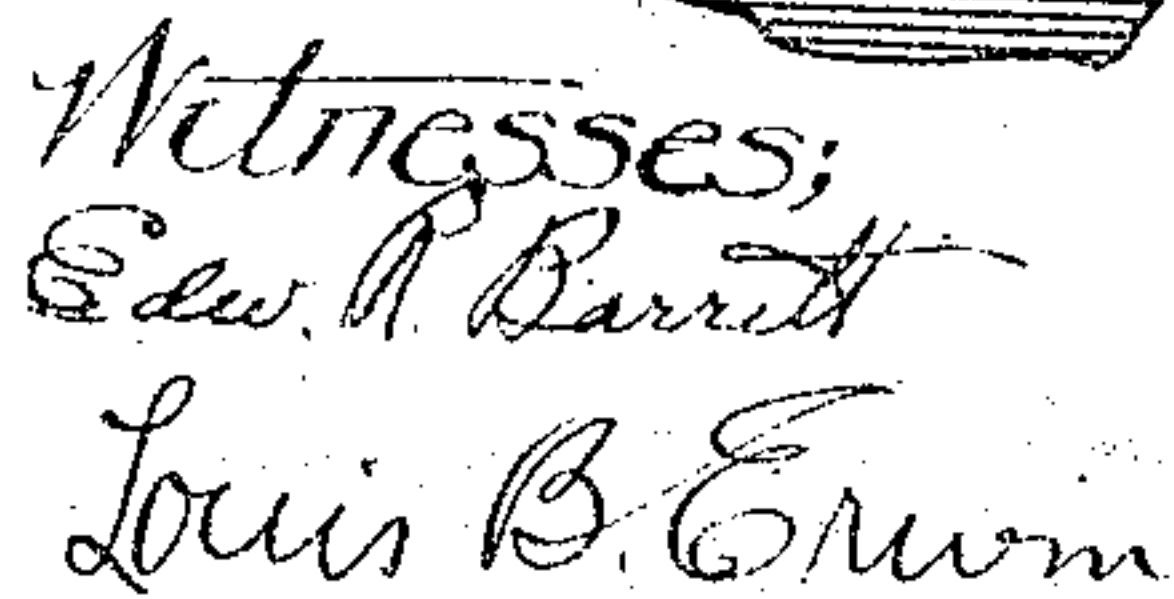


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4 SHEETS—SHEET 1.



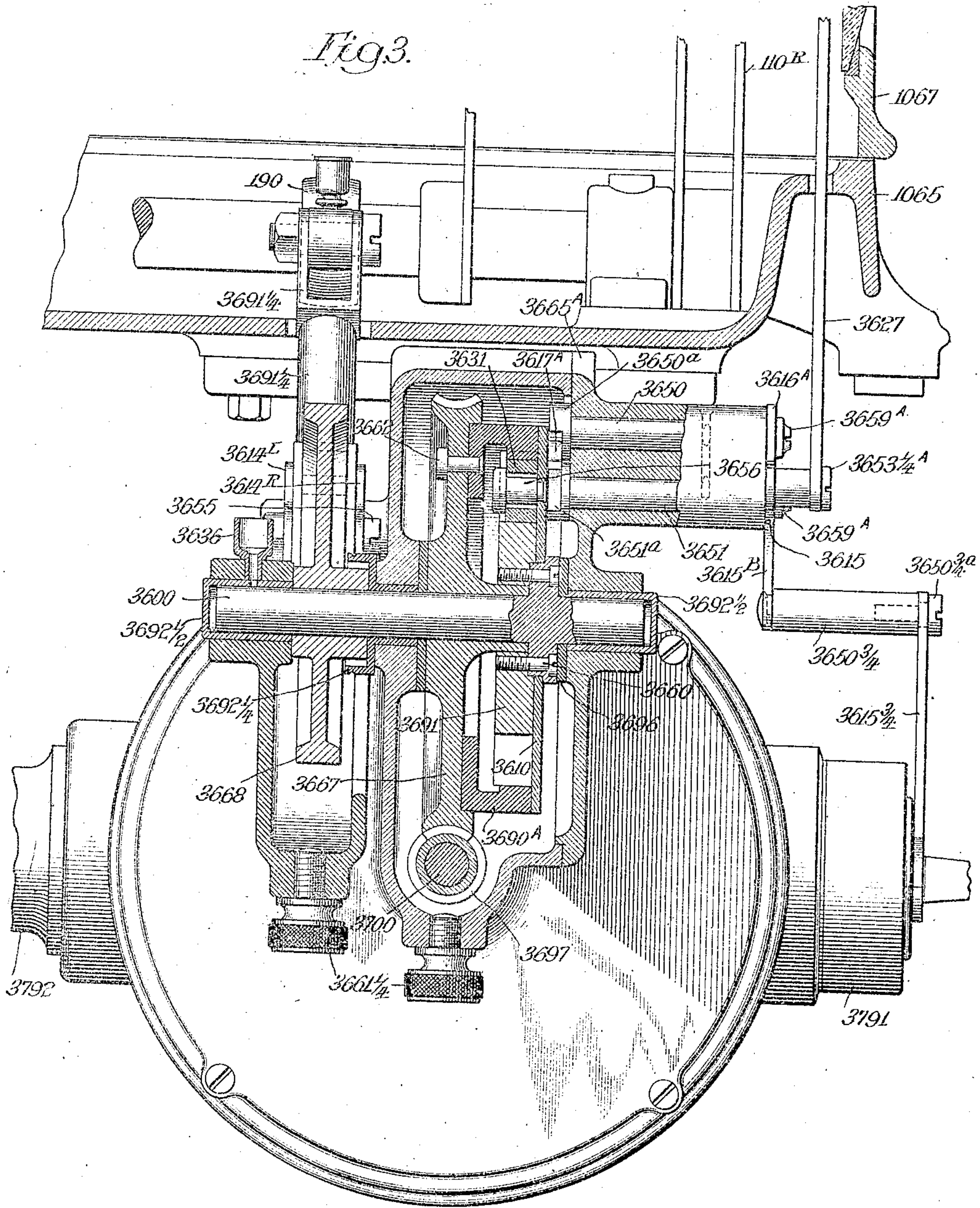
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990,317.

J. G. VINCENT.
POWER DRIVE FOR ADDING MACHINES.
APPLICATION FILED AUG. 13, 1906.

Patented Apr. 25, 1911.

4 SHEETS—SHEET 2.



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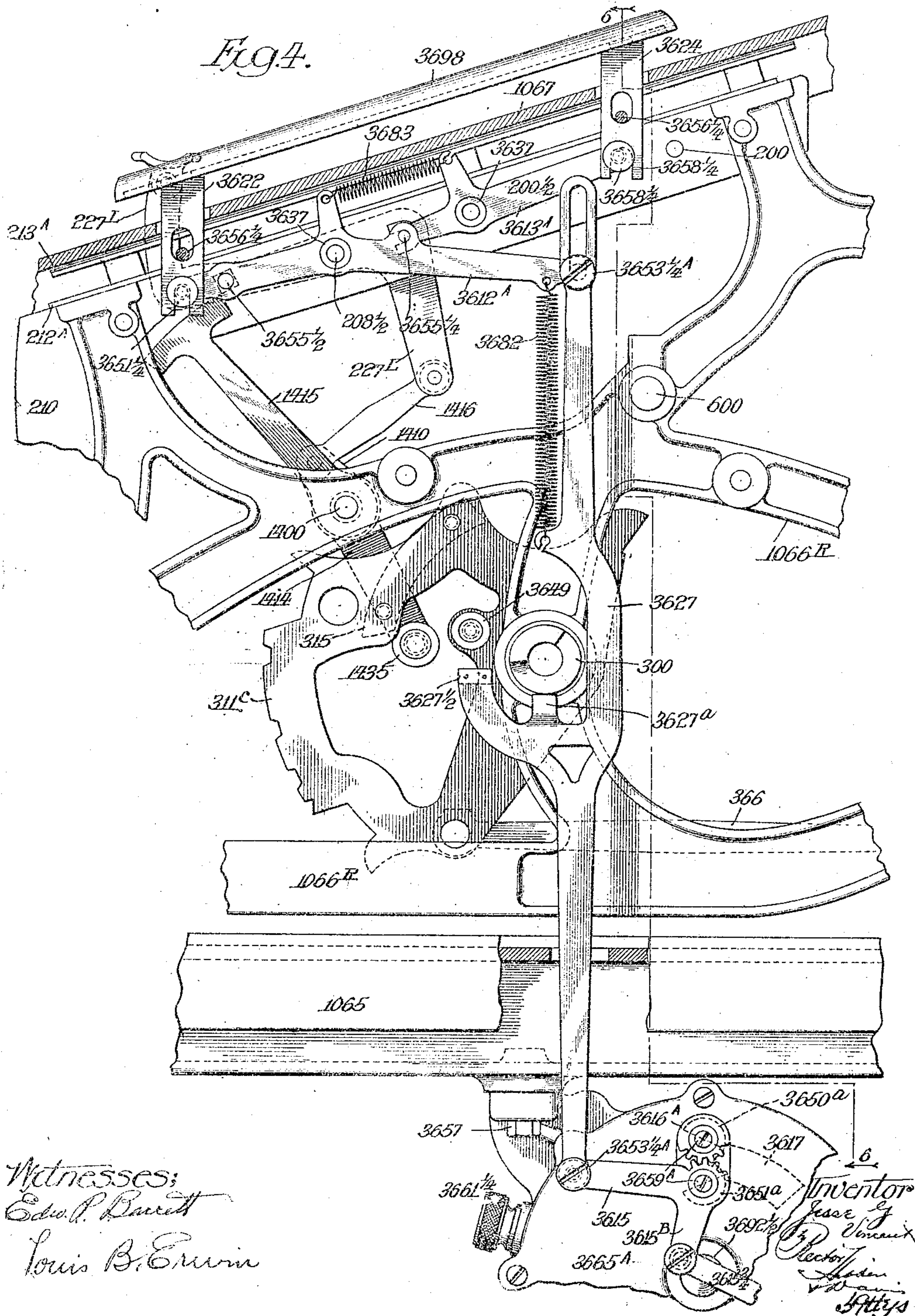
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4 SHEETS—SHEET 3.

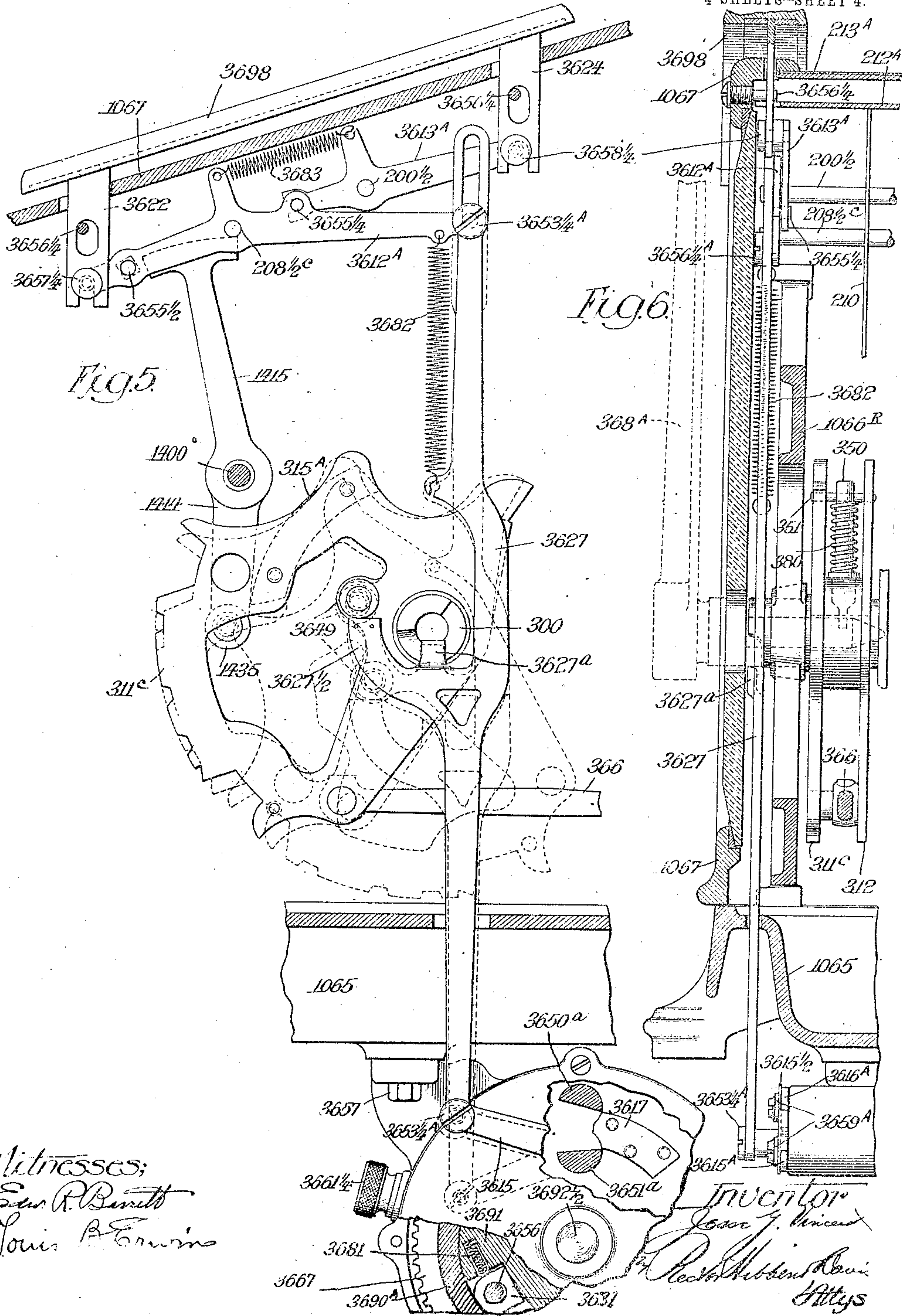


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APPLICATION FILED AUG. 13, 1906.

Patented Apr. 25, 1911.

4 SHEETS—SHEET 4.



UNITED STATES PATENT OFFICE.

JESSE G. VINCENT, OF DETROIT, MICHIGAN, ASSIGNOR TO BURROUGHS ADDING MACHINE COMPANY, OF DETROIT, MICHIGAN, A CORPORATION OF MICHIGAN.

POWER-DRIVE FOR ADDING-MACHINES.

990,317.

Specification of Letters Patent.

Patented Apr. 25, 1911.

Application filed August 13, 1906. Serial No. 330,466.

To all whom it may concern:

Be it known that I, JESSE G. VINCENT, 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 Power-Drives for Adding-Machines, of which the following is a specification.

The present invention relates to the application of power for driving adding machines and the like which have generally been operated by hand.

The object in general is to improve the controlling devices whereby the power drive is brought into play at the will of the person running the machine, in such manner that the possibility of misoperation is reduced to the minimum.

One specific object is to prevent the establishment of the above mentioned relation so long as the machine is equipped for hand operation as by the application of a handle to the working parts thereof; and vice versa to prevent the application of hand operating means such as a detachable handle at a time when a detent or the like is displaced for effecting connection between the motor and the machine.

Another specific object of the invention is to provide for the automatic return to normal of detent devices displaced when establishing the above recited relation between the power drive and the working parts of the adding machine, while at the same time permitting the operator to hold displaced the key or other manipulative device which he touches to cause an operation of the machine to take place.

The invention also aims to improve the character of the detent devices to provide against wear.

With these and incidental objects in view the invention consists in certain novel features of construction and combinations of parts the essential elements whereof are recited in the appended claims and a preferred form of embodiment of which is illustrated in detail in the accompanying drawings and fully described hereinafter.

Of said drawings Figure 1 represents in side elevation, except for casing and cross-rods and shafts appearing in section, an adding machine of the well-known Burroughs type having applied thereto the improvements of the present invention; Fig.

2 represents in elevation the on-and-off switch of an electric motor with the turn button in section and a portion of a slotted link embracing the same; Fig. 3 represents a vertical cross-section taken substantially on the line 3—3 of Fig. 1, showing on an enlarged scale the clutch connections between the motor and the adding machine; Fig. 4 represents on an enlarged scale in side elevation those parts having more particularly to do with the present invention and already shown on a smaller scale in Fig. 1, these parts being shown in both instances in normal position; Fig. 5 is a somewhat similar view with the parts out of normal and dotted line illustrations of different positions assumed by them; and Fig. 6 represents a vertical cross-section taken substantially on the line 6—6 of Fig. 4 looking toward the front of the machine as indicated by the arrows crossing said section line.

The type of adding machine to which the present improvements are shown applied in the present instance is that exemplified in the William S. Burroughs Patents Nos. 504,963 and 505,078 issued September 12, 1893 and is so well-known both through these and other patents and through the presence of the machine in large numbers on the market that no detailed description need be given although some of the working parts of a machine of this type will be referred to where the same come into play in connection with the present improvements.

The reference numeral 300 designates the usual stub shaft of such an adding machine to which shaft it is customary to apply a detachable operating handle such as indicated by dotted lines 368^A in Fig. 6, the hub of the handle and the outer end of the shaft being shouldered to provide for rotative engagement between them. The power drive illustrated in the present case is in the form of an electric motor suspended from the bottom of the adding machine whose base casting is designated by the numeral 1065.

The numeral 3765 designates the casing of the motor with which is compounded a gear casing whose cap or cover plate is designated 3665^A in Fig. 1. The armature shaft 3700 projects into this gear casing and carries a worm 3697 in mesh with a worm wheel 3667 loosely mounted upon a shaft 3600, see Fig. 3, and the latter has bolted to a flanged

portion the clutch disk 3691 peripherally recessed for the reception of clutch blocks or struts 3631 (Fig. 5). The latter are loosely mounted upon inwardly projecting pins 3656 of a plate 3610 loose upon the flanged portion of the shaft. The disk 3691 is embraced by a hardened ring 3690^a riveted to the web of the worm wheel 3667 and springs 3681 interposed behind the clutch blocks 3631 tend to thrust them toward the shallow ends of the recesses in the disk to frictionally connect the clutch members in a well-known manner so that the worm wheel may drive the shaft. The latter carries a cam 3668 which runs against a roller at the lower end of a pitman 3691 1/4—3691 1/2, the latter being jointed to a crank arm 190 on a shaft 100 of the adding machine, which shaft carries one or more crank arms 110^R connected by strong springs 180 with the base casting 1065 of the adding machine and connected by a link 366 with a sector plate 311^c rigidly secured to the shaft 300. A radius link 3614^R maintains the pitman and its roller in proper relation to the cam, and it will be seen that through the above described connections power may be applied to rock the sector 311^c against the stress of the springs 180.

The control of the above described clutch is primarily effected through the medium of a pair of rock shafts 3650 and 3651 journaled in bearings on the gear casing as shown in Fig. 3. The before-mentioned plate 3610 carries on its outer side a rigidly affixed stop strip 3617 with a double concave end face and the rock shafts are formed with flanged heads on their inner ends with semi-circular projecting portions 3650^a and 3651^a designed to engage respectively with the concave portions of said stop piece 3617 for the purpose of preventing rotation of the plate 3610 and consequently frictional driving engagement between the clutch members. This is the normal condition and it is necessary to displace both of the detents 3650^a and 3651^a before the power drive can be brought into action. The two rock shafts 3650 and 3651 are geared together so as to act in unison by means of two segments, one formed in the edge of a disk 3616^a secured to the end of the rock shaft 3650 and the other formed in the edge of the disk-like central portion of a bell crank lever 3615 secured to the end of the rock shaft 3651. The depending arm 3615^b of this bell crank lever is jointed to the forward end of a link 3615 3/4 whose rear end is formed with a double key-hole slot comprising a central portion 3615 3/4^b, an elongated front portion 3615 3/4^a and a shorter rear portion 3615 3/4^c. This slotted end of the link embraces the shank 3791^a of the turn button of the on-and-off switch 3791 of the electric motor and said shank is

oblong in cross-section as shown in Fig. 2 so that when lying lengthwise of the key-hole slot the link may move longitudinally but when lying crosswise of said slot in the central portion thereof as shown in said Fig. 2 no longitudinal movement of the link can take place. In this manner displacement of the detents to permit the closing of the clutch is prevented so long as the switch is turned off and permitted only when the motor is in operation. Hence no misoperation of the machine can take place on account of a release of the clutch when no power is present to drive it. Correspondingly the switch having been turned on it is prevented from being turned off while the detents remain displaced. This feature has been made the subject of a divisional application, Serial No. 602,423, filed January 13, 1911.

The forwardly extending arm of the bell crank 3615 is coupled to the lower end of a vertically extending bar 3627 whose upper end is longitudinally slotted to receive the screw stud 3653 1/4^a on the rear end of a lever 3612^a, the latter being pivoted intermediate its ends on a stud 208 1/2—^c below the key-board of the adding machine. A starting bar 3698 extends at a convenient location along the right-hand side of the rows of keys of the adding machine and is mounted upon legs 3622 and 3624 suitably guided for vertical movement through the top of the machine, the forward leg being engaged with the front end of said lever 3612^a and the rearward leg being similarly engaged with the rear end of a lever 3613^a pivoted intermediate its ends on a stub shaft 200 1/2 and engaged at its forward end with a stud 3655 1/4 on the lever 3612^a. The two levers are connected above their pivots by a contractile spring 3683 which thus exerts itself to elevate the starting bar 3698 and depress the stud 3653 1/4^a. The latter normally occupies the lower end of the slot of the bar 3627, the lever 3612^a being connected with said bar by a contractile spring 3682. Through the engagement of said stud with the lower end of said slot, the spring 3683 tends to hold the bar 3627 depressed, the weight of the bar of course having the same effect, and under these conditions the detents 3650^a and 3651^a stand in front of the stop piece 3617 and the clutch remains open. Depression of the starting bar 3698 has the effect of lifting the detent bar 3627 through the medium of the lever 3612^a and the spring 3682 and this lifting of the bar rocks the detents out of engagement with said stop piece to the positions illustrated in Fig. 5. When this takes place the clutch instantly closes and the motor drives the adding machine.

It will be understood that the power of the motor is only applied to put the machine

through one-half of a cycle of operation and that the springs 180 complete the operation.

It is important that all of the working parts of the adding machine shall have returned to normal before the power drive can again take effect and consequently it is desirable that the detents be restored to effective positions without regard to the operator's manipulation of the starting bar. To this end the detent bar 3627 is formed with a forwardly projecting arm 3627 1/2 which presents a horizontal edge or flange as an abutment to a tappet roller 3649 carried by the sector plate 311°. Normally these parts are separated from each other as shown in Figs. 1 and 4 but when the starting bar is depressed as above explained the upward movement of the detent bar 3627 brings the horizontal edge or flange of the arm 3627 1/2 up to said tappet roller as shown by the full lines in Fig. 5. Therefore, immediately upon the application of power to drive the adding machine said detent bar is again depressed by the rocking of the sector plate 311° and the detents are restored to effective position, the timing being such that this takes place as soon as the stop piece 3617 passes the rear ends of the detents. While it is thus highly desirable that the detents shall be restored to effective position by the initial movement of the working parts of the adding machine in order that there can be no second application of power until those parts have returned to normal, yet it is likewise desirable that the operator may hold the starting bar down and not be required to repeatedly touch the same in order to produce successive operations of the adding machine. It will be readily seen that this continued depression of the starting bar will permit a succession of operations to the utmost limit of the speed capacity of the adding machine whereas if the operator is required to repeatedly touch the bar it is practically impossible to get the greatest speed out of the adding machine. It will be seen that with the construction above described the starting bar can be held down during any number of successive operations for when the detent bar 3627 is depressed by the working parts of the machine it does not necessarily lift the starting bar back to normal position but if the latter is held down the spring 3682 simply stretches. Then as the parts of the adding machine go back to normal this spring draws the starting bar up to the stud 3653 1/4" which stud remains elevated as long as the starting bar is depressed and consequently permits sufficient upward movement of the detent bar to displace the detents. It follows that the instant the adding machine parts arrive at normal they are started on another cycle of operation by the motor. Of course when the starting bar is released then the stud

3653 1/4" takes up a lower position and the detent bar cannot move far enough to again displace the detents.

In order to prevent any connection being effected between the motor and the working parts of the adding machine while the latter is equipped for hand operation, the detent bar 3627 is formed with a laterally and upwardly projecting lug 3627^a which engages the hub of the hand lever 368^a. Thus so long as such handle is in place the detent bar is prevented from displacing the detents. Correspondingly when the detents are displaced the hand lever cannot be connected with the working parts of the adding machine as the lug 3627^a then projects into the space which the hub of said hand lever must occupy in order to connect with the shaft 300. Thus by reference to Fig. 6 it will be seen that with the handle fully applied as there represented in dotted lines, a portion of its hub or sleeve will extend directly above the projection 3627^a, and vice versa if the bar 3627 stands in a raised position, permitted by the absence of the handle, then said projection 3627^a will be encountered by the end of the hub or sleeve if it is attempted to apply the handle, and hence the latter cannot be rotatively engaged with the shaft 300, it being noted that the projection is in the vertical plane of the projecting part of the shaft which said portion of the handle hub has to overlap in order that rotative engagement may be had.

Where a total key is employed it is desirable to guard against premature starting of the motor when taking a total and in the present instance means are provided for blocking the starting bar during depression of the total key.

The numeral 227^L designates the shank of the usual Burroughs total key which is part of a bell crank lever whose depending arm is connected by a link 1416 with a crank arm 1410 on a shaft 1400 and the latter has affixed to it an arm 1415 with a segmental outer end portion. The lever 3612^a is equipped with a square stud 3655 1/2 at its forward part and normally the segmental outer end of the arm 1415 is just forward of this stud. When the total key is depressed said arm is swung rearwardly through the connections described and its segmental part immediately passes below said pin thereby blocking depression of the starting bar in an obvious manner. Not until the total key is fully depressed does the segmental outer end of the arm 1415 pass rearward of said pin as illustrated in Fig. 5 and so the motor cannot be connected with the working parts of the adding machine when a total is to be taken until the total key has been fully depressed. When the starting bar is depressed without first depressing the total key the latter is prevented from being depressed by

reason of the stud 3655 1/2 taking up a position behind the segmental end of the arm 1415. The total key is held down during the requisite portion of movement of the said working parts by reason of the engagement of a curved flange 315 on the sector plate 311 in front of a roller 1435 on an arm 1414 depending from the shaft 1400. In an itemizing operation the said flange passes behind said roller and prevents depression of the total key but this particular feature forms no part of the present invention.

It will be seen that the above described constructions are well calculated to thoroughly fulfil all of the objects primarily stated. The double detent construction has the advantage of preventing such impairing of correct performance of the clutch parts as might take place through wear where a single detent was employed. The safety devices described effectually prevent erroneous manipulation of the machine without placing any restrictions upon its speed of operation. It is to be understood, however, that the above described constructions are susceptible of modification within the scope of the invention.

What is claimed is:

1. The combination with the prime mover of the machine proper, of a power drive applied thereto with an intervening clutch and clutch closer, a detent normally restraining the latter, and a manipulative displacing device yieldingly connected with the detent, and means operated by the power drive for restoring the detent to normal position.

2. The combination with the prime mover of the machine proper, of a power drive applied thereto with an intervening clutch and clutch closer, a detent normally restraining the latter, a manipulative displacing device yieldingly connected with the detent and means operated by the clutch for restoring the detent to normal position.

3. The combination with the prime mover of the machine proper, of a power drive applied thereto with an intervening clutch and clutch closer, a detent normally restraining the latter, a manipulative displacing device yieldingly connected with the detent, and means operated by said prime mover for restoring the detent to normal position.

4. The combination with the prime mover of the machine proper and a tappet piece operated thereby; of a power drive applied to said prime mover with an intervening clutch and clutch closer, a detent normally restraining the latter, and a manipulative starting device yieldingly connected with said detent to displace the same and present it to the action of the tappet piece.

5. The combination with the prime mover of the machine proper and a tappet piece operated thereby; of a power drive applied

to said prime mover with an intervening clutch and clutch closer; and detent devices for normally restraining the latter comprising a detent proper, a reciprocating bar coupled thereto and having a shoulder for presentation to said tappet piece, and a manipulative device yieldingly connected with said bar.

6. The combination with the prime mover of the machine proper and a tappet piece operated thereby; of a power drive applied to said prime mover with an intervening clutch and clutch closer; and detent devices for normally restraining the latter comprising a rocking detent proper, a reciprocating bar coupled thereto and having a shoulder for presentation to said tappet piece, and a manipulative device yieldingly connected with said bar.

7. The combination with the prime mover of the machine proper and a tappet piece operated thereby; of a power drive applied to said prime mover with an intervening clutch and clutch closer; and detent devices for normally restraining the latter comprising a detent proper, a slotted reciprocating bar coupled thereto and having a shoulder for presentation to said tappet piece, a lever having a pin engaging the slot of said bar, and a spring connecting the lever and the bar.

8. The combination with an oscillatory member; of a power drive applied thereto with an intervening clutch and clutch closer, a detent normally restraining the latter, a manipulative displacing device, yieldingly connected with the detent, and means operated by said oscillatory member for restoring the detent to normal position.

9. The combination with an oscillatory member carrying a tappet piece; of a power drive applied to said member with an intervening clutch and clutch closer, a detent normally restraining the latter, and a manipulative starting device yieldingly connected with said detent to displace the same and present it to the action of the tappet piece.

10. The combination with an oscillatory member carrying a tappet piece; of a power drive applied to said parts with an intervening clutch and clutch closer, and detent devices for normally restraining the latter comprising a detent proper, a reciprocating bar coupled thereto and having a shoulder for presentation to said tappet piece, and a manipulative device yieldingly connected with said bar.

11. The combination with the prime mover of the machine proper; of a plurality of operating means for application thereto with provisions for disabling the one by application of the other.

12. The combination with the prime mover of the machine proper; of hand operating

means applicable thereto, a power drive also applied thereto, and means for obstructing application of the one form of operating means by the application of the other.

5 13. The combination with the prime mover of the machine proper and a detachable handle for operating the same; of a power drive applied to said prime mover with an intervening clutch, and means for closing the
10 latter with provisions for preventing such closing while the handle is operatively connected with the prime mover of the machine.

14. The combination with the prime mover
15 of the machine proper and a detachable handle for operating the same; of a power drive applied to said prime mover with an intervening clutch, and means for closing the latter with provisions for preventing appli-
20 cation of the handle when said means take effect.

15. The combination with the prime mover of the machine proper and a detachable handle for operating the same; of a power drive
25 applied to said prime mover with an intervening clutch and clutch closer, a detent for restraining the latter, and means for displacing the detent with provisions for preventing such displacement while the handle
30 is operatively connected with the prime mover.

16. The combination with the prime mover of the machine proper and a detachable handle for operating the same; of a power drive
35 applied to said prime mover with an intervening clutch and clutch closer, a detent for restraining the latter, and means for displacing the detent with provisions for preventing application of the handle when said de-
40 tent is displaced.

17. The combination with the prime mover of the machine proper and a detachable handle for operating the same; of a power drive
45 applied to said prime mover with an intervening clutch and clutch closer, and detent devices for restraining the latter including a reciprocating member adapted to be obstructed by the handle.

18. The combination with the prime mover
50 of the machine proper and a detachable handle for operating the same; of a power drive applied to said prime mover with an intervening clutch and clutch closer, and detent devices for restraining the latter including
55 a reciprocating member adapted to obstruct the handle.

19. The combination with the prime mover of the machine proper and a detachable handle for operating the same; of a power drive
60 applied to said prime mover with an intervening clutch and clutch closer; and detent devices for restraining the latter including a reciprocating member adapted to be obstructed by the handle and a manipulative
65 device yieldingly connected with the bar.

20. The combination with the prime mover of the machine proper and a detachable handle for operating the same; of a power drive applied to said prime mover with an intervening clutch and clutch closer; and detent
70 devices for restraining the latter, including a reciprocating member adapted to obstruct the handle and a manipulative device yieldingly connected with said member.

21. The combination with the prime
75 mover of the machine proper and a detachable handle for operating the same; of a power drive applied to said prime mover with an intervening clutch and clutch closer; and detent devices for restraining the lat-
80 ter including a reciprocating member having a projection adapted to be obstructed by the handle.

22. The combination with the prime
85 mover of the machine proper and a detachable handle for operating the same; of a power drive applied to said prime mover with an intervening clutch and clutch closer; and detent devices for restraining the latter including a reciprocating member having a
90 projection adapted to obstruct the handle.

23. The combination with the prime mover of the machine proper and a detachable handle for operating the same; of a
95 power drive applied to said prime mover with an intervening clutch and clutch closer; and detent devices for restraining the latter including a reciprocating member having a projection adapted to be obstructed
100 by the handle and a manipulative device yieldingly connected with the bar.

24. The combination with the prime mover of the machine proper and a detachable handle for operating the same; of a
105 power drive applied to said prime mover with an intervening clutch and clutch closer; and detent devices for restraining the latter including a reciprocating member having a projection adapted to obstruct the handle and a manipulative device yieldingly con-
110 nected with said member.

25. The combination with the main shaft of the machine proper and a detachable handle rotatively engageable therewith; of a
115 power drive applied to said shaft with an intervening clutch and clutch closer; and a detent normally restraining the latter and having a part which when the detent is displaced enters space that a part of the handle appropriates when it is applied to the
120 shaft.

26. The combination with the main shaft of the machine proper and a detachable handle adapted to be thrust endwise into rota-
125 tive engagement with said shaft; of a power drive applied to said shaft with an intervening clutch and clutch closer; and a detent normally restraining the latter and having a part which when the detent is displaced enters space that the handle hub ap-
130

propriates when thrust endwise into rotative engagement with the shaft.

27. The combination with the main shaft of the machine proper and a detachable handle having a sleeve or hub portion adapted to be thrust endwise into rotative engagement with the shaft; of a power drive applied to said shaft with an intervening clutch and clutch closer; and a detent normally restraining the latter and having a projection which the handle hub or sleeve confronts and obstructs when the handle is rotatively engaged with the shaft and which

projection confronts and obstructs the sleeve or hub when the detent is displaced.

28. In a machine of the character described, a depressible starting bar, levers pivoted intermediate their ends and jointed at their outer ends to opposite ends of said bar and jointed together between their pivots, and a spring connecting said levers, substantially as and for the purpose described.

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Witnesses:

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