

R. E. BENNER.

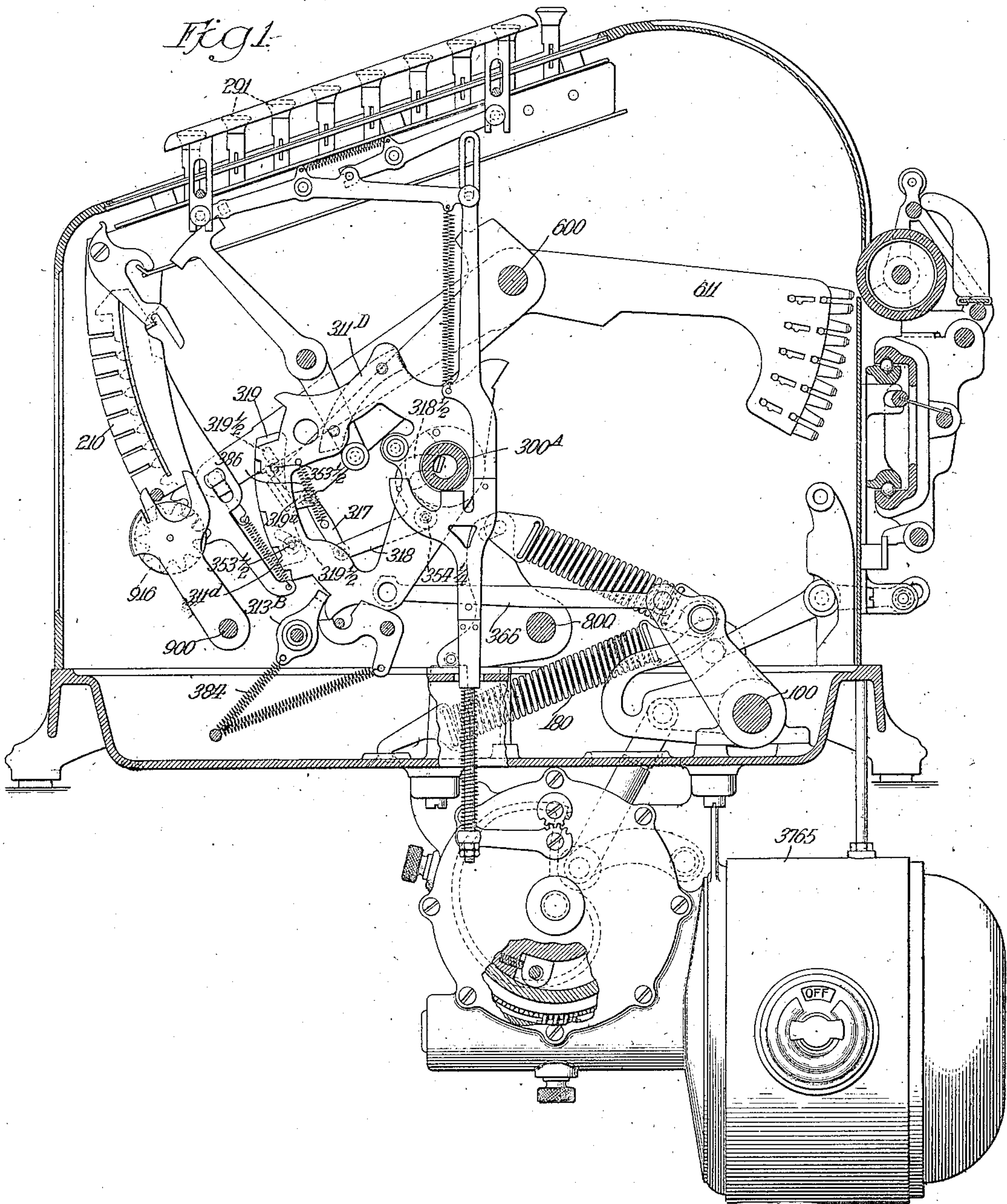
FULL STROKE MECHANISM FOR ADDING MACHINES.

APPLICATION FILED JAN. 22, 1907.

Patented Nov. 10, 1908.

3 SHEETS—SHEET 1.

903,536.



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Fig. 2

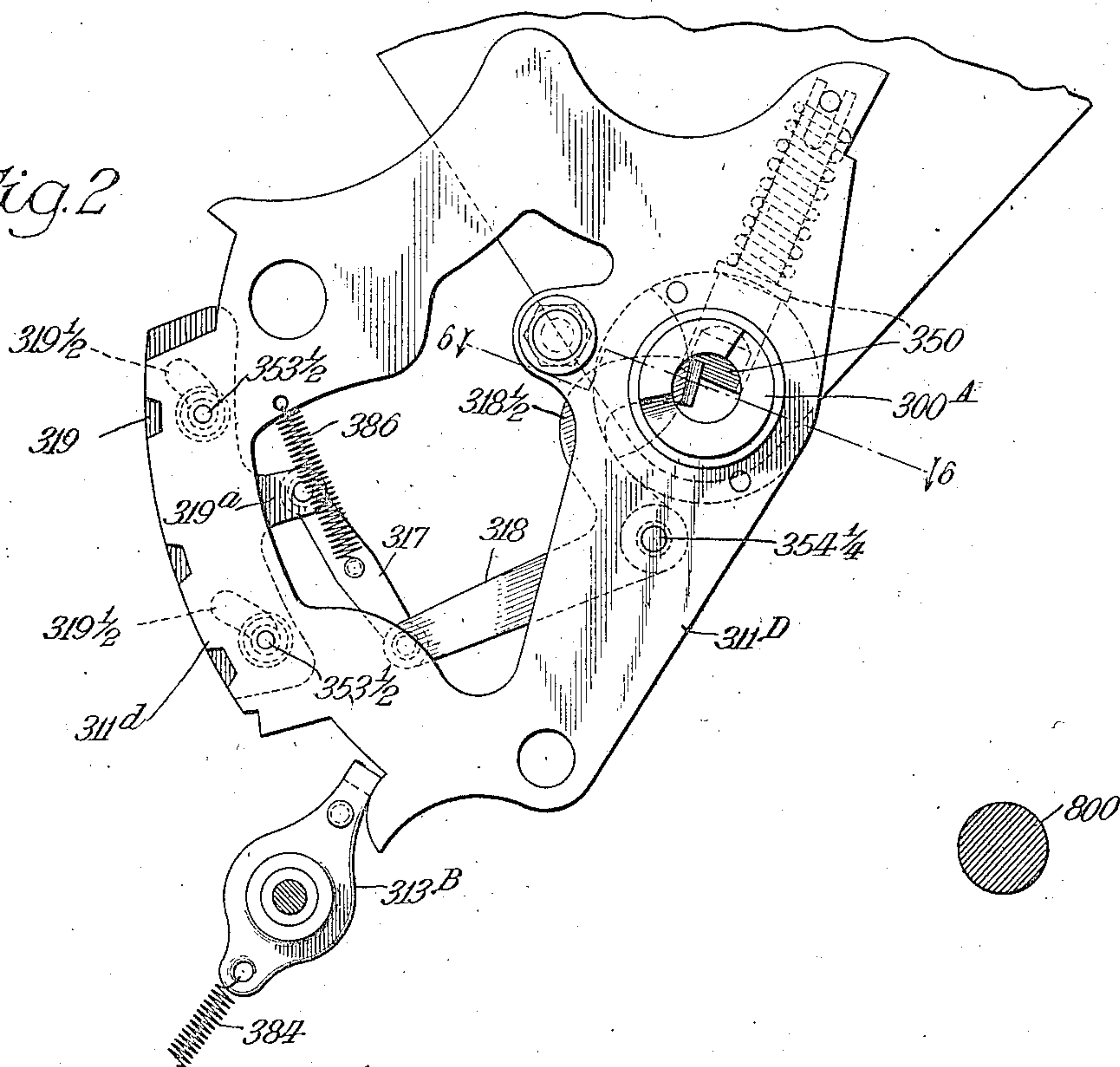
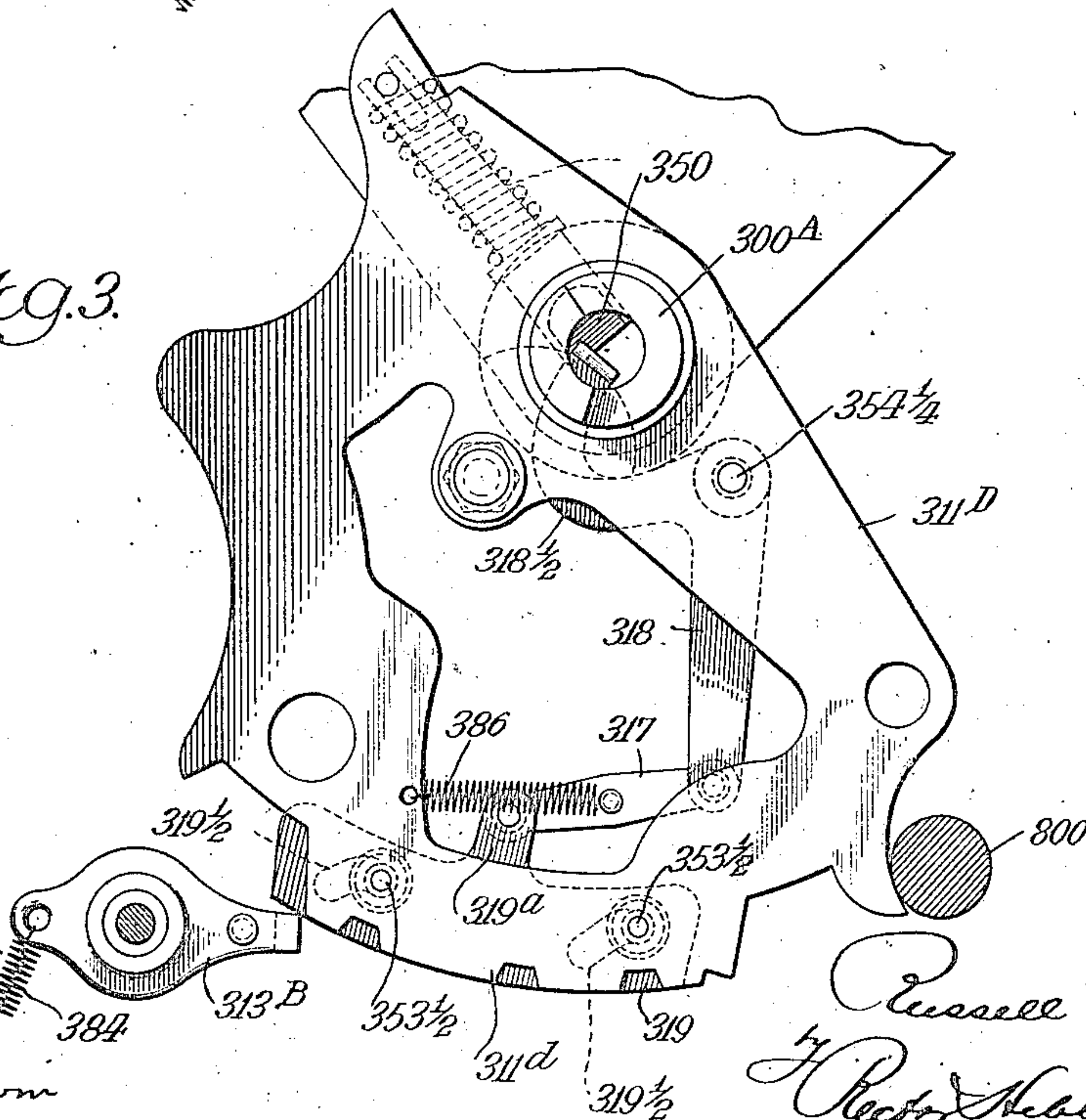


Fig. 3



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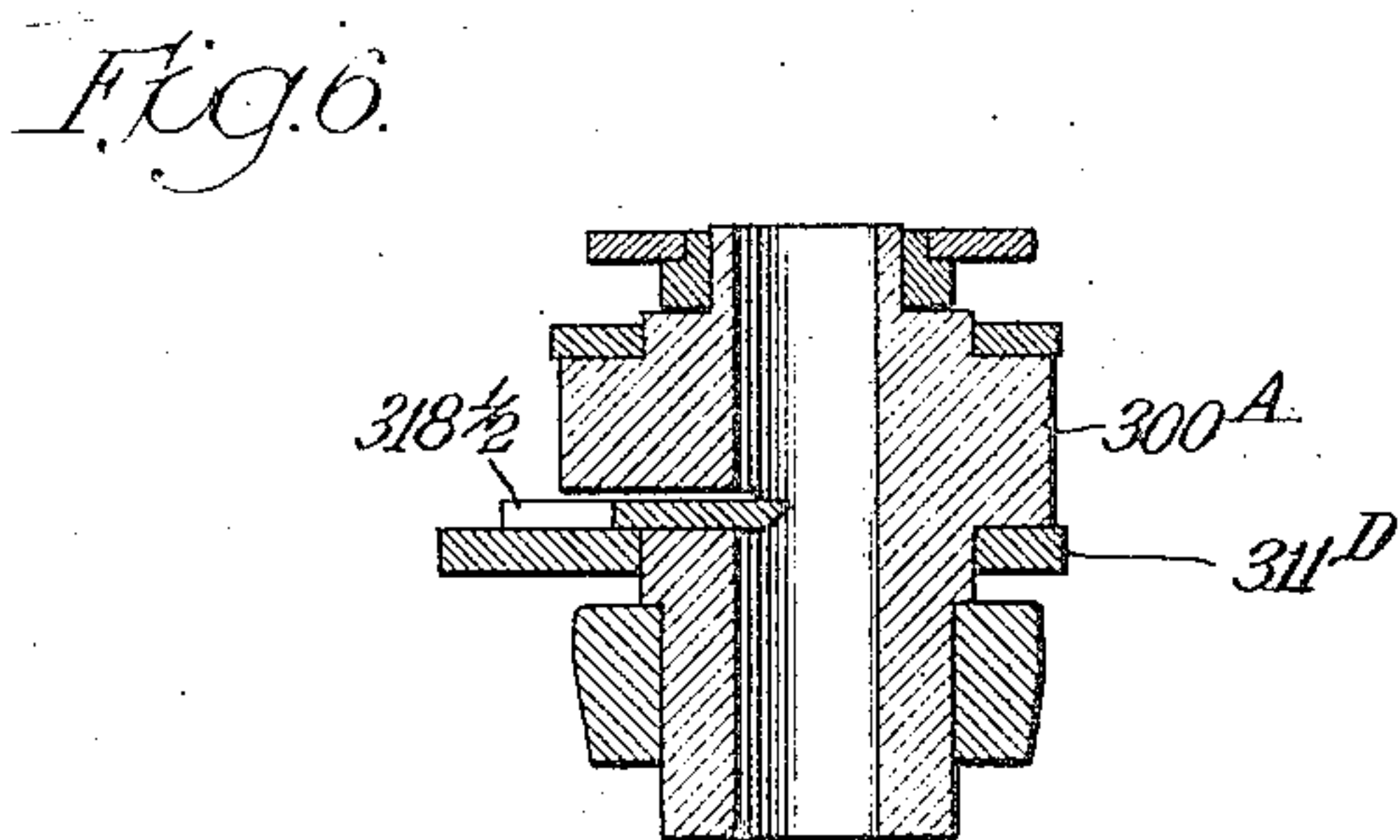
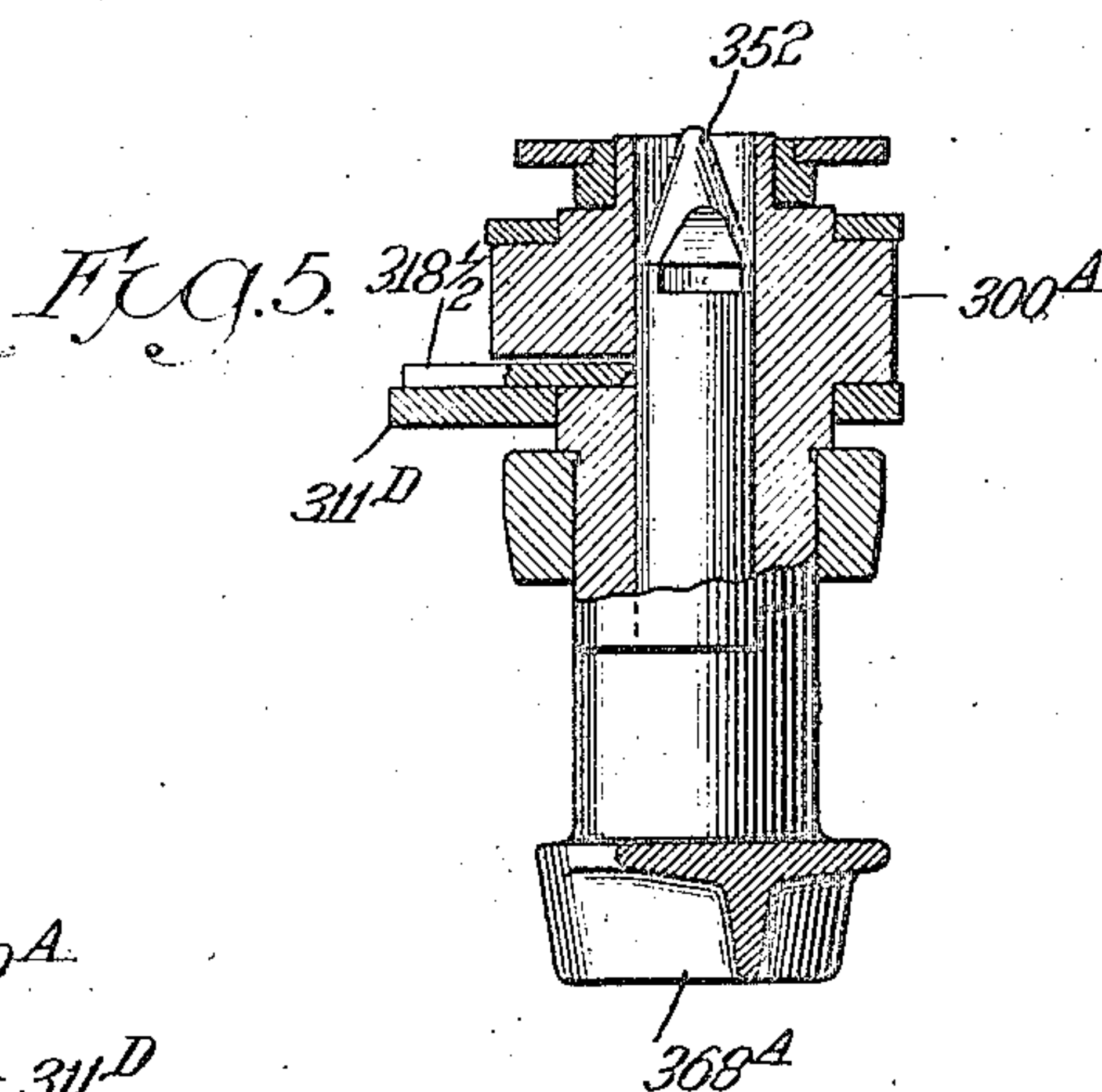
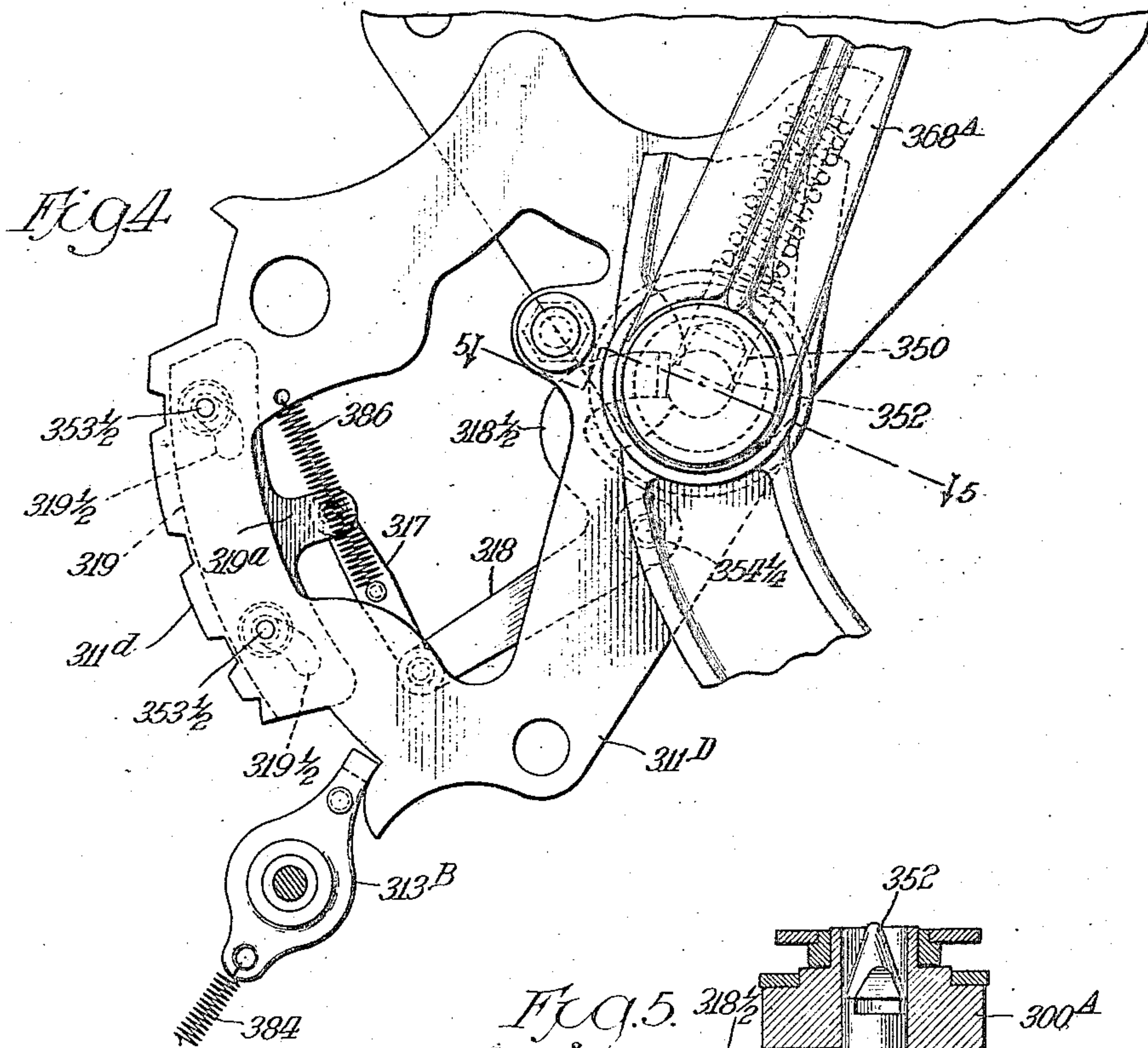
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3 SHEETS—SHEET 3.

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UNITED STATES PATENT OFFICE.

RUSSELL E. BENNER, OF DETROIT, MICHIGAN, ASSIGNOR TO BURROUGHS ADDING MACHINE COMPANY, OF DETROIT, MICHIGAN, A CORPORATION OF MICHIGAN.

FULL-STROKE MECHANISM FOR ADDING-MACHINES.

No. 903,536.

Specification of Letters Patent.

Patented Nov. 10, 1908.

Application filed January 22, 1907. Serial No. 353,489.

To all whom it may concern:

Be it known that I, RUSSELL E. BENNER, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Full-Stroke Mechanism for Adding-Machines, of which the following is a specification.

The invention has more particular reference to adding machines or the like in which provision is made for operating either by hand or by power. When such a machine is operated by hand it is quite important if not essential that there shall be effective means for compelling full strokes of the operating handle. Otherwise it would be a very simple matter to make the machine go wrong. However, when such a machine is operated by power there is no need for the full stroke safe-guard and in fact it becomes an objectionable feature because of tendency to become locked when the machine is run at high speed. Of course it will be understood that when a machine of this kind is operatively connected with a motor full strokes of the parts operated upon by the motor are bound to take place and it is only when such parts are under the direct control of the operator that resort need be had to expedients for preventing irregular movements of them either intentionally or by accident.

The object of the present invention is to provide for automatically rendering a full stroke device effective in a machine of the kind mentioned whenever it is equipped for operation by hand and to keep such full stroke device out of operation so long as the machine is power-driven.

In machines of the kind mentioned it is customary to make the operating handle detachable and when the machine is to be power-driven the handle is left off. In the form of embodiment of the present invention as illustrated and described herein the act of applying such a detachable handle to the machine effects the displacement of means which in the absence of the handle operate to disable the full stroke device.

In the accompanying drawings illustrating such embodiment of the invention Figure 1 represents partly in right-side elevation and partly in vertical section an adding and listing machine of the well-known Burroughs type with an electric motor applied thereto and full stroke mechanism of the

present invention, the operating handle being detached; Fig. 2 represents on an enlarged scale and in similar elevation the full stroke mechanism without the balance of the machine and with the handle still detached; Fig. 3 is an exactly similar view except that the oscillating member carrying full stroke mechanism is shown at the opposite end of its stroke as compared with Fig. 2 and a corresponding change in the relative positions of some of the parts; Fig. 4 is a view similar to Fig. 2 but showing the operating handle attached and the changed relation of parts resulting therefrom; Fig. 5 is a section taken substantially on the line 5—5 of Fig. 4; and Fig. 6 is a section taken substantially on the line 6—6 of Fig. 2.

While by preference the invention is here shown and described as applied to the Burroughs type of adding and listing machine it is to be understood that the invention is not necessarily limited to such particular application.

For details of the type of machine mentioned reference may be had to the William S. Burroughs Patents Nos. 504,963 and 505,078 of June 12, 1893. It will suffice for the purposes of the present specification to briefly point out a limited number of Burroughs parts.

The reference numeral 300^A designates the usual oscillatory tubular shaft journaled in a suitable bearing on the right-hand frame-piece of the machine, this shaft being shouldered at its outer end as shown in Fig. 5 for rotative engagement with the similarly shouldered boss or hub of the familiar handle lever 368^A. The latter is formed beyond said boss or hub with a stud 352 pointed at its end to provide an inclined surface which, when the handle is applied by introducing the stud into the tubular shaft, operates to displace a retaining latch 350 in a well-known manner. The tubular shaft has secured to it a sector 311^D which as usual has a limited segmental marginal portion 311^A formed with peripheral notches. The usual pawl 313^B is pivoted to the frame-work and connected by a spring 384 with a fixed stud and this spring tends to hold the pawl substantially radial with reference to the sector. The effect of this arrangement is well understood, the sector in its oscillations causing the notched peripheral portion to wipe past the pawl, turning the latter on its pivot

against the tension of the spring and the notches preventing any reverse movement until the segmental portion 311^a of the sector has passed by the pawl when the latter rights itself for tilting in the opposite direction when the reverse movement of the sector takes place. Of course any attempt to reverse the movement of the sector before completing its stroke in one direction would cause the pawl to lock in one of the notches. According to the present invention it is proposed to nullify the effect of these notches when the machine is operated by power.

In the drawings the reference numeral 3765 designates an electric motor suspended from the bottom of the machine and arranged to drive the machine through the medium of suitable connections whose details need not be described. Suffice it to say that the motor rotates one member of a clutch whose other member rotates a cam, the latter operating through a pitman to rock the familiar drive-shaft 100 of the adding machine, which drive-shaft is connected by a link 366 with the sector 311^p. The usual springs 180 restore the shafts 100 and 300^A after their operation brought about by pulling forward a handle applied to the latter shaft or through the described connection with the motor.

When the machine is to be run by power the handle is detached and under such circumstances there is presented to the full stroke pawl 313^B a plain edged surface instead of the notched periphery of the sector. For this purpose a segmental plate 319 is arranged on the inner side of the sector conforming in general outline with the segmental portion 311^a of the latter. This plate is formed with a pair of cam slots 319¹ engaged by studs 353¹ projecting inwardly from the sector. The slots extend obliquely for the most part and on such angles that upward movement of the plate with reference to the sector will bring the other edge of the plate flush with the outermost portions of the notched edge of the sector as clearly shown in Figs. 1, 2 and 3. The movement of the plate in the opposite direction would cause it to retreat from the notched periphery of the sector to a point beyond the bottoms of the notches as shown in Fig. 4. It will be seen that this arrangement provides for nullifying the effect of the notches and thus eliminating the full stroke action of the pawl 313^B. The cam slots have limited inner portions extending in the direction of the length of the plate so that pressure of the pawl against the edge of the plate can have no effect to push back the latter. The plate has a centrally-located lug 319^a projecting inwardly from its rear edge and pivotally connected with a link 317 which is in turn pivotally connected with

one arm 318 of a bell crank lever. The latter is pivoted at 354¹ to the sector and its other arm 318¹ is curved to direct it toward the center of the shaft 300^A. The latter is slotted in one side as shown in Fig. 6 to receive this arm of the bell crank lever which has a beveled end to protrude into the opening of the shaft as shown in Figs. 1, 2, 3 and 6. A spiral spring 386 is connected at one end with the sector and at the other with the link 317 and exerts itself to lift the plate 319 and hold it at effective position. This condition obtains so long as the handle remains unattached and consequently the pawl 313^B is deprived of function. Of course the spring 386 also acts to yieldingly project the beveled extremity of the bell crank arm 318¹ into the opening of the shaft 300^A. Under these conditions the machine can be power-driven without any danger of a lock-up in the full stroke mechanism under high speed. It will be noted that when the plate 319 is in effective position it projects at its upper end somewhat beyond the segmental portion 311^a of the sector. This projecting portion of the plate continues to restrain the pawl when the sector has reached the end of its down stroke, (see Fig. 3). Consequently, there will be no reversal of the pawl but the latter will simply ride idly upon the periphery of the plate as the latter is carried to and fro by the sector.

It has already been mentioned that the handle is customarily formed with a stud having a pointed end. This is availed of for the purpose of displacing the devices which nullify the effect of the full stroke pawl. When the stud of the handle is thrust into the tubular shaft the inclined surface of the stud-point operating against the beveled end of the bell crank arm 318¹ will force the latter back and exclude it from the bore of the shaft as shown in Fig. 5. The movement of the bell crank lever thus produced operates through the link 317 to draw down the plate 319 against the stress of the spring 386 and the effect heretofore described is brought about through the co-action of the studs and cam slots, viz., that of withdrawing the outer edge of the plate to a point in rear of the bases of the sector notches. The full stroke pawl will then of course coöperate as usual with the segmental portion of the sector and compel full strokes of the latter by the handle.

While the construction above described will be seen to thoroughly fulfil the object primarily stated it is to be understood that such construction is susceptible of considerable modification without necessarily departing from the spirit and scope of the invention.

What is claimed is:

1. In a machine of the character described, the combination with a reciprocating driv-

ing member and a double acting full stroke device therefor to compel complete movements thereof in both directions; of means for automatically rendering said full stroke device operative or inoperative.

2. In a machine of the character described, the combination of means for operating the machine by hand, means for operating the machine by power, a full-stroke device, and means for rendering the same operative or inoperative according as the machine is being operated by hand or by power.

3. In a machine of the character described, the combination of a power drive, a full-stroke device, means for disabling the latter, and a detachable operating handle for the machine, with provisions for enabling the full-stroke device by the application of said handle to the machine.

4. In a machine of the character described, the combination of an oscillatory drive-shaft, a handle adapted to be detachably engaged with said shaft to oscillate it, a power drive operatively connected with said shaft, a full-stroke sector carried by the latter, a full-stroke pawl arranged to cooperate with said sector, and means for preventing such cooperation during operation of the machine by the power drive, with provisions for disabling said means by the application of the operating handle to the oscillatory shaft.

5. In a machine of the character described, the combination of an oscillatory drive-shaft, a handle adapted to be detachably engaged with said shaft to oscillate it, a power drive operatively connected with said shaft, a sector carried by the latter and having a notched peripheral portion, a reversible spring-actuated pawl to engage said peripheral portion of the sector and compel full strokes in both directions, a plain plate lying adjacent the notched peripheral portion of the sector and adapted to engage the pawl and prevent its entrance into the notches, and means for displacing said plain plate by the application of the handle to the oscillatory shaft.

6. In a machine of the character described, the combination of an oscillatory drive-shaft, a handle adapted to be detachably engaged with said shaft to oscillate it, a power drive operatively connected with said shaft, a sector carried by the latter and having a notched peripheral portion, a reversible spring-actuated pawl to engage said peripheral portion of the sector and compel full strokes in both directions, a plain plate lying adjacent the notched peripheral portion of the sector and spring-held to engage the pawl and prevent its entrance into the notches, and means for displacing said plain plate by the application of the handle to the oscillatory shaft.

7. In a machine of the character described, the combination of an oscillatory drive-

shaft, a handle adapted to be detachably engaged with said shaft to oscillate it, a power drive operatively connected with said shaft, a sector carried by the latter and having a notched peripheral portion, a reversible spring-actuated pawl to engage said peripheral portion of the sector and compel full strokes in both directions, a plain plate lying adjacent the notched peripheral portion of the sector and adapted to engage the pawl and prevent its entrance into the notches, said plate projecting beyond one end of the notched portion of the sector, and means for displacing said plain plate by the application of the handle to the oscillatory shaft.

8. In a machine of the character described, the combination of an oscillatory drive-shaft, a handle adapted to be detachably engaged with said shaft to oscillate it, a power drive operatively connected with said shaft, a sector carried by the latter and having a notched peripheral portion, a reversible spring-actuated pawl to engage said peripheral portion of the sector and compel full strokes in both directions, a plain plate lying adjacent the notched peripheral portion of the sector and adapted to engage the pawl and prevent its entrance into the notches, cam-slot and pin connections between the plate and the sector, a spring impelling the plate longitudinally in one direction and through the cam-slot and pin connections holding said plate in effective position, and means for moving the plate against the stress of said spring by application of the handle to the oscillatory shaft.

9. In a machine of the character described, the combination of an oscillatory drive-shaft, a handle adapted to be detachably engaged with said shaft to oscillate it, a power drive operatively connected with said shaft, a sector carried by the latter and having a notched peripheral portion, a reversible spring-actuated pawl to engage said peripheral portion of the sector and compel full strokes in both directions, a plain plate lying adjacent to the notched peripheral portion of the sector and adapted to engage the pawl and prevent its entrance into the notches, said plate projecting beyond one end of the notched portion of the sector, cam-slot and pin connections between the plate and the sector, a spring impelling the plate longitudinally in one direction and through the cam-slot and pin connections holding said plate in effective position, and means for moving the plate against the stress of said spring by application of the handle to the oscillatory shaft.

10. In a machine of the character described, the combination of an oscillatory drive-shaft, a handle adapted to be detachably engaged with said shaft to oscillate it, a power drive operatively connected with said shaft, a sector carried by the latter and

having a notched peripheral portion, a reversible spring-actuated pawl to engage said peripheral portion of the sector and compel full strokes in both directions, a plain plate
 5 lying adjacent the notched peripheral portion of the sector and adapted to engage the pawl and prevent its entrance into the notches, and means for displacing said plain plate by the application of the handle
 10 to the oscillatory shaft, said means comprising a lever projecting into the path of the handle and connections between the same and the plate.

11. In a machine of the character described, the combination of an oscillatory
 15 drive-shaft, a handle adapted to be detachably engaged with said shaft to oscillate it, a power drive operatively connected with said shaft, a sector carried by the latter and
 20 having a notched peripheral portion, a reversible spring-actuated pawl to engage said peripheral portion of the sector and compel full strokes in both directions, a plain plate
 25 lying adjacent the notched peripheral portion of the sector and spring-held to engage the pawl and prevent its entrance into the notches, and means for displacing said plain
 30 plate by the application of the handle to the oscillatory shaft, said means comprising a lever projecting into the path of the handle and connections between the same and the plate.

12. In a machine of the character described, the combination of an oscillatory
 35 drive-shaft, a handle adapted to be detachably engaged with said shaft to oscillate it, a power drive operatively connected with said shaft, a sector carried by the latter and
 40 having a notched peripheral portion, a reversible spring-actuated pawl to engage said peripheral portion of the sector and compel full strokes in both directions, a plain plate
 45 lying adjacent the notched peripheral portion of the sector and adapted to engage the pawl and prevent its entrance into the notches, cam-slot and pin connections between the plate and the sector, a spring im-
 50 pelling the plate longitudinally in one direction and through the cam-slot and pin connections holding said plate in effective position, and means for moving the plate against the stress of said spring by application of the handle to the oscillatory shaft, said
 55 means comprising a lever projecting into the path of the handle and a link connecting said lever with the plate.

13. In a machine of the character described, the combination of an oscillatory
 60 hollow shaft, an operating handle having a pointed stud to enter the hollow shaft and constructed for rotative engagement with the latter, a sector carried by the shaft and having a notched peripheral portion, a reversible spring-actuated pawl to engage said
 65 peripheral portion of the sector and compel

full strokes in both directions, a plain plate lying adjacent the notched peripheral portion of the sector and adapted to engage the pawl and prevent its entrance into the notches, a lever projecting into the opening
 70 of the hollow shaft for coaction with the pointed handle stud, and operating connections between the lever and the plain plate.

14. In a machine of the character described, the combination of an oscillatory
 75 hollow shaft, an operating handle having a pointed stud to enter the hollow shaft and constructed for rotative engagement with the latter, a sector carried by the shaft and having a notched peripheral portion, a reversible
 80 spring-actuated pawl to engage said peripheral portion of the sector and compel full strokes in both directions, a plain plate lying adjacent the notched peripheral portion of the sector and adapted to engage the
 85 pawl and prevent its entrance into the notches, cam-slot and pin connections between the plate and the sector, a spring impelling the plate longitudinally in one direction and through the cam-slot and pin con-
 90 nections holding said plate in effective position, a lever projecting into the opening of the hollow shaft for coaction with the pointed handle stud, and operating connections between the lever and the plain plate.
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15. In a machine of the character described, the combination of an oscillatory
 100 drive-shaft, a handle adapted to be detachably engaged with said shaft to oscillate it, a power drive operatively connected with said shaft, a sector carried by the latter and having a notched peripheral portion, a reversible spring-actuated pawl to engage said
 105 peripheral portion of the sector and compel full strokes in both directions, a plain plate lying adjacent the notched peripheral portion of the sector and adapted to engage the pawl and prevent its entrance into the notches, a lever projecting into the path of the handle and a link connecting said lever
 110 with the plain plate; substantially as and for the purpose described.

16. In a machine of the character described, the combination of an oscillatory
 115 drive-shaft, a handle adapted to be detachably engaged with said shaft to oscillate it, a power drive operatively connected with said shaft, a sector carried by the latter and having a notched peripheral portion, a reversible spring-actuated pawl to engage said
 120 peripheral portion of the sector and compel full strokes in both directions, a plain plate lying adjacent the notched peripheral portion of the sector and adapted to engage the pawl and prevent its entrance into the
 125 notches, a lever projecting into the path of the handle, a link connecting said lever with the plain plate, and a spring connecting the sector with the lever, link and plate.

17. In a machine of the character de- 130

scribed, the combination of an oscillatory hollow shaft, an operating handle having a pointed stud to enter the hollow shaft and constructed for rotative engagement with
5 the latter, a sector carried by the shaft and having a notched peripheral portion, a reversible spring-actuated pawl to engage said peripheral portion of the sector and compel full strokes in both directions, a plain plate
10 lying adjacent the notched peripheral portion of the sector and adapted to engage the pawl and prevent its entrance into the notches, cam-slot and pin connections be-

tween the plate and the sector, a spring impelling the plate longitudinally in one direction and through the cam-slot and pin connections holding said plate in effective position, a lever projecting into the opening of the hollow shaft for coaction with the pointed handle stud, and a link connecting the lever and the plain plate. 15 20

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