Fig. 6.

In Fig. 1, the front of the casing is shown provided with apertures through which to view the several register-wheels, and all the arbors for said wheels are in gear-train connection, as clearly shown in Fig. 6. The arbor B' is also shown provided with a spur-wheel G' in mesh with a pinion E' of a key-shaft F' by which all the arbors may be turned to engage with the stop-pins of the register-wheels thereon, the pin-abutting faces of the cam-grooves in said arbors being alternately in opposite directions, and in one full revolution of each arbor the cipher characters of all the companion register-wheels will appear at the reading points.

In the operation of the machine, assuming that all the register-wheels are in normal position, that is with the cipher-characters of same at the reading points, the operator reads from a pay-roll or section of same the wage-values in consecutive order thereon, and for each wage value said operator first depresses corresponding push-buttons and then pulls the crank O forward its full throw to register the parts of currency necessary to pay the wage. For instance if the wage is \$36.91, the 30 push button of the lower row of nine, the 6 push button in the next row above and the 91 push-button in the series 1 to 99 inclusive will be depressed, and the companion latches I are then operative to hold said buttons depressed until such time as the crank O is given a full forward throw and released to automatically return to normal position, this return of the crank resulting in an operation of the slide J to unlatch the shanks of plates G with which said buttons are connected. The registration for the currency parts necessary to make up the wage amount aforesaid is a result of a combination of arms D swung into the path of the head-bar of the crank-and-spring controlled reciprocative frame, the depression of these arms causing a rock of all the rack-levers E a distance sufficient to move all the units register-wheels one space, all of said arms being of approximately the same length.

There are four arms D of gradually diminishing length in pivotal connection with the

20 and 1 dollar rack-levers, two in connection with the 10 cent rack-lever and four in connection with the 1 cent rack-lever. Hence if the longest of any four group of the aforesaid arms be acted upon by the reciprocative frame, the companion units register-wheel will have a four step rotary movement, and if the longest of the two group of arms be likewise acted upon, its companion units register-wheel will have a two step rotary movement. From the foregoing it follows that the unit register-wheel companion to either four group of arms will have a three or two step rotary movement according to which one of said arms designed to effect the corresponding throw of the relative rack-lever is swung into the path of the head-bar of the aforesaid frame. A depression of the 20, 40, 60 or 80 dollar push-button sets the machine for a one, two, three or four step rotary movement of the twenty dollar units register-wheel. A depression of the 1, 2, 3 or 4 dollar push-button sets the machine for a one, two, three or four step rotary movement of the one dollar units register-wheel. A depression of the 20 cent push-button sets the machine for a two step rotary movement of the ten-cent units register-wheel, and the depression of the 1, 2, 3 or 4 cent push-button sets the machine for a one, two, three or four step rotary movement of the cent units register-wheel. Hence it will be understood that each of the 20 and 1 dollar, and the 1 cent units register-wheels moves the number of steps its unit occurs in a wage tallied by the machine up to four times said unit, and the same is true of the 10 cent units register-wheel up to twice its unit occurs in a wage likewise tallied.

All the various possible combinations from one cent to ninety nine dollars and ninety-nine cents are predetermined in the machine herein set forth, and the parts of currency necessary to any amount within these limits are registrable by said machine up to a sum total of nine thousand nine hundred and ninety nine of each part. Hence when a pay-roll or section of same, is tallied by said machine, the number of parts of predetermined value in currency necessary to the ready discharge of said pay-roll or section of same is mechanically calculated, by the several independent registers.

As another instance of a wage tally, assume the amount of the wage be \$80.48, the 80 dollar and 48 cent push-buttons will be depressed, and upon an operation of the crank O the 20 dollar units register-wheel will have a four step movement, the twenty-five cent units register-wheel a one step movement, the ten cent units register-wheel a two step movement and the one cent units register-wheel a three step movement.

In the manipulation of the machine, if a

wrong push-button is depressed an operation of the push-stem K will serve to unlatch the plate-shank in connection with said button and permit return of same to normal position. It will also be understood that if one push-button in any transverse row of said buttons is depressed, the depression of another in the same row will result in an unlatching of the first.

10 The details of the machine herein set forth may be varied indefinitely without departure from the scope of my invention in a generic sense.

I claim:

15 1. A calculating machine comprising a series of spring-controlled rockers each provided with a crank, means for actuating the rockers, rods in connection with the cranks of the rockers, spring-controlled levers having segmental rack-ends, arms controlled by the
20 rods and pivotally connected to the levers, an arbor, pinions loose on the arbor in mesh with the rack-ends of said levers, units register-wheels loose on said arbor, ratchet-and-pawl mechanism connecting the register-wheels with the pinions, other register-wheels in multiplying train with each of those afore-
25 said, means for tilting and temporarily latching the aforesaid rockers out of normal position singly and in various combinations to thereby set one or more of the aforesaid arms in working position, a lever-and-spring controlled slide-frame to which said arms in working position are opposed, and means in
30 conjunction with said frame for unlatching the tilted rocker or rockers.

2. A calculating machine comprising a series of spring-controlled rockers each provided with a crank, means for actuating the rockers, a rod in connection with the crank of
40 each rocker, spring-controlled levers having segmental rack-ends, arms controlled by the rods and pivotally connected to the levers, an arbor, pinions loose on the arbor in mesh with the rack-ends of said levers, units register-wheels loose on said arbor, ratchet-and-pawl mechanism connecting the register-wheels with the pinions, other register-wheels in multiplying train with each of those afore-
45 said, means for tilting and temporarily latching the aforesaid rockers out of normal position singly and in various combinations to thereby set one or more of the aforesaid arms in working position, a lever-and-spring controlled slide-frame to which said arms in working position are opposed, means in conjunction with said frame for unlatching the tilted rocker or rockers, and means for setting
50 all the register-wheels to have the cipher-character of each at the reading point.

3. In a calculating machine, a series of spring-controlled rockers each provided with a crank, means for actuating same, a rod in connection with a crank of each rocker,
55 spring-controlled levers having segmental

rack-ends, arms controlled by the rods and pivotally connected to the levers, an arbor, pinions loose on the same in mesh with the rack-ends of said levers, units register-wheels loose on said arbor, ratchet-and-pawl mechanism connecting the register wheels with the pinions, other register-wheels in multiplying train with each of those aforesaid, detents engageable with notches of the several register-wheels, means for tilting and temporarily
70 latching the aforesaid rockers out of normal position singly and in various combinations to thereby set one or more of the aforesaid arms in working position, a lever-and-spring controlled slide-frame to which said arms in working position are opposed, and means in connection with said frame for unlatching the tilted rocker or rockers.

4. A calculating machine comprising a series of spring-controlled rockers each provided with a crank, edgewise plates having rocker-opposing feet and spring-supported push-button shanks, spring-controlled latches engageable with notches of depressed shanks, a spring-controlled retractor for all the
85 latches, rods in connection with the cranks of the rockers, spring-controlled levers having segmental rack-ends, arms controlled by the rods and pivotally connected to the levers, an arbor, pinions loose on the arbor in mesh with the rack-ends of said levers, units register-wheels loose on said arbor, pawl-and-ratchet mechanism connecting the register wheels with the pinions, other register-wheels in multiplying train with each of those afore-
90 said, a lever-and-spring controlled slide-frame operative on any one or more of the aforesaid arms adjusted out of normal position, and means in conjunction with said frame for actuating the aforesaid latch-retractor.

5. A calculating machine comprising a series of spring-controlled rockers each provided with a crank, edgewise plates having rocker-opposing feet and spring-supported
110 push-button shanks, spring-controlled latches engageable with notches of depressed shanks, a spring-controlled retractor for all the latches, a spring-controlled push-stem operative on depression to actuate the latch-retractor, rods in connection with the cranks of the rockers, spring-controlled levers having segmental rack-ends, arms controlled by the rods and pivotally connected to the levers, an arbor, pinions on the arbor to mesh with the rack-ends of said levers, units register-wheels loose on said arbor, pawl-and-ratchet mechanism connecting the register-wheels with the pinions, other register-wheels in multiplying train with each of those afore-
115 said, a lever-and-spring controlled slide frame operative on any one or more of the aforesaid arms adjusted out of normal position, and means in conjunction with said frame for actuating said latch-retractor.

6. A calculating machine comprising a series of spring-connected rockers each provided with a crank, means for actuating same, a rod in connection with the crank of
 5 each rocker, spring-controlled levers having segmental rack-ends, arms controlled by the rods and pivotally connected to the levers, an arbor, pinions loose on the arbor in multiplying train with each of those aforesaid,
 10 detents engageable with notches of the several register-wheels, means for tilting and temporarily latching the aforesaid rockers out of normal position singly and in various combinations to thereby set one or more of
 15 the aforesaid arms in working position, a lever-and-spring controlled slide-frame to which said arms in working position are opposed, and means in conjunction with said frame for unlatching the tilted rocker or
 20 rockers, and a governor mechanism controlling said frame and its operating crank.

7. In a calculating machine, a series of spring-controlled levers having segmental rack-ends, arms in pivotal connection with
 25 the levers, means governing throw of the arms into working-position, a sliding-frame to which said arms in working position are opposed, a spring and a lever controlling the frame, an arbor, pinions loose on the arbor
 30 in mesh with the rack-ends of the levers, units register-wheels loose on said arbor, and other register-wheels in multiplying train with each of those aforesaid.

8. In a calculating machine, a series of
 35 spring-controlled levers, arms in pivotal connection with the levers, means for throwing and temporarily holding one or more of said arms in working position, a sliding-frame to which each arm in working position is
 40 opposed, a spring and lever for the control of the frame, arm-releasing mechanism with which said frame coöperates, a series of multiplying registers, and means in conjunction with each lever for actuating a companion
 45 register.

9. In a calculating machine, a series of spring-controlled levers, arms in pivotal connection with the levers, there being a plurality of arms of different lengths companion
 50 to some of the levers, means for throwing and temporarily holding one or more of said arms in working position, a sliding-frame to which each arm in working position is opposed, a spring and lever for the control of
 55 the frame arm releasing mechanism with which said frame coöperates, a series of multiplying registers, and means in conjunction with each lever for actuating a companion register.

60 10. In a calculating machine, a series of spring-controlled levers, operating-arms in

pivotal connection therewith and provided with eye-branches, adjusting rods engaging said branches of the arms, a spiral-spring confined on each rod between a collar of same
 65 and a washer thereon opposing the eye-branch of the companion arm, spring-controlled mechanisms for actuating the rods, latches for the same, a slide-frame operative on all the arms adjusted to working position,
 70 a series of multiplying registers, means in conjunction with each lever for actuating a companion register, frame-actuating mechanism, and frame-controlled release mechanism, for said latches.

11. In a calculating machine, a series of spring-controlled levers, operating arms in pivotal connection therewith, rods in sections joined by turn-buckles and connected
 80 to said arms, spring-controlled mechanisms for actuating the rods, latches for the same, a slide-frame operative on all the arms adjusted to working position, a series of multiplying registers, means in conjunction with each lever for actuating a companion register,
 85 frame-actuating mechanism, and frame-controlled release-mechanism for said latches.

12. In a calculating machine, a series of multiplying-registers, a corresponding series of levers and means in conjunction with each
 90 of same for actuating a companion register, a spring-controlled slide-frame a rod of which underlies the levers, arms in pivotal connection with said levers and adjustable singly and in series into the path of a head-bar of
 95 same frame, means for maintaining the adjustment, releasing mechanism in conjunction with the frame, and crank-controlled mechanism for actuating said frame against spring-resistance.

13. In a calculating-machine, a multiplying-register actuating-mechanism comprising a rock-shaft provided with an operator's crank, a rack-crank fast on said shaft, a
 100 pinion in mesh with the rack-crank, a bearing for the pinion-hub, a disk fast on said hub between annular plates held to revolution therewith and projecting therefrom, a spring-controlled clutch-dog guided in a radial recess of the disk, and another disk that surrounds the one aforesaid and is ratchet-toothed for the engagement of said dog.

In testimony that I claim the foregoing I have hereunto set my hand at Watertown
 115 in the county of Dodge and State of Wisconsin in the presence of two witnesses.

EDWARD J. BRANDT.

Witnesses:

HUGO KOENIG,
 ROBT. DENT.