

905,424.

W. F. HAUSSTEIN.
CALCULATING MACHINE.
APPLICATION FILED NOV. 8, 1904.

Patented Dec. 1, 1908.
2 SHEETS—SHEET 1.

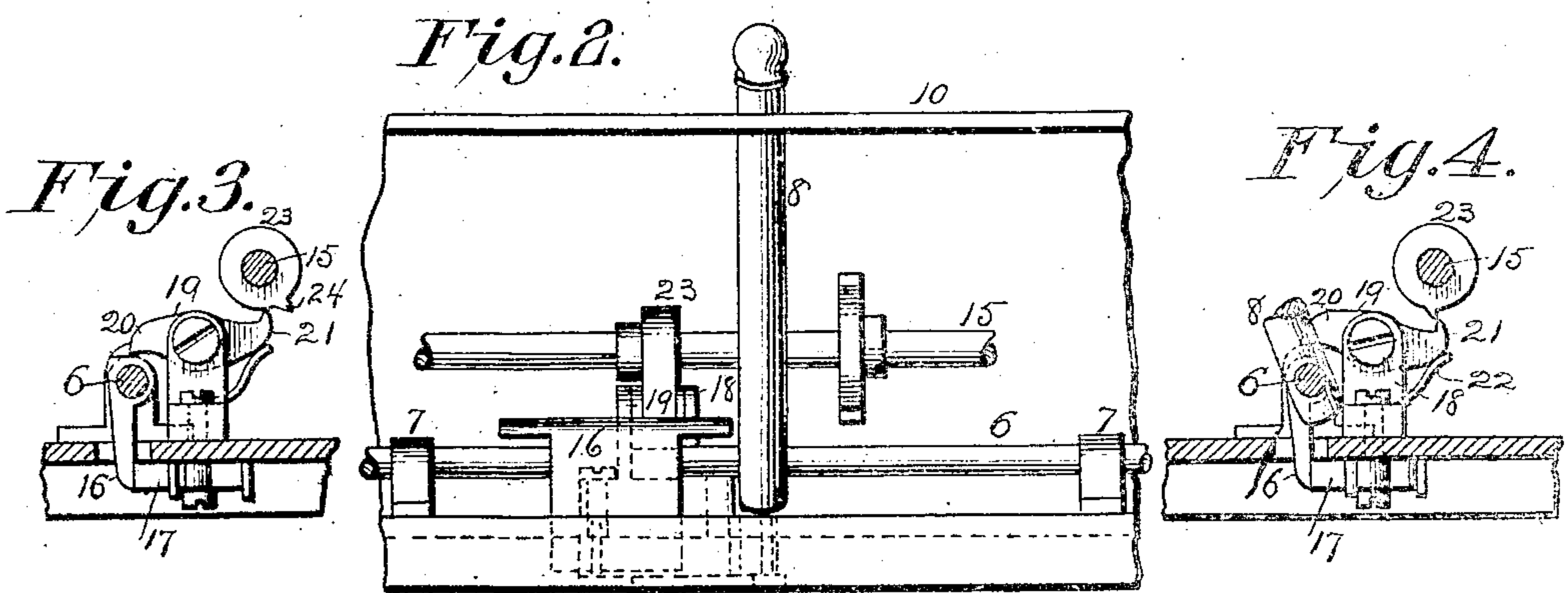
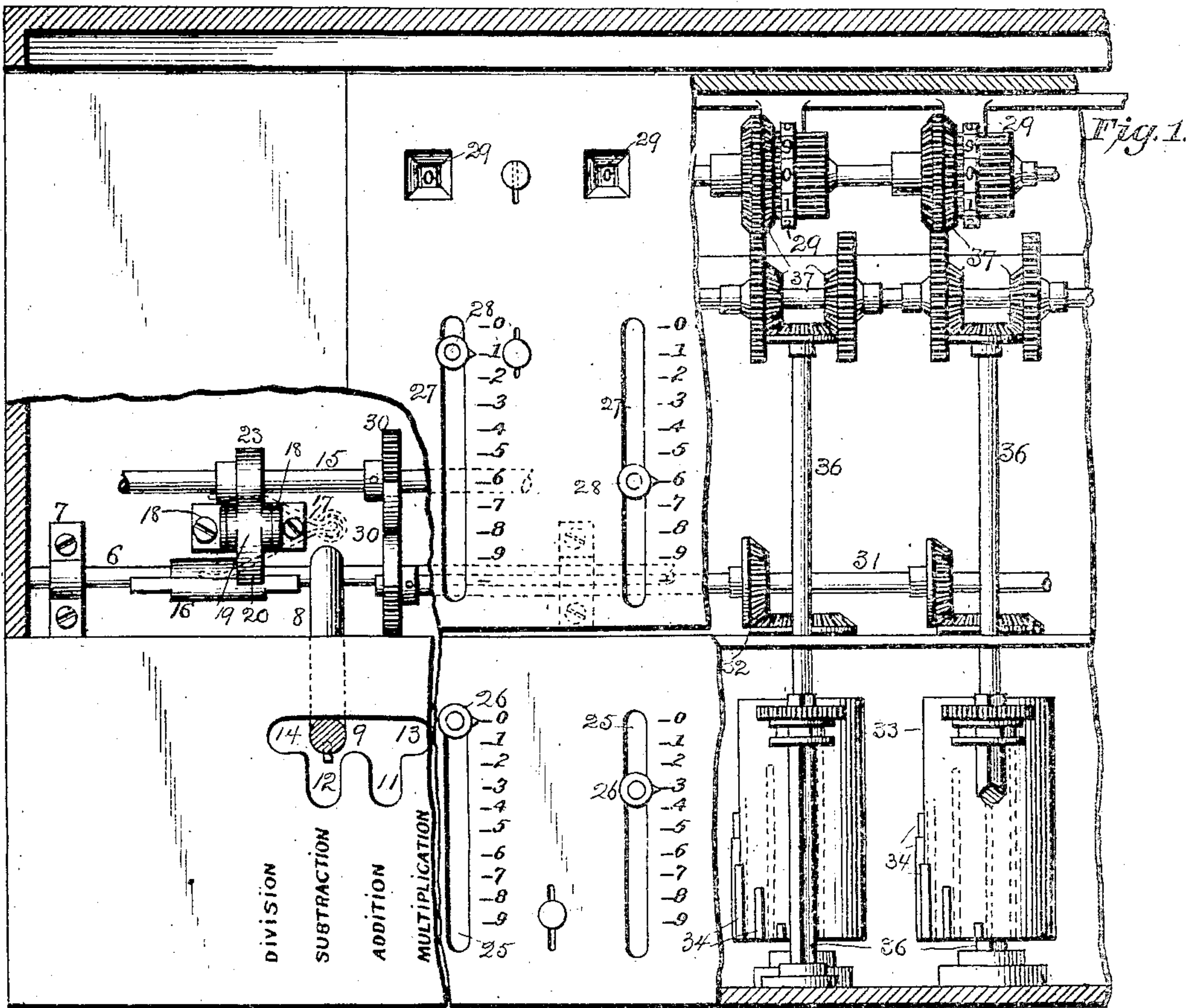
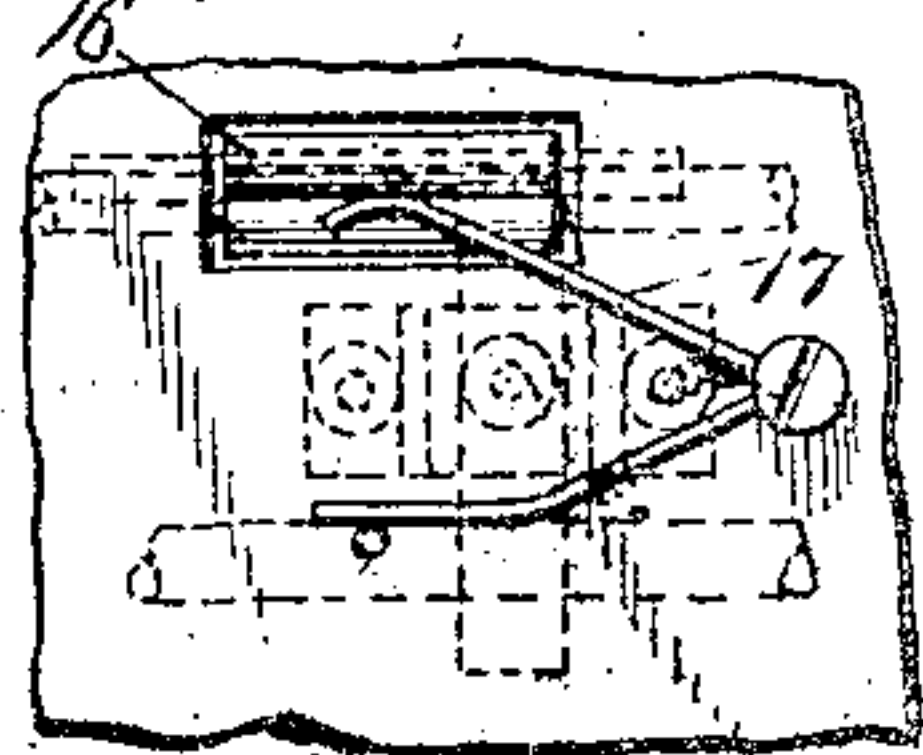


Fig. 5.



Witnesses

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2 SHEETS—SHEET 2.

Fig. 6.

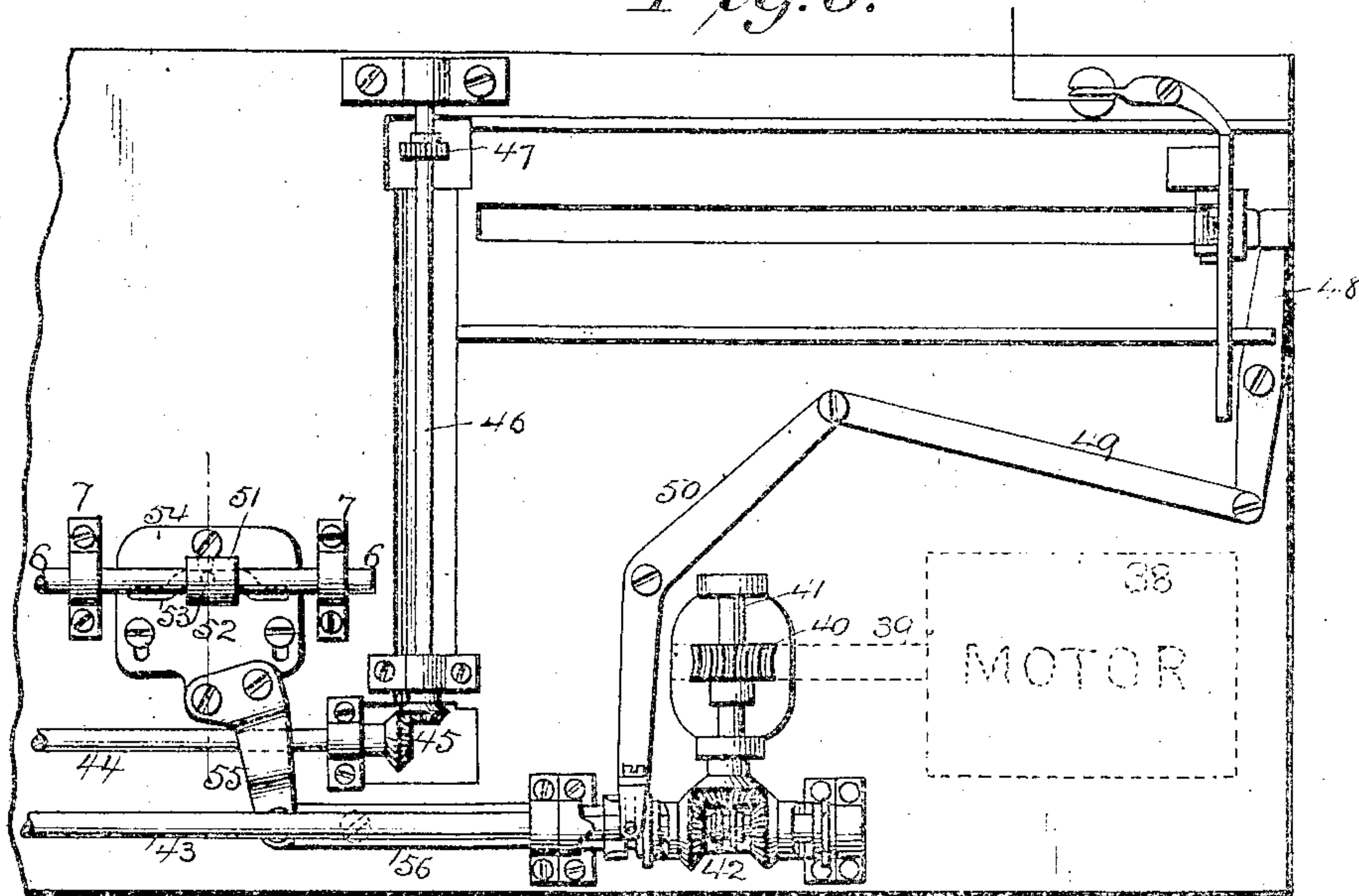


Fig. 7.

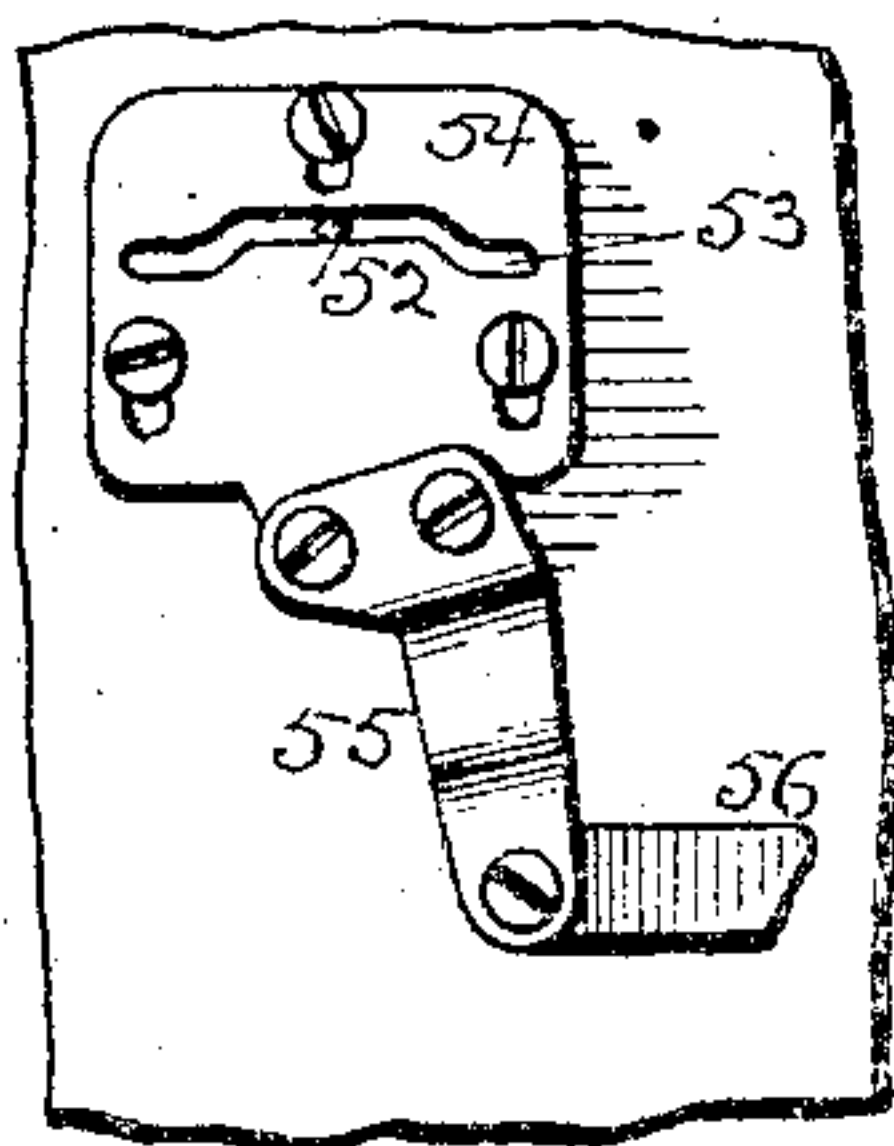


Fig. 8.

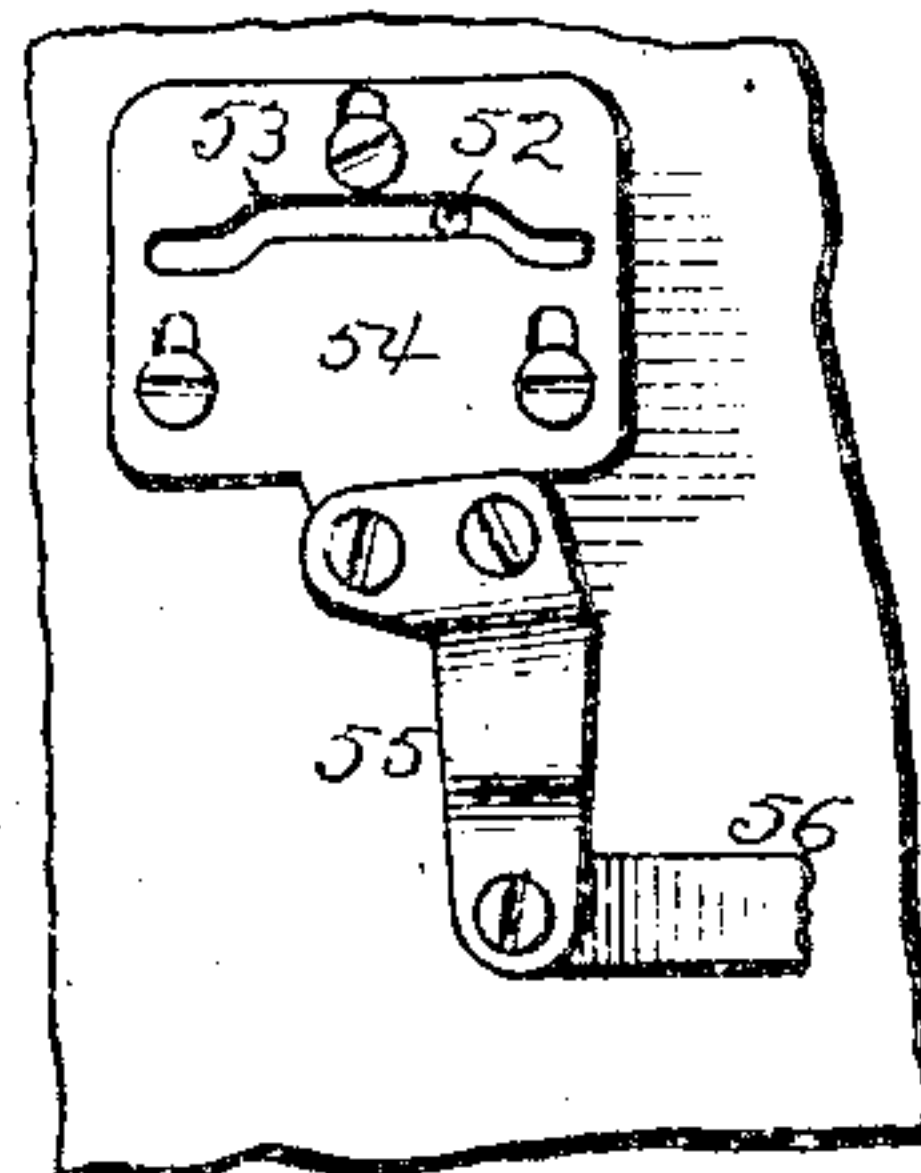
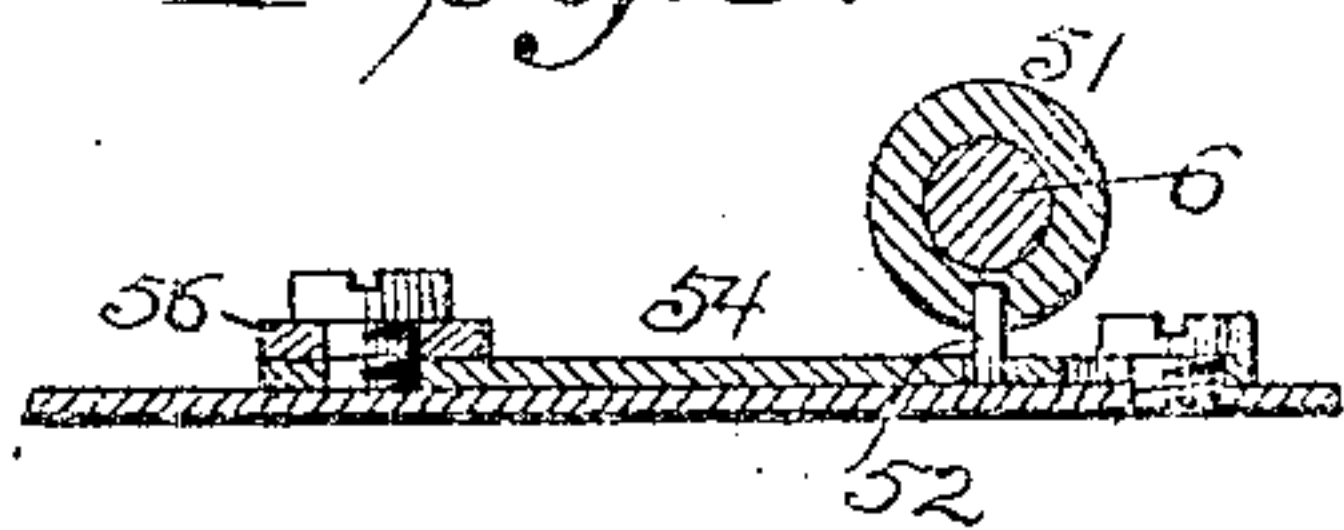


Fig. 9.



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UNITED STATES PATENT OFFICE.

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CALCULATING-MACHINE.

No. 905,424.

Specification of Letters Patent.

Patented Dec. 1, 1908.

Application filed November 8, 1904. Serial No. 281,931.

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 Rechner, Number 809,075, granted January 8, 1906. In that machine the operations of addition, subtraction multiplication and division are performed, the multiplication consisting of repeated additions of the multiplier and the present invention relates to certain parts of the machinery for addition and subtraction. In said machine there is a starting lever mounted on a rock shaft, the machine being started to perform the various operations by moving the starting lever to certain predetermined positions for the various operations which movements either rock or slide the rock shaft. Each step of an operation of addition or subtraction is performed during one complete revolution of the main shaft, and to start an operation of addition or subtraction, the starting lever is moved in such a manner as to slightly rock the shaft upon which it is mounted. During any operation there is danger that the starting lever may be accidentally moved out of its proper position and the character of the operation changed and perhaps some of the parts disarranged or broken besides wasting the time occupied and compelling the resetting up of the mechanism and beginning the operation anew.

It is the special object of this invention to render such an accident impossible and the invention consists in providing such a machine with mechanism which is operative during the time the machine is performing the various operations and which during such operations will securely lock the starting lever in the position to which it has been brought to start the machine, such mechanism at the end of each complete revolution of the main shaft, being automatically released permitting the starting lever to return to its

normal or inoperative position ready to be operated to again start the machine.

In the accompanying drawings, in which are illustrated the mechanisms comprised in this invention and so much of the original machine as is necessary to a proper understanding of the invention, Figure 1 is a top plan view of part of the machine illustrating the present invention, parts being broken away, parts shown in dotted lines, and the starting lever in section, Fig. 2 is a partial front elevation with the front of the casing removed, Fig. 3 is a partial sectional view on a plane cutting transversely partially through the bottom of the casing, showing some of the mechanism in end elevation, just after a complete revolution of the main shaft, Fig. 4 is a similar view with the parts in position at the end of a complete revolution of the main shaft, Fig. 5 is a partial bottom plan view, Fig. 6 is a plan view of part of the machine with the top plates removed, Figs. 7 and 8 are detail plan views of some of the parts shown in Fig. 6, in different positions, and Fig. 9 is an enlarged sectional detail on line 9—9 of Fig. 6.

In the original machine there is a shaft journaled in bearings on the base of the machine, upon which shaft is secured the starting lever 8 which normally projects upward through a longitudinal slot 9 in the top plate 10 of the stationary part of the machine. From this slot extend lateral branch slots 11 and 12 into which the starting lever 8 is moved to start the machine to perform the operation of addition or subtraction, said lever being movable also to either end, 13 or 14 of the slot 9 to start the machine to perform the operation of multiplication or division.

The main shaft of the machine is shown at 15 and as each complete revolution of the shaft completes an addition or subtraction operation, the starting lever must be maintained in position until an operation is completed or until one revolution of the main shaft is made.

The special mechanism of this invention comprises devices for locking the starting lever until the end of the revolution of the main shaft required to complete an opera-

tion of addition or subtraction. Of this mechanism 16 indicates a broad arm or plate, secured rigidly to the starting lever shaft 6 projecting through the bottom of the machine and operated by a spring 17 secured under the bottom. Pivoted in standards or lugs 18 erected on the bottom of the machine is a pawl 19 one end 20 of which is normally held in contact with that part of the plate 16 which projects above the shaft 6 by a spring 22. This also normally presses the other or hook end 21 of the pawl into contact with the periphery of the cam 23 secured on the main shaft 15 and which is provided with a tooth 24; the cam being adjusted or timed on the main shaft so as to cause the tooth 24 to engage and press down the hook end 21 of the pawl 19 at the end of each revolution of the main shaft at the completion of each operation of the machine. This operates the pawl to raise and release its front end 20 from engagement with the broad pawl 16, permitting said pawl 16, under the action of the spring 17, to rock the shaft 6 and move the starting lever out of the branch slot 11 or 12, into which it has been moved to start the machine. The starting lever thus assumes its inoperative position in the slot 9 as shown in Figs. 1 and 4 holding the end 20 of the pawl 19 raised until the starting lever is again moved into one of the branch slots 11 or 12 to again start the machine. As soon as the starting lever is again moved to start the machine, the end 20 of the pawl 19, under the influence of the spring 22, drops down behind the upper end of the broad pawl 16, thus preventing the rocking of the shaft 6, and locking the starting lever in position until again released in the manner before described.

To the right of Fig. 1 is shown sufficient of the calculating mechanism of the Rechnitzer calculating machine to identify the connection of the mechanism of the present invention therewith, the slots and slides for indicating the amounts to be added or subtracted being indicated at 25, 26, 27 and 28, and the numeral wheels for indicating the results, at 29.

The main shaft 15 is connected by gearing 30 with a shaft 31 which in turn is connected, by bevel gearing 32, with the shafts (not shown) of the drums 33, which latter carry teeth 34 of graduated length. As slidable gears 35 are adjusted (by slides 26) on shafts 36, these shafts are rotated a distance determined by the positions of the slides and as they are connected, by gearing 37 with the numeral wheels 29, said numeral wheels are correspondingly rotated and the various calculating operations performed in the manner fully explained in the specifica-

tion of the Rechnitzer patent, hereinbefore referred to.

The main shaft is driven by a motor, as at 39 in Fig. 6 and is connected, disconnected and reversed by mechanism illustrated in said figure and Figs. 7, 8 and 9, which is also illustrated and described in my Patent #883,403, granted March 31, 1908 and forms no part of the present invention but is shown and described herein merely to more clearly illustrate the connection of the mechanism of the subject matter hereof with the driving mechanism of the machine.

The motor shaft 39 carries a worm meshing with worm-wheel 40 on shaft 41, which latter, by the clutch mechanism 42, actuates a shaft 43 connected by gearing (not shown) with the shaft 15 and also with a shaft 44, the latter being connected by gearing 45 with a shaft 46 carrying a pinion 47 which meshes with a rack (not shown), on the sliding carriage.

The carriage, at the end of its stroke, strikes a lever 48 and thus, through the medium of a link 49 and lever 50, automatically reverses the movement of the mechanism, thus returning the carriage, all as fully described in said co-pending application.

The starting lever rock shaft 6 carries a hub 51 from which projects a pin 52 into a slot 53 in a slidable plate 54 so that when the starting lever is moved into or out of branch slots 11 or 12 the shaft 6 is rocked, thus sliding plate 54 which operates an elbow lever 55 connected by a bar or link 56 with the clutch mechanism, thus actuating the latter to start or stop the machine.

What I claim as new is:—

1. In a machine of the character described, comprising a rotatable main shaft, a plate having a main slot therein and a branch slot leading laterally from the main slot, and a starting lever projecting through and normally at rest in the main slot, the combination therewith of a pawl automatically operated to retain the lever in the branch slot until the main shaft has completed one rotation.

2. In a machine of the character described, comprising a rotatable main shaft, a plate having a main slot therein and a branch slot leading laterally from the main slot, and a starting lever projecting through and normally at rest in the main slot, the combination therewith of a pawl automatically operated to retain the lever in the branch slot until the main shaft has completed one rotation, and means for releasing the lever at the end of a rotation of the main shaft and permitting it to resume its inoperative position.

3. In a machine of the character described,

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comprising a rotatable main shaft, a plate having a main slot therein and a branch slot leading laterally from the main slot, and a starting lever projecting through and normally at rest in the main slot, the combination therewith of a pawl, and means operated from the main shaft for retaining the lever in the branch slot until the said shaft has completed one revolution.

4. In a machine of the character described, comprising a rotatable main shaft, a plate having a main slot therein and a branch slot leading laterally from the main slot, and a starting lever projecting through and normally at rest in the main slot, the combination therewith of a pawl, and means operated from the main shaft for retaining the lever in the branch slot until said shaft has completed one revolution and releasing the lever at the end of a revolution of the main shaft and permitting it to resume its inoperative position.

5. In a machine of the character described, comprising a rotatable main shaft, a plate having a main slot therein and a branch slot leading laterally from the main slot, a rock-shaft, and a lever mounted on the rock-shaft and projecting through and normally at rest in an inoperative position in the main slot and adapted to be moved into the branch slot, the combination therewith of a pawl, and means for automatically operating the pawl to lock the rock-shaft against rocking when the lever is in the branch slot, thereby retaining the lever in the branch slot, during a revolution of the main shaft.

6. In a machine of the character described, comprising a rotatable main shaft, a plate having a main slot therein and a branch slot leading laterally from the main slot, a rock shaft, and a lever mounted on the rock-shaft and projecting through and normally at rest in an inoperative position in the main slot and adapted to be moved into the branch slot, the combination therewith of a pawl, and means for automatically operating the pawl to lock the rock-shaft against rocking when the lever is in the branch slot, thereby retaining the lever in the branch slot, during a revolution of the main shaft and means for releasing the rock-shaft at the end of each revolution of the main shaft.

7. In a machine of the character described, comprising a rotatable main shaft, a plate having a main slot therein and a branch slot leading laterally from the main slot, a rock-shaft, and a lever mounted on the rock-shaft and projecting through and normally at rest in an inoperative position in the main slot and adapted to be moved into the branch slot, the combination therewith of a pawl, and means operated from the main shaft for automatically operating the pawl to lock the

rock-shaft against rocking when the lever is in the branch slot, thereby retaining the lever in the branch slot during a revolution of the main shaft, and means for releasing the rock-shaft at the end of each revolution of the main shaft.

8. In a machine of the character described, comprising a rotatable main shaft, a plate having a main slot therein and a branch slot leading laterally from the main slot, a rock-shaft, and a lever mounted on the rock-shaft and projecting through and normally at rest in an inoperative position in the main slot and adapted to be moved into the branch slot, the combination therewith of a pawl, and means operated from the main shaft for automatically operating the pawl to lock the rock-shaft against rocking when the lever is in the branch slot, thereby retaining the lever in the branch slot during a revolution of the main shaft, means for releasing the rock-shaft at the end of each revolution of the main shaft, and means operated from the main shaft for releasing the rock-shaft at the end of each revolution of the main shaft.

9. In a machine of the character described, comprising a rotatable main shaft, a plate having a main slot therein and a branch slot leading laterally from the main slot, a rock-shaft, and a lever mounted on the rock-shaft and projecting through and normally at rest in an inoperative position in the main slot and adapted to be moved into the branch slot, the combination therewith of a pawl on the rock-shaft, a second pawl engaging the first pawl, and automatic means for engaging the second pawl and locking the rock-shaft against rocking when the lever is in the branch slot, thereby retaining the lever in the branch slot until the main shaft has made a full rotation.

10. In a machine of the character described, comprising a rotatable main shaft, a plate having a main slot therein and a branch slot leading laterally from the main slot, a rock shaft, and a lever mounted on the rock-shaft and projecting through and normally at rest in an inoperative position in the main slot and adapted to be moved into the branch slot, the combination therewith of a pawl on the rock-shaft, a double ended pawl one end of which is adapted to engage the said pawl, means for automatically operating the double ended pawl to lock the first pawl, and a cam on the main shaft adapted to permit the double ended pawl to lock the rock shaft during a rotation of the main shaft.

11. In a machine of the character described, comprising a rotatable main shaft, a plate having a main slot therein and a branch slot leading laterally from the main slot, a rock-shaft, and a lever mounted on

the rock-shaft and projecting through and normally at rest in an inoperative position in the main slot and adapted to be moved into the branch slot, the combination there-
5 with of a pawl on the rock-shaft, a double ended pawl one end of which is adapted to engage the said pawl, means for automatically operating the double ended pawl to lock the first pawl, a cam on the main shaft
10 adapted to permit the double ended pawl

to lock the rock shaft during a rotation of the main shaft, and a tooth on the cam to operate the double ended pawl at the end of each revolution to release the rock-shaft.

In testimony whereof I affix my signature 15
in presence of two witnesses.

WILLIAM F. HAUSSTEIN.

Witnesses:

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