

No. 894,550.

PATENTED JULY 28, 1908.

J. G. VINCENT.  
 ADDING MACHINE.  
 APPLICATION FILED NOV. 30, 1906.

3 SHEETS—SHEET 1.

*Fig. 1.*

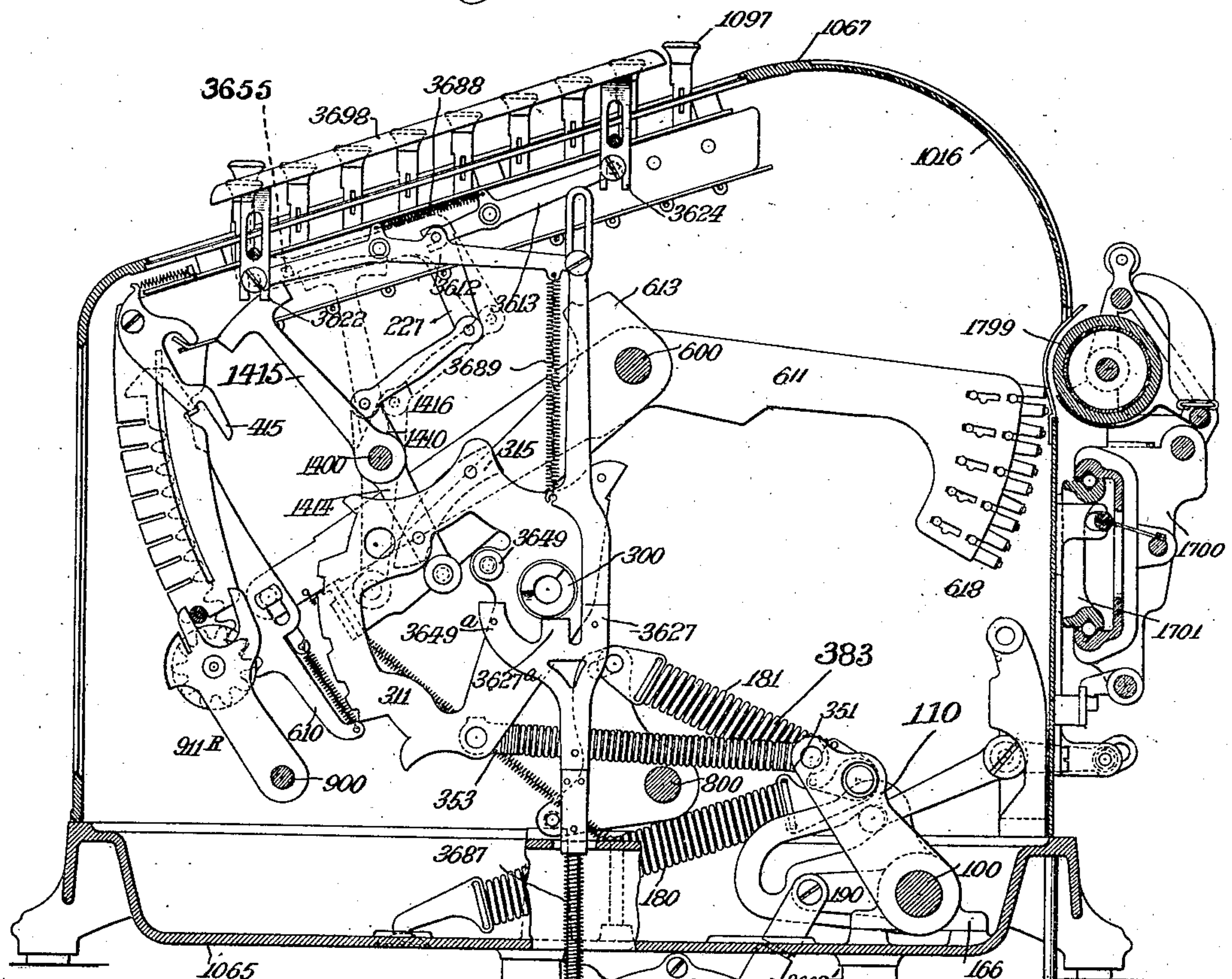
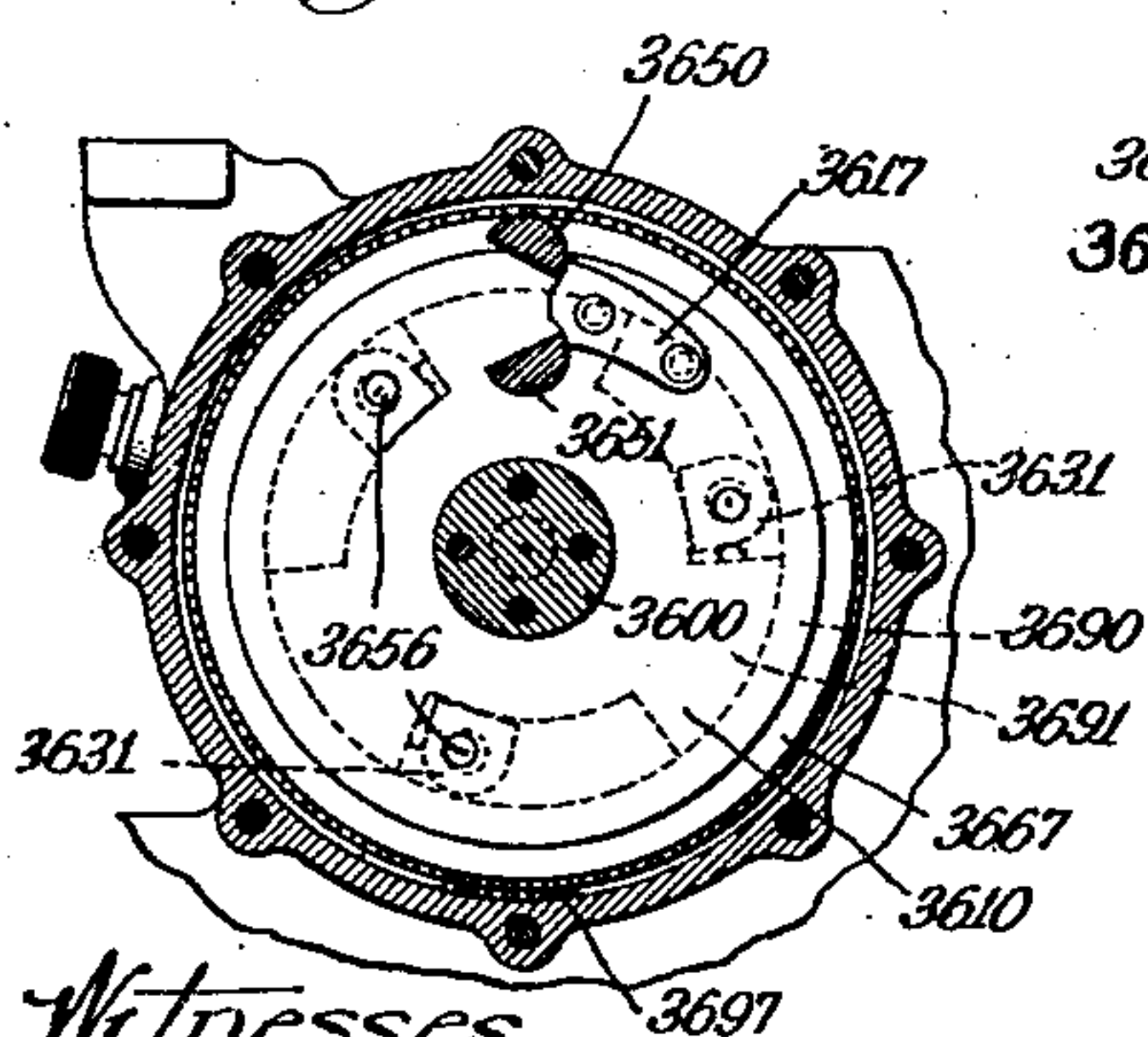
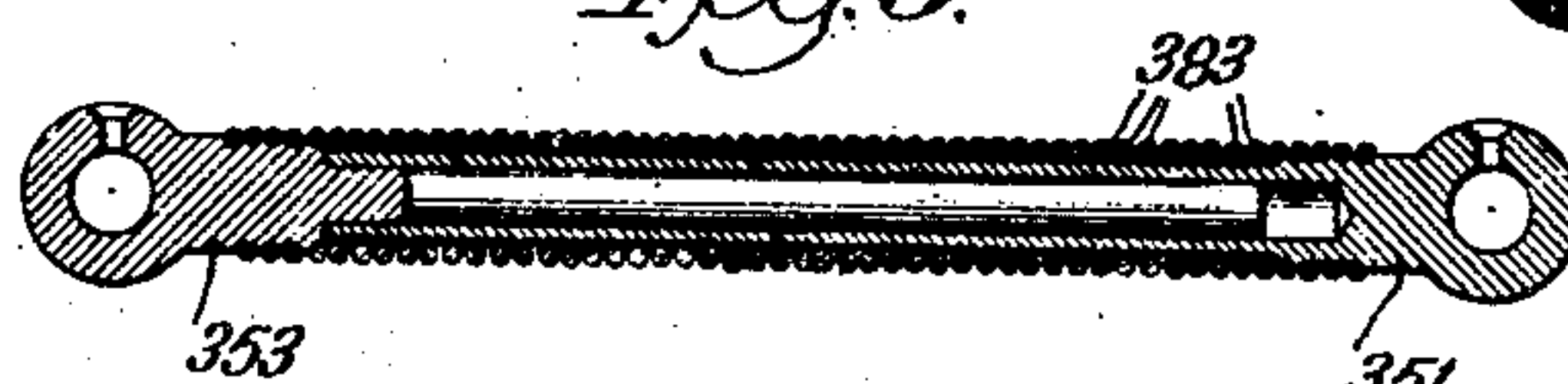


Fig. 2.



Witnesses  
Edw. P. Barrett  
Louis B. Ewain

Fig. 3.



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Jesse J. Vincent  
Per. Motion Picture  
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3 SHEETS—SHEET 2.

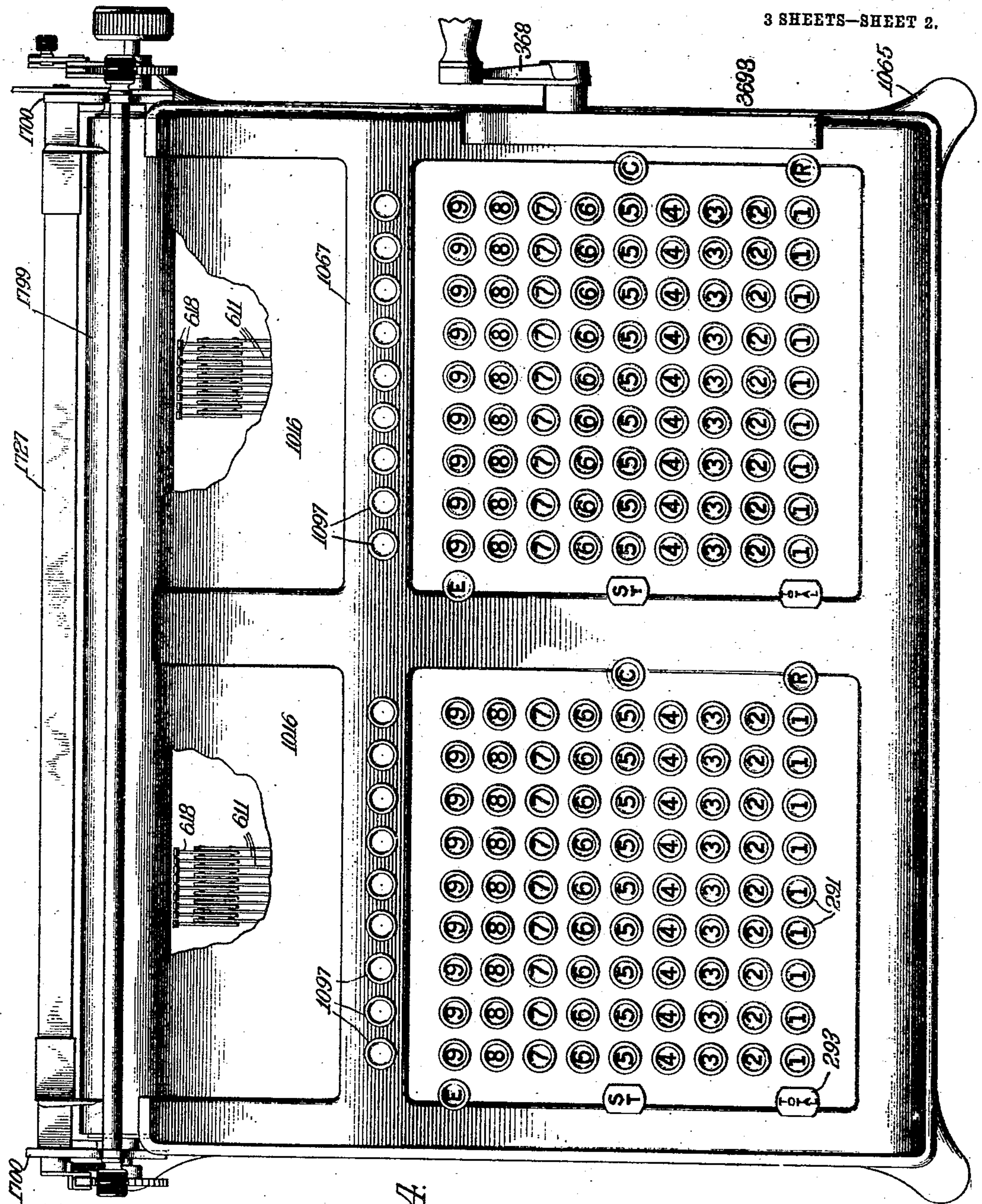


Fig. 4.

Witnesses  
E. P. Bennett  
Louis B. Erwin

Inventor  
J. G. Vincent  
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L. H. Fitty's



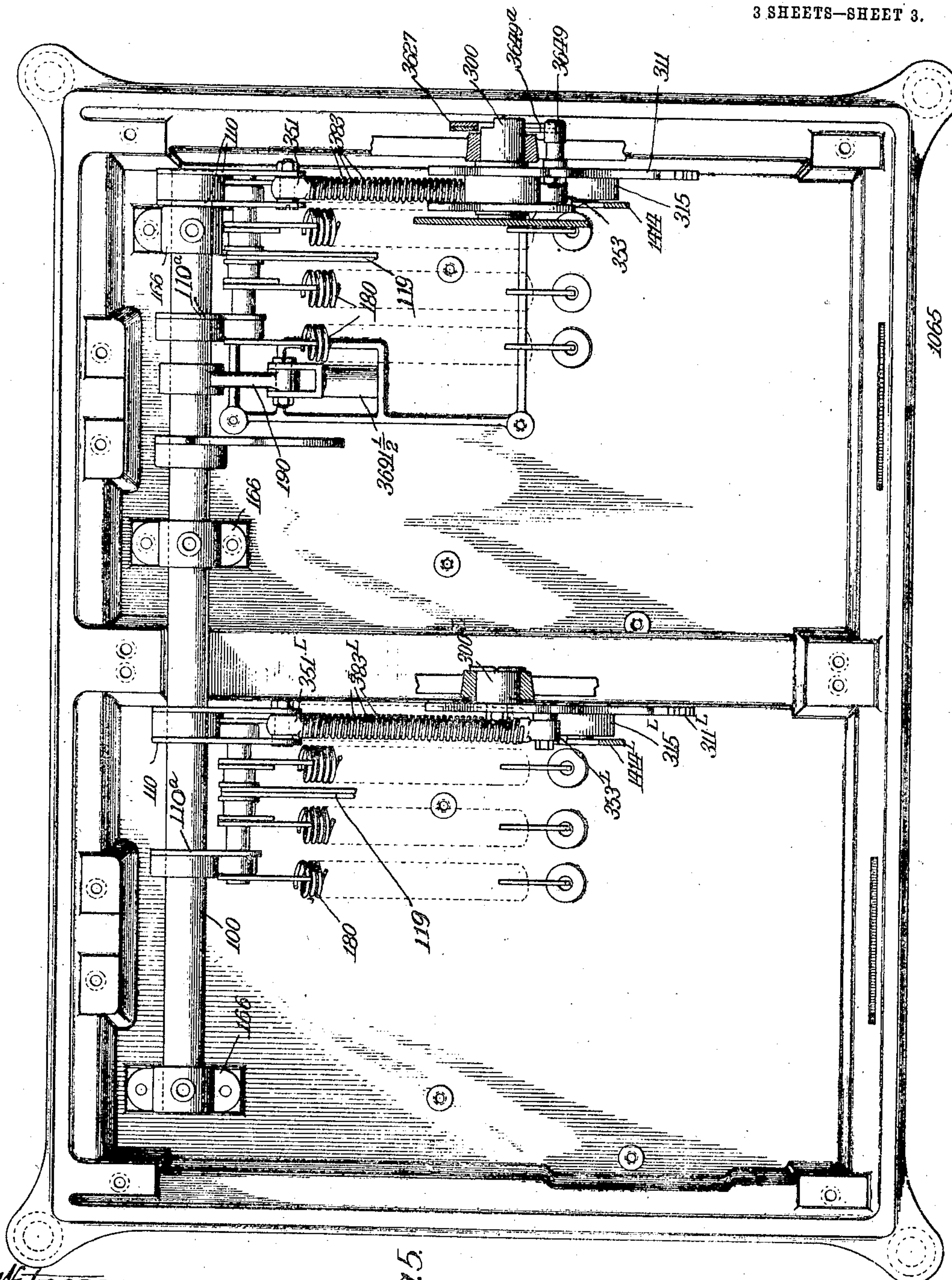
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3 SHEETS—SHEET 3.





# UNITED STATES PATENT OFFICE.

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

## ADDING-MACHINE.

No. 894,550.

Specification of Letters Patent.

Patented July 28, 1908.

Application filed November 30, 1906. Serial No. 345,805.

*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 Adding-Machines, of which the following is a specification.

One object of the present invention is to provide a double capacity in a machine for performing the usual functions of an adding machine; viz., accumulating, listing and striking totals of different amounts. In this same connection the invention provides for greatly increased facilities in the matter of tabulation as it is proposed to make a single paper carriage and platen serve for both divisions of the adding machine.

Each section or division of the "double" machine is independent of the other as to equipment for the customary manipulation of amount keys and total and other special keys but only one section or division is equipped with means for directly applying driving power, provision being made for distribution of power between the two sections or divisions. When a motor is employed to take the place of hand-power in driving the machine, the one section or division will be equipped with a starting device to be touched by the operator, and the usual safety device will be employed to prevent operation of this starting device while the total key of this section or division of the machine is partially depressed. Owing to the remoteness of the total key of the other section or division of the machine, and the many intervening parts between it and the starting device it is found impractical to use such a safety device in connection with this other total key. Therefore recourse is had to other means for protecting the machine from damage due to touching the starting device while this particular total key is but partially depressed.

According to the present invention a yielding character of connection is employed to transmit power to those working parts of this other section or division of the machine which might otherwise be disastrously affected by an application of power to drive them when the total key was but partially depressed.

A similar character of yielding connection is employed to fulfil a further object of the invention which is to provide, in an adding machine equipped for operation either by

hand or by power, for completion of a cycle of operation of the machine when power-driven notwithstanding interference with the proper action of the handle-shaft or attachments. Thus while this operating connection is a rigid and positive one when conveying motion from the handle-shaft to the power-driven shaft when the operator is applying force by hand to operate the machine, yet said connection will yield when the initial movement of parts is being produced by a motor coupled to the power-driven shaft.

A still further object of the invention is to provide for completing by hand an operation of the machine which has been partially performed by the motor and accidentally interrupted. Thus provision is made for removing at will the obstruction otherwise presented by the motor-controlling detent devices to the application of the detachable handle to its shaft.

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 the accompanying drawings and described in detail hereinafter.

Of said drawings Figure 1 represents in right-side elevation an adding machine of the familiar Burroughs type with the improvements of the present invention embodied therein, the inclosing casing of the machine being shown in section as well as certain cross-rods or shafts and studs and the paper carriage attachment at the rear and a portion of the motor casing being broken away to disclose interior parts, some in section and others in side elevation; Fig. 2 represents a sectional right-side elevation of part of the driving connections from the motor; Fig. 3 represents in longitudinal section a telescopic link which constitutes the operating connection between the handle-shaft and the power-driven shaft; Fig. 4 represents a top plan view of the complete machine with portions of the casing broken away to disclose certain parts on a lower plane and with the operating handle applied; and Fig. 5 is a top plan view of the base casting on which the supporting frame-work is erected, this view also showing the power-driven shaft and immediate connections.

While the invention is here disclosed as



embodied in a machine of the Burroughs type (see William S. Burroughs patents Nos. 504,963 and 505,078 of June 12, 1893) it is not to be understood as necessarily limited in this respect, being adaptable to other types of adding machines. In view of the disclosures in the above-mentioned patents and also the presence on the market of the Burroughs machine in large numbers it will not be at all necessary to a complete understanding of the present invention by those skilled in the art that this specification shall go further than to briefly specify a limited number of Burroughs parts with which the cooperating elements of the present invention are immediately associated.

Within a single inclosing casing of proper dimensions and of panel formation are inclosed two complete adding and listing structures each comprising an accumulator and type-carriers with key-controlled mechanism for differentially setting up types and correspondingly actuating the accumulator, these structures being capable of adjustment in the usual manner for the taking of totals and sub-totals. The skeleton or frame-like portion of the inclosing casing is designated by the numeral 1067 in Fig. 4 and is of suitable formation to accommodate side by side two complete key-boards, one for each of the above-mentioned adding and listing structures, also controlling keys such as the so-called elimination, sub-total, total, error, and repeat keys, one set for each key-board. The arrangement of the key-boards is such as to bring the transverse rows of keys into alinement which is an advantage in tabulating work.

In rear of each key-board the cross-bar of the casing carries column-release keys 1097 of well-known construction and arrangement. The two groups of type-carriers 611 with their type-plates 618 appear in plan view in Fig. 4 where the panel plates 1016 of the casing are broken out and it is to be noted that there is a single platen roller 1799 common to the two groups of type-carriers and plates, this platen roller being sufficiently long to cooperate with either or both groups of type and allow for a sufficient range of lateral shift. Said roller platen is journaled in a paper carriage 1700 arranged to slide transversely of the machine upon suitable tracks supported by a bracket 1701 secured to the back of the casing (Fig. 1).

The above-described casing and the adding and listing structures are erected upon a single supporting base in the form of a casting 1065 (Fig. 5) and said casting is provided with bearings 166 for a shaft 100 extending across the rear part of the machine for operative connection with both of the adding and listing structures. Crank arms 110, 110<sup>a</sup> secured to this shaft are connected by springs 180 with the bottom of the casting

and by other springs 181 with crank-arms of rock-shafts 800, respectively, of the adding and listing structures (that of the right-hand structure only being shown, Fig. 1), and as in the case of the usual Burroughs machine the springs 180 normally rock the shaft 100 forward and the springs 181 transmit movement from said shaft to the main working parts of the adding and listing mechanisms when said shaft 100 is moved in opposition to said springs 180, pitmen 119 producing the reverse or forward movements of the shafts 800. In the present instance as distinguished from the usual Burroughs construction a single drive shaft 100 is connected with the base casting through two different sets of springs 180 and with the two adding and listing mechanisms through two different sets of springs 181 and pitmen 119. This shaft may be rocked against the stress of the springs 180 either by hand or power. In the latter case the motor is arranged to operate directly upon the shaft whereas when the shaft is to be rocked by hand the handle is applied to a separate shaft which is appropriately connected with the shaft 100. In the present instance this separate shaft is part of the right-hand section or division of the double machine. It is designated by the numeral 300 and has the usual location in the frame and the usual formation to receive the detachable handle 368 (Fig. 4). Said shaft carries the usual sector 311 notched to cooperate with the familiar full-stroke device. It is well known that in machines of this character such full-stroke devices are sometimes the cause of trouble on account of erroneous action in locking the handle. In order to prevent such action from interrupting a cycle of operations set on foot by the motor the present invention provides for a yielding of the driving connections between the sector 311 and the crank-arms 110 of the right-hand section or division of the machine.

Instead of employing the customary single-piece link, a telescopic form of connection is adopted, the same comprising a shouldered rod 353 pivotally connected with the sector 311, a tubular rod 351 similarly connected with the crank arms 110 and embracing the reduced portion of the rod 353, and a coiled spring 383 embracing both rods and engaged at opposite ends with spiral grooves therein, see Fig. 3. It will be seen that through this form of connection rigidity is insured when the machine is being operated by hand as in such case there is a direct thrust of the shoulder of the rod 353 against the end of the rod 351. However, when power is applied directly to the shaft 100 motion is transmitted to the sector 311 through the medium of the spiral spring 383 and consequently should the full-stroke devices go wrong and lock said sector the motor



can continue to rock the shaft 100 by reason of the yielding of the spring 383. In the case of an electric motor this will have the advantage of preventing burning out. This yielding form of connection has an additional advantage in allowing for a slight over-running when the motor rocks the shaft 100 thereby doing away with adjustments which have heretofore been found necessary in order to insure correct timing.

An exactly similar form of driving connection is used between the sector 311<sup>L</sup> of the left-hand section or division of the machine and the crank arms 110 of that section or division, said connection comprising telescopic rods 353<sup>L</sup> and 351<sup>L</sup> and a coiled spring 383<sup>L</sup> (see Fig. 5). This sector 311<sup>L</sup> is carried by a stub shaft 300<sup>L</sup> similarly located to the shaft 300 but not formed for attachment of a handle, this shaft 300<sup>L</sup> being at an inaccessible position in the middle of the interior of the double machine. The sector 311<sup>L</sup> requires no full-stroke device as it has no such association with the source of driving power as to serve a useful function in compelling full strokes in operating the machine. Said sector does, however, subserve the customary functions of effecting automatic release of depressed amount keys in the left-hand section or division of the machine and of holding the total key of said section or division out or in as the case may be during an operation of the machine. For the latter purpose the sector carries a segmental flange 315<sup>L</sup> for co-action with a roll on an arm 1414<sup>L</sup> which is coupled to the total key. Similar devices are employed in the right-hand section or division of the machine and reference may be had to the illustration thereof in Fig. 1 for a full understanding of the corresponding devices of the left-hand section or division. The segmental flange of the sector 311 is designated 315 and the co-acting roll-carrying arm 1414. The latter is secured to a rock-shaft 1400 which carries a crank-arm 1410 connected by a link 1416 with the depending arm of the total-key bell-crank lever 227. The roll or arm 1414 stands normally to the rear of the flange 315 but clear of the forward end thereof so that depression of the total key is not obstructed. Complete depression of said key results in swinging the arm 1414 so far forward as to carry its roll beyond the flange (see dotted lines Fig. 1). In the one case the total key is locked out during an operation of the machine, or during the first half of an operation, by the engagement between the inner edge of the flange and the roll; in the other case the key is locked in by the engagement of the outer edge of the flange with said roll. Now if the total key should be but partially depressed and the roll on arm 1414 across the end of the flange when power is applied to drive the machine, serious damage would likely be caused. In the

right-hand section or division of the machine this can be and is guarded against by providing an interlock between the total key and the starting device for the motor. However, the remoteness of the total key 293 (Fig. 4) of the left-hand section or division from said starting device (bar 3698) and the multitude of intervening parts makes an interlock affecting this particular total key impracticable. None is therefore employed but damage to the machine through partial depression of the left-hand total key is prevented by the described flexibility in the operating connections between the sector 311<sup>L</sup> and the drive-shaft 100 whereby turning of the latter with the sector blocked results merely in stretching the spring 383<sup>L</sup>.

The motor here illustrated is of the electrical type and the armature shaft drives a worm 3697 (Figs. 1 and 2) and therethrough a worm wheel 3667 carrying one member of a clutch in the form of an annular flange 3690. This flange encircles a peripherally recessed disk 3691 secured to a shaft 3600 carrying a cam 3668 which operates upon a roller at the lower end of a link 3691<sup>1</sup> jointed to a crank arm 190 secured to the shaft 100 at about the middle of that portion of the latter which pertains to the right-hand section or division of the machine (Fig. 5). Spring-pressed struts 3631 in the recesses of the disk 3691 are arranged to effect a driving union between said disk and the wheel 3667 but said struts are normally restrained by reason of the engagement therewith of pins or studs 3656 of a disk or plate 3610 (Fig. 2) rotatably mounted upon the shaft 3600. This plate or disk is in turn restrained by the abutment of a stop-strip 3617 thereon against detent plugs 3650 and 3651. These plugs are geared together by intermeshing segments 3616 and 3616<sup>a</sup> and the latter is formed integrally with an arm 3615 by which these detent plugs are rocked to release the plate or disk 3610 and consequently permit the clutch to close. The outer end of said arm is formed with an eye through which slides a round rod 3626 forming part of a vertical bar 3627 which extends upwardly adjacent the shaft 300 to a point below the key-board of the machine at the right. A nut 3626<sup>a</sup> screwed on the lower end of said rod 3626 engages the underside of the arm 3615 so that elevation of the bar 3627 will result in rocking the detent plugs and closing the clutch in the manner described. A presser bar 3698 extends along the right-hand side of the key-board and constitutes a starting device when the machine is motor-driven. This bar is provided with legs 3622 and 3624 which engage levers 3612 and 3613, respectively, jointed together between pivots and normally upheld as to their outer ends by a connecting spring 3688. The lever 3612 extends beyond its point of engagement with



the lever 3613 to the bar 3627 with which it has a slot-and-pin connection. A spring 3689 connects said lever with said bar so that when the starting bar 3698 is depressed and the rear end of the lever 3612 correspond-  
 5 ingly elevated the bar 3627 will be elevated through the medium of said spring 3689.

In order to prevent attachment of the handle 368 at a time when the detent plugs  
 10 are displaced the bar 3627 is provided with a lateral extension having an upstanding lug 3627<sup>a</sup> adapted, when the bar 3627 rises, to cross the space through which the handle must be introduced. Now it might happen  
 15 that the operation of the machine would be interrupted on account of some accident affecting the motor so that the machine would be stopped with this lug across the space through which the handle must pass in  
 20 being applied to the machine. In such case the operator might find himself in the predicament of inability to operate the machine either by hand or power. To provide for this contingency the connection between the  
 25 bar 3627 and the arm 3615 is of the sliding character above described and a spring 3687 envelops the rod 3626 between said arm and the shoulder formed on the bar 3627 where the said rod unites therewith, this spring pro-  
 30 viding for the return of said arm 3615 along with the bar 3627 in an ordinary operation of the machine by the motor and at the same time permitting the said bar to be drawn downwardly by hand in order to permit in-  
 35 troduction of the handle under such conditions as above mentioned when an operation of the machine is to be completed by hand. Ordinarily the lowering of the bar 3627 takes place automatically by reason of a roller-  
 40 stud 3649 on the sector 311 operating against a lateral projection 3649<sup>a</sup> of the bar 3627, so as to return the detents to operative position before the stop-strip 3611 can return to its normal position.

The interlock hereinbefore mentioned be-  
 45 tween the starting device and the total key of the right-hand section or division of the machine comprises a square lug 3655 on the lever 3612, and an arm 1415 secured to the shaft 1400 and having a segmental outer end  
 50 portion which normally stands just in rear of and below said lug. When the total key is depressed said segmental end portion at once passes forward under the lug thus preventing  
 55 operation of the starting bar until, by complete depression of the total key, the rear end of said segmental portion passes forwardly beyond the lug.

It will now be seen that the construction  
 60 herein disclosed is well adapted to fulfil the objects primarily stated. The double capacity of the machine coupled with the independence of its divisions as to accumulation and listing of items and printing of totals,  
 65 supplies a want long felt in certain classes of

work such for example as that pertaining to trial balances. In such case the debits can be put into one section or division and the credits in the other and the make-up of the machine allows for ample space between the  
 70 debit and credit entries as recorded—a thing not provided for in the so-called “split” machine with wide key-board.

What is claimed is:

1. The combination of a plurality of add-  
 75 ing and itemizing structures each complete in itself as to capabilities for accumulating amounts and setting up type representing the different items, a laterally shiftable  
 80 platen common to the structures for taking imprints simultaneously from their sets of type, and driving means common to the structures.

2. The combination of a plurality of add-  
 85 ing and itemizing structures each complete in itself as to capabilities for accumulating amounts and setting up type representing the different items, a supporting base common to the structures, a single inclosing cas-  
 90 ing for the same, a laterally shiftable platen common to the structures for taking imprints simultaneously from their sets of type, and driving means common to the structures.

3. The combination of a plurality of add-  
 95 ing and itemizing structures each complete in itself as to capabilities for accumulating amounts and setting up type representing the different items, a laterally shiftable platen common to the structures for taking  
 100 imprints simultaneously from their sets of type, a drive-shaft common to the structures, and means for applying power to said shaft.

4. The combination of a plurality of add-  
 105 ing and itemizing structures each complete in itself as to capabilities for accumulating amounts and setting up type representing the different items, a platen common to the structures for taking imprints simultaneously  
 110 from their sets of type, a drive-shaft common to the structures, means for applying power to said shaft and distensible operating connections between said shaft and working parts of the structures respectively.

5. The combination of a plurality of add-  
 115 ing and itemizing structures each complete in itself as to capabilities for accumulating amounts and setting up type representing the different items, and each having total-printing means and manipulative controlling  
 120 devices therefor with provisions for locking said devices in or out during operation of the machine, a platen common to the structures for taking imprints simultaneously from their sets of type, driving means common to the  
 125 structures, and yielding connections between the driving means and the means for locking the total controlling devices.

6. The combination of a plurality of add-  
 130 ing and itemizing structures each complete in



itself as to capabilities for accumulating amounts and setting up type representing the different items, and each having total-printing means and manipulative controlling devices therefor with provisions for locking said devices in or out during operation of the machine, including oscillatory members, a drive-shaft common to the structures, yielding connections between said shaft and said oscillatory members, and a platen common to the structures for taking imprints simultaneously from their sets of type.

7. The combination of a pair of adding and itemizing structures mounted side by side and each complete in itself as to capabilities for accumulating amounts and setting up type representing the different items, and each having total-printing means and manipulative controlling devices therefor with provisions for locking said devices in or out during operation of the machine, driving means common to the two structures, a motor applied to said driving means, a starting device associated with the key-boards of the structures, an interlock between said starting device and the total controlling device of one structure, and yielding connections between the driving means and the lock of the other structure.

8. The combination of a pair of adding and itemizing structures mounted side by side and each complete in itself as to capabilities for accumulating amounts and setting up type representing the different items, and each having total-printing means and manipulative controlling devices therefor with provisions for locking said devices in or out during operation of the machine, including oscillatory members, driving means common to the two structures, a motor applied to said driving means, a starting device associated with the key-boards of the structures, an interlock between said starting device and the total controlling device of one structure, and yielding connections between the driving means and the oscillatory member of the other structure.

9. In a machine of the character described, the combination of a hand-operated driving member, a power-operated driving member, and a yielding connection between said members.

10. In a machine of the character described, the combination of an oscillatory hand-operated driving member, an oscillatory power-operated driving member, and a yielding connection between said members.

11. In a machine of the character de-

scribed, the combination of a hand-operated driving member, a power-operated driving member, and a distensible connection between said members.

12. In a machine of the character described, the combination of an oscillatory hand-operated driving member, an oscillatory power-operated driving member, and a distensible connection between said members.

13. In a machine of the character described, the combination of a hand-operated driving member, a power-operated driving member, a telescopic connection between said members and a contractile spring applied to said telescopic connection.

14. The combination of a pair of adding and itemizing structures mounted side by side and each complete in itself as to capabilities for accumulating amounts and setting up type representing the different items, and each having total-printing means and manipulative controlling devices therefor with provisions for locking said devices in or out during operation of the machine, including oscillatory members, a drive-shaft common to the two structures, a motor clutched to said shaft, a starting device associated with the key-boards of the structures, an interlock between said starting device and the total-controlling device of one structure, and yielding connections between the drive-shaft and the oscillatory members of both structures, each connection comprising telescopic members and a contractile spring, substantially as described.

15. In a machine of the character described, the combination with a drive-shaft equipped for application thereto of a handle, a power-driven shaft, a motor clutched thereto, normally restrained clutch-closing means, a detent controlling the same, and a bar yieldingly connected with said detent and adapted to obstruct application of the handle when operated to displace the detent.

16. In a machine of the character described, the combination with a drive-shaft equipped for application thereto of a handle, a power-driven shaft, a motor clutched thereto, normally restrained clutch-closing means, a detent controlling the same, a starting bar slidably engaged with the detent, and a spring interposed between the latter and the bar to permit independent movement thereof; substantially as and for the purpose described.

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Witnesses:

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