No. 883,403. PATENTED MAR. 31, 1908.

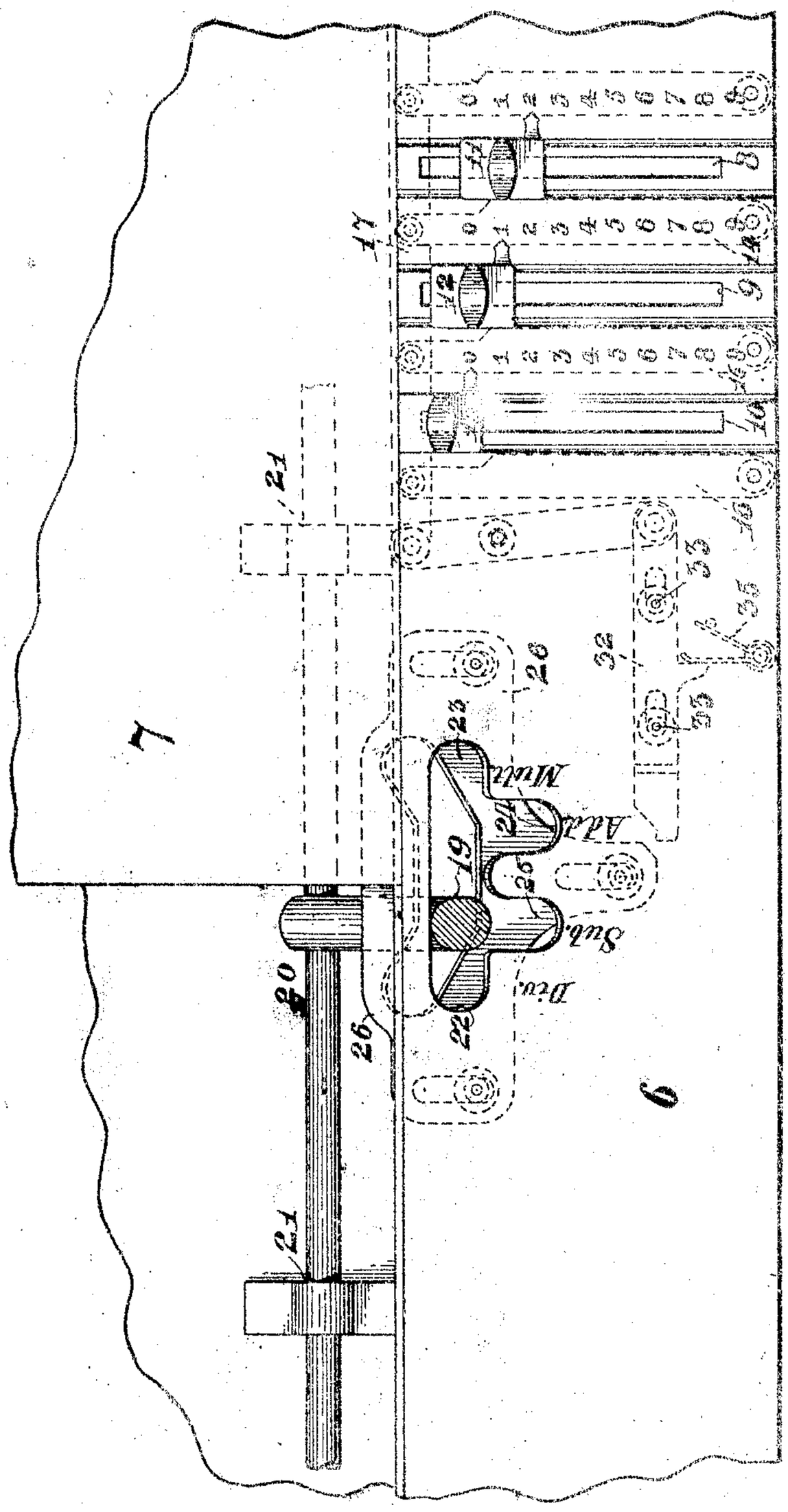
W. F. HAUSSTEIN.

CALCULATING MACHINE.

APPLICATION FILED NOV. 9, 1904.

4 SHEETS—SHEET 1.

Fig. 1.



Witnesses
Herman Mayer
Alan McDonnell

William F. Haussteín Inventor
By His Attorney William R Baird

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4 SHEETS—SHEET 2

Fig. 2.

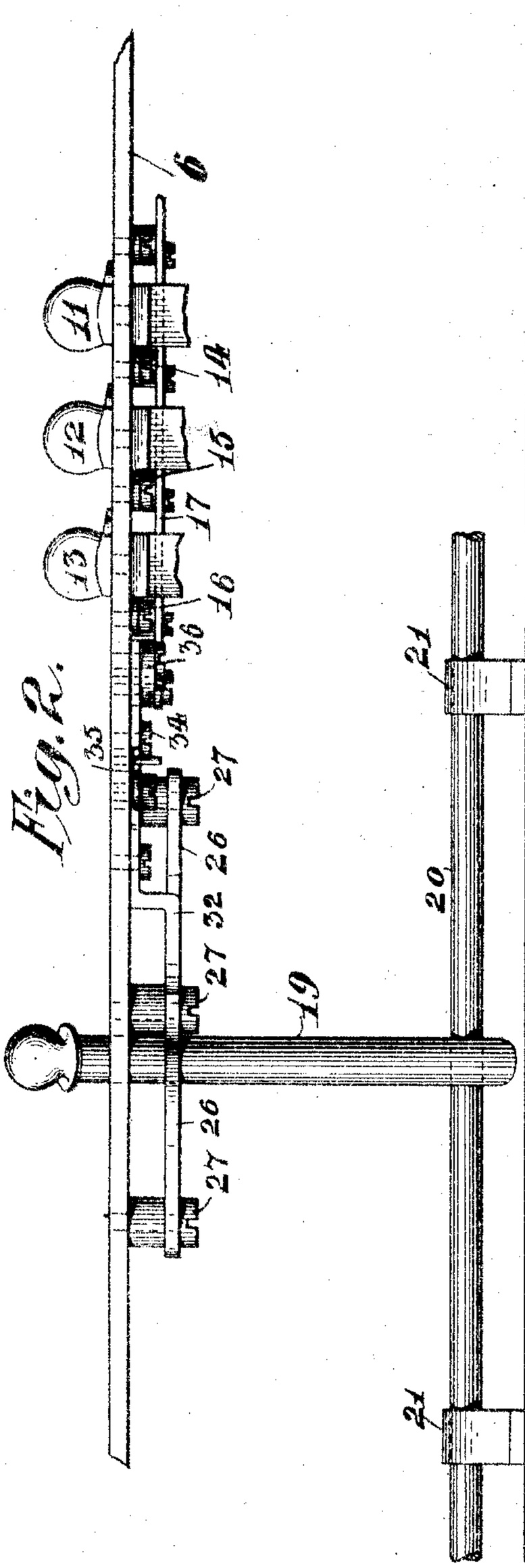
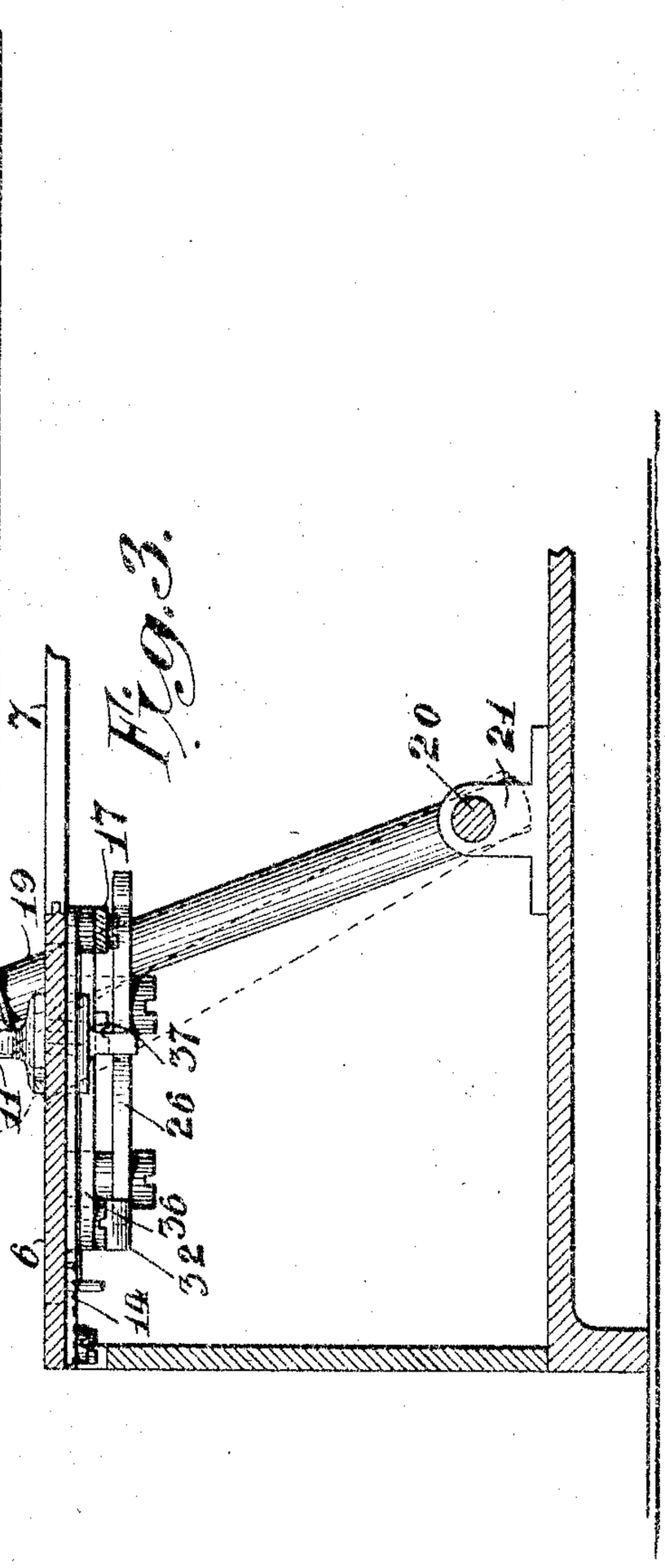


Fig. 3.



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4 SHEETS—SHEET 3.

Fig. 4.

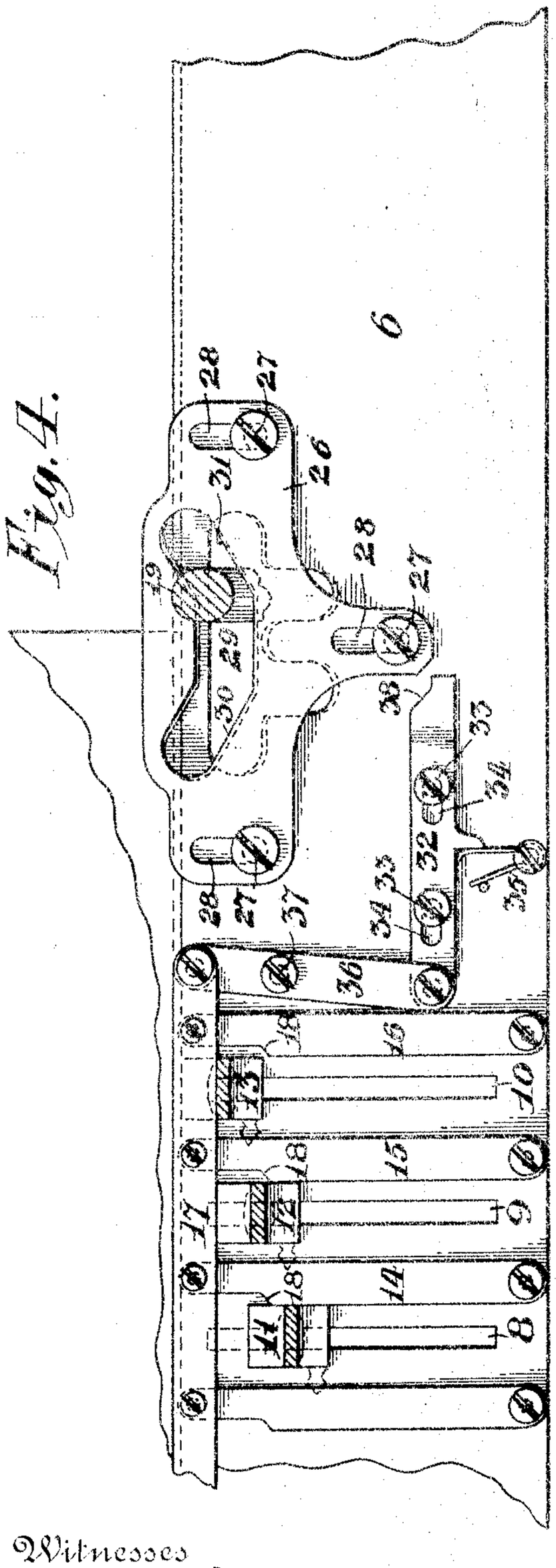
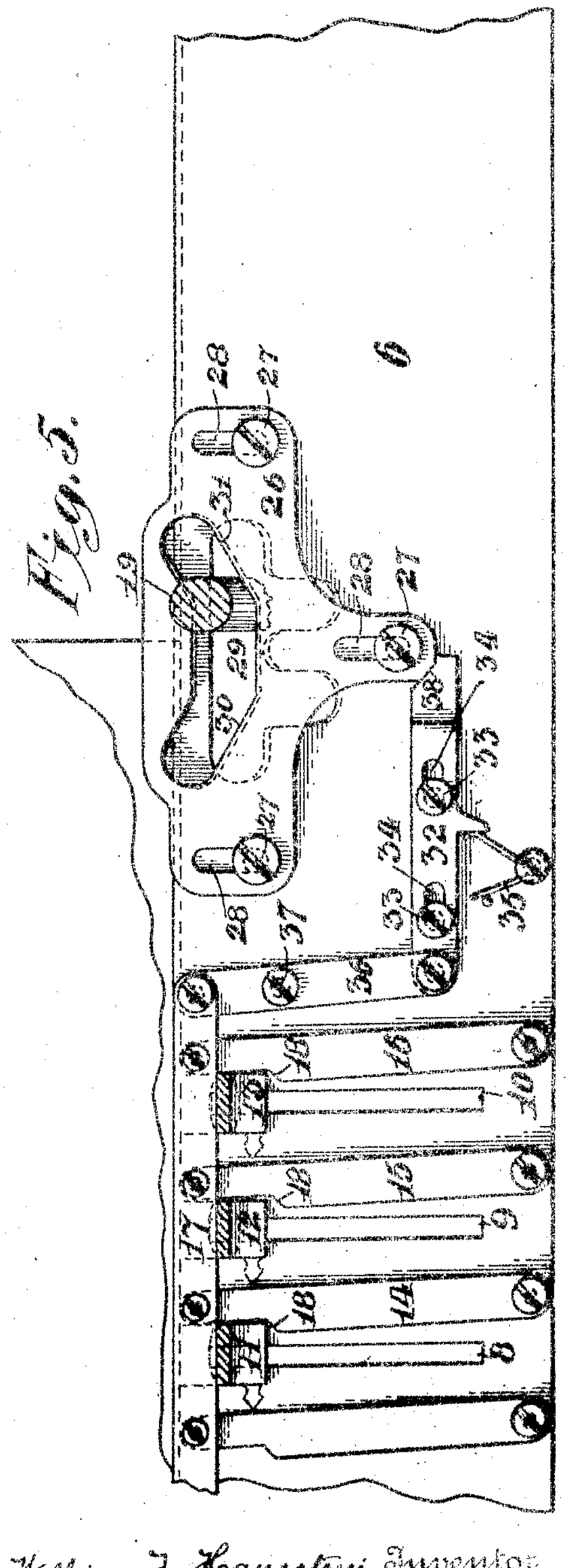


Fig. 5.



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4 SHEETS—SHEET 4.

Fig. 6.

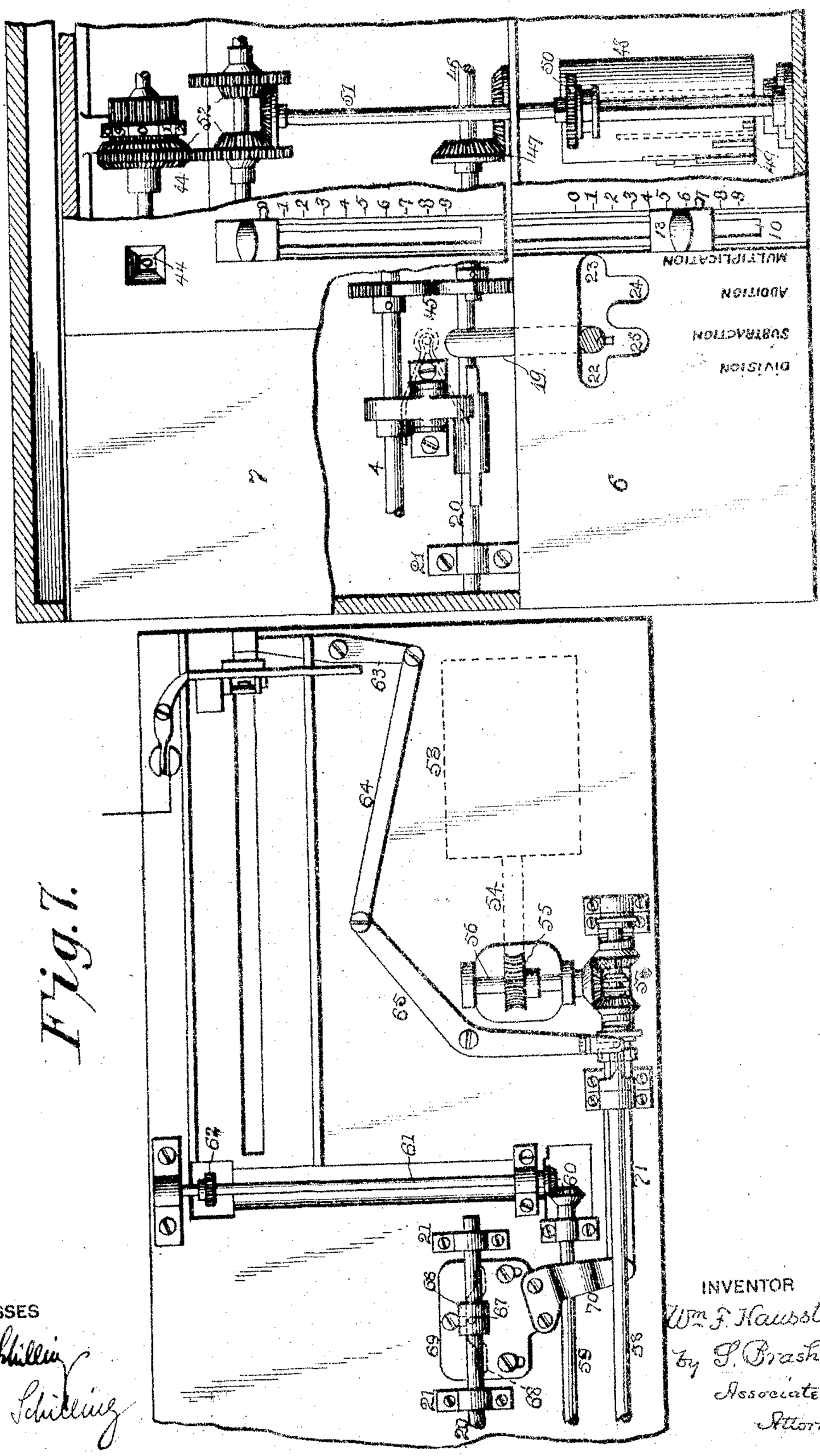

Fig. 7.

WITNESSES

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UNITED STATES PATENT OFFICE.

WILLIAM F. HAUSSTEIN, OF LYNDHURST, NEW JERSEY, ASSIGNOR TO THE KEUFFEL & ESSER COMPANY, OF HOBOKEN, NEW JERSEY, A CORPORATION OF NEW JERSEY.

CALCULATING-MACHINE.

No. 883,403. Specification of Letters Patent. Patented March 31, 1908.

Application filed November 9, 1904. Serial No. 232,002.

To all whom it may concern:

Be it known that I, WILLIAM F. HAUSSTEIN, a citizen of the United States, residing at Lyndhurst, in the county of Bergen and State of New Jersey, have invented certain new and useful Improvements in Calculating-Machines, of which the following is a specification.

This invention relates to calculating machines such as that which forms the subject matter of U. S. Patent to Alexander Rechnitzer, Number 809,075, granted Jan. 8, 1906.

In that machine the operation of addition, subtraction, multiplication and division are performed and the machine comprises two series of graduated slots, one slot in each series for each digit of the number to be handled. In each slot there is a numeral slide by means of which the mechanism is set up for either of the operations named, after which the machine is started by means of a manually operated starting lever.

In performing either of the operations, on the machine as heretofore constructed, should the operator fail to set up the number to be added or subtracted or the multiplier or divisor, and then start the machine, the result of the operation would be nothing and the wear of the machine and the time consumed would be wasted.

The special object of this invention is to render it impossible to start the machine unless the multiplier or divisor is set up in its series of slots and the invention consists in providing mechanism in such machines for carrying out this object by locking the starting lever when the numeral slides are all at zero.

In the accompanying drawings I have illustrated the mechanism for preventing the starting of the machine with so much of the machine itself as is necessary to render the construction and operation thereof understandable.

In these drawings, Figure 1 is a top plan view of enough of the machine as improved to illustrate my invention, parts being broken away and parts shown in dotted lines. Fig. 2 is a front elevation of the same with the front of the casing removed. Fig. 3 is a transverse vertical section through the casing showing the mechanism of Fig. 2 in end elevation. Fig. 4 is a bottom plan view with one at least of the numeral slides adjusted to indicate some number, the starting lever being free to be operated to start the machine, and Fig. 5 is a similar view with the numeral slides at zero and the starting lever locked against operation. Fig. 6 is a partial plan view with parts broken away, showing part of the numeral wheels and their actuating mechanism. Fig. 7 is a partial plan view with the top plate and sliding carriage removed showing the clutch mechanism and the devices actuated by the starting lever for starting and stopping the machine.

Referring now specifically to the drawings, 6 indicates the stationary top of the machine and 7 the top of the sliding carriage thereof.

In the top 6 is a series of graduated slots, as at 8, 9, and 10, the number of such slots being governed by the capacity of the machine, or the number of digits of the highest number to be added or subtracted or of the multiplier or divisor, each slot being graduated from 0 to 9 and provided with a numeral slide as at 11, 12, and 13 carrying a suitable pointer or indicator and connected up inside the machine with the calculating mechanism as in the original machine but not herein shown.

Pivoted under the top plate 6, by the side of each slot is a bar as at 14, 15, 16, all of said bars being connected for simultaneous movement by a bar 17 and each bar comprising a reduced end and an inclined portion 18 connecting said end and the main body.

The starting lever, indicated at 19, is mounted on a shaft 20 journaled in bearings 21 on the base of the machine and passes up through a slot in the top 6. In starting the machine this lever is moved to the left hand end 22 of the slot for division, to the right hand end 23 for multiplication, into a branch slot 24 for addition and into another branch slot 25 for subtraction.

26 indicates a plate mounted below the top 6 by screws 27 passing through slots 28 which permits of its sliding forward and backward. This plate is provided with a transverse slot 29 whose ends are inclined forward as at 30, 31.

32 indicates a longitudinal locking bar slidably secured upon the under side of the top plate 6 by screws 33 passing through

slots 34 and yieldingly forced toward the right by a spring 35. A lever 36 is pivotally secured at 37 under the top plate one end being pivoted to the bar 32 and the other end to the bar 17. The force of the spring 35, transmitted through the lever 36 and the bar 17, normally presses the free reduced ends of the bars 14, 15 and 16 to the left against the numeral slides when in zero position. In this position the right hand end of the locking bar 32, which is inclined, or cam shaped, at 38, forces the plate 26 forward and locks the starting lever against movement either forward, backward or to either side, as shown in Fig. 5, said lever being thus prevented from reaching either end of the slot 29 or of the branch slots 24 or 25 so that the machine cannot be started to perform any of its operations.

Should any one or more of the numeral slides be set at any figure from 1 to 9, (as shown for instance in Fig. 4), such slide (or slides) contacts with and passes over the inclined portion 18 of said bar and forces such bar to the right, the connecting bar 17 carrying all the rest of the bars 14 etc. to the right also. This draws the locking bar 32 to the left against the action of the spring 35 thus freeing it from contact with the plate 26 and leaving said plate free and permitting the starting lever to be moved into either of the positions necessary to start the machine to perform either of the operations of addition, subtraction, multiplication or division.

It will thus be obvious that when all of the numeral slides are at zero, the starting lever will be automatically locked and that the machine cannot be started to perform a useless operation and that when any number whatever is set up by the slides, the locking mechanism is released and the starting lever is free to be moved into position to start the machine to perform any of the operations it is capable of performing.

In Fig. 6 is shown sufficient of the calculating mechanism of the Rechnitzer patented calculating machine to identify the connection of the mechanism of the present invention therewith, the graduated slots and slides for indicating the amounts to be added or subtracted being indicated at 10 and 13, and one of the numeral wheels for indicating the results, at 44.

The main shaft 4 of the machine is connected by gearing 45 with a shaft 46, which in turn is connected by bevel gearing 47 with the shafts (not shown) of the drums 48 (of which there is a number in each machine equal to the number of digits in the highest number upon which the machine is capable of operating) which carry teeth 49 of graduated length. As slidable gears 50 are adjusted (by slides 8, 9, 10) on shafts 51, these shafts are rotated a distance determined by the positions of the slides and as they are connected by gearing 52 with the numeral wheels 44, said numeral wheels are correspondingly rotated and the various calculating operations performed in the manner fully explained in the specification of the Rechnitzer patent hereinbefore referred to.

The main sheet 4, is driven by a motor, as at 53 in Fig. 7, and is connected, disconnected and reversed by mechanism illustrated in said figure, which is fully described and claimed in a co-pending application of mine, Serial Number 237,236 filed Dec. 17, 1904, the motor shaft 54 carrying a worm (not shown) meshing with worm wheel 55 on shaft 56, which latter, by the clutch mechanism 57, actuates a shaft 58 connected by gearing (not shown) with the shaft 4 and also with a shaft 59, the latter being connected by gearing 60 with a shaft 61 carrying a pinion 62 which meshes with a rock-shaft (not shown) on the carriage of the machine.

The carriage at the end of its stroke strikes a lever 63, thus, through the medium of a link 64, and lever 65, automatically reversing the movement of the carriage, all as fully described in said co-pending application.

The starting lever slidable rock shaft 20 carries a hub 66 from which projects a pin 67 into a slot 68 in a slidable plate 69 so that when the starting lever is moved from its normal position as indicated in Fig. 1, into or out of either of the ends 22 or 23 of the slot, the shaft 20, is moved longitudinally, causing pin 67 to pass into or out of one of the ends of the slot 68, which will cause said plate 69 to slide and actuate an elbow lever 70 connected by a bar or link 71 with the clutch mechanism, and thus actuate the latter to start or stop the machine.

What I claim as new is:—

1. In a machine of the character described, numeral wheels, mechanism for operating them; means for setting up numbers, a motor, a shaft actuated thereby, means for connecting said shaft with the mechanism for operating the numeral wheels, and means for preventing such connection brought into operative position by setting up zero.

2. In a machine of the character described, numeral wheels, mechanism for operating them; means for setting up numbers, a motor, a shaft actuated thereby, means for connecting said shaft with the mechanism for operating the numeral wheels, and automatic means for preventing such connection normally held in operative position while the setting means is at zero.

3. In a machine of the character described, numeral wheels, mechanism for operating them; means for setting up numbers, a motor, a shaft actuated thereby, means for connecting said shaft with the mechanism for operating the numeral wheels, and means for preventing the operation of such connection normally held in operative position when the

setting means is at zero and rendered inoperative by setting up a number greater than zero.

4. In a machine of the character described, numeral wheels, mechanism for operating them; means for setting up numbers, a motor, a shaft actuated thereby, means for connecting said shaft with the mechanism for operating the numeral wheels, and automatic means for preventing the operation of such connection normally held in operative position when the setting means is at zero and rendered inoperative by setting up a number greater than zero.

5. In a machine of the character described, numeral wheels, mechanism for operating them; means for setting up numbers, a motor, a shaft actuated thereby, means for connecting said shaft with the mechanism for operating the numeral wheels, and spring-actuated means for preventing the operation of such connection normally held in operative position when the setting means is at zero and rendered inoperative by setting up a number greater than zero.

6. In a machine of the character described, means for setting up numbers, a motor, a shaft actuated thereby, a clutch on said shaft, means for shifting the clutch, and means for locking the shifting mechanism brought into operative position by setting up zero.

7. In a machine of the character described, means for setting up numbers, a motor, a shaft actuated thereby, a clutch on said shaft, means for shifting the clutch, and automatic locking means for the shifting mechanism normally held in locking position when the setting means is in the zero position.

8. In a machine of the character described, means for setting up numbers, a motor, a shaft actuated thereby, a clutch on said shaft, means for shifting the clutch, and locking means for the shifting mechanism moved from its locking position by setting up a number greater than zero.

9. In a machine of the character described, means for setting up numbers, a motor, a shaft actuated thereby, a clutch on said shaft, means for shifting the clutch, and automatic locking means for the shifting mechanism removed from its locking position by setting up a number greater than zero.

10. In a machine of the character described, means for setting up numbers, a motor, a shaft actuated thereby, a clutch on said shaft, means for shifting the clutch, and spring-actuated locking means for the shifting mechanism removed from its locking position by setting up a number greater than zero.

11. In a motor actuated machine of the character described, the combination with the motor, a shaft, operative connection between the motor and the shaft, and means for actuating said connections, of numeral slides for setting up numbers, and means for locking the actuating mechanism brought into operative position by setting all the numeral slides at zero.

12. In a motor actuated machine of the character described, the combination with the motor, a shaft, operative connections between the motor and the shaft, and means for actuating said connections, of numeral slides for setting up numbers, and automatic locking means for the actuating mechanism removed from operative position by setting up any numeral slide to a number greater than zero.

13. In a motor actuated machine of the character described, the combination with a motor, a shaft, operative connections between the motor and the shaft, and means for actuating said connections, of a locking bar for the actuating mechanism, a numeral slide for setting up a number, a bar pivoted alongside the slide and operated thereby, and connections between the said pivoted bar and locking bar.

14. In a motor actuated machine of the character described, the combination with the motor, a shaft, operative connections between the motor and the shaft, and means for actuating said connections, of a plurality of numeral slides for setting up numbers, a bar pivoted alongside of each slide, a bar connecting said pivoted levers, and connections between the connecting bar and the locking bar.

15. In a motor actuated machine of the character described, the combination with the motor, a shaft, operative connections between the motor and the shaft, and means for actuating said connections, of a slidable locking plate, a locking bar therefor, a numeral slide for setting up a number, a bar pivoted adjacent thereto, a pivoted lever connected at one end with the locking bar, and a connection between the opposite end of the lever and the locking bar.

16. In a calculating machine, the combination with a lever, a slidable locking plate, and a locking bar therefor, of a plurality of numeral slides for setting up numbers, a pivoted bar adjacent to each slide, a bar connecting said pivoted bars for simultaneous operation, and a pivoted lever connected at one end with the connecting bar and at the other end with the locking bar.

17. In a calculating machine, the combination with a slidable slotted plate and a lever projected through its slot, of means for setting up a number, and a locking bar for the slotted plate brought into operation by bringing the setting means to zero.

18. In a calculating machine, the combination with a slidable slotted plate and a lever projected through its slot, of means for setting up a number, and a locking bar for

the slotted plate withdrawn from operation by setting up a number greater than zero.

19. In a calculating machine, the combination with a slidable plate having a slot consisting of a main portion and two inclined ends, and a lever projected through said slot, of means for setting up a number and locking means for the slidable slotted plate brought into and released from operative position by the operation of the setting up means.

20. In a motor actuated machine of the character described, the combination with the motor, a shaft, operative connections between the motor and the shaft, and means for actuating said connections, of a numeral slide for setting up a number, a pivoted lever comprising a body, a reduced end, and an inclined connecting portion, and locking means for the actuating mechanism brought into and withdrawn from operative position by the operation of the numeral slide upon the various parts of the pivoted lever.

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

WILLIAM F. HAUSSTEIN.

Witnesses:
WILLIE L. E. KEUFFEL,
CLARENCE S. HAMMELL.