

W. J. KILPATRICK.
 ADDING MACHINE.
 APPLICATION FILED MAY 6, 1910.

978,168.

Patented Dec. 13, 1910.

2 SHEETS—SHEET 1.

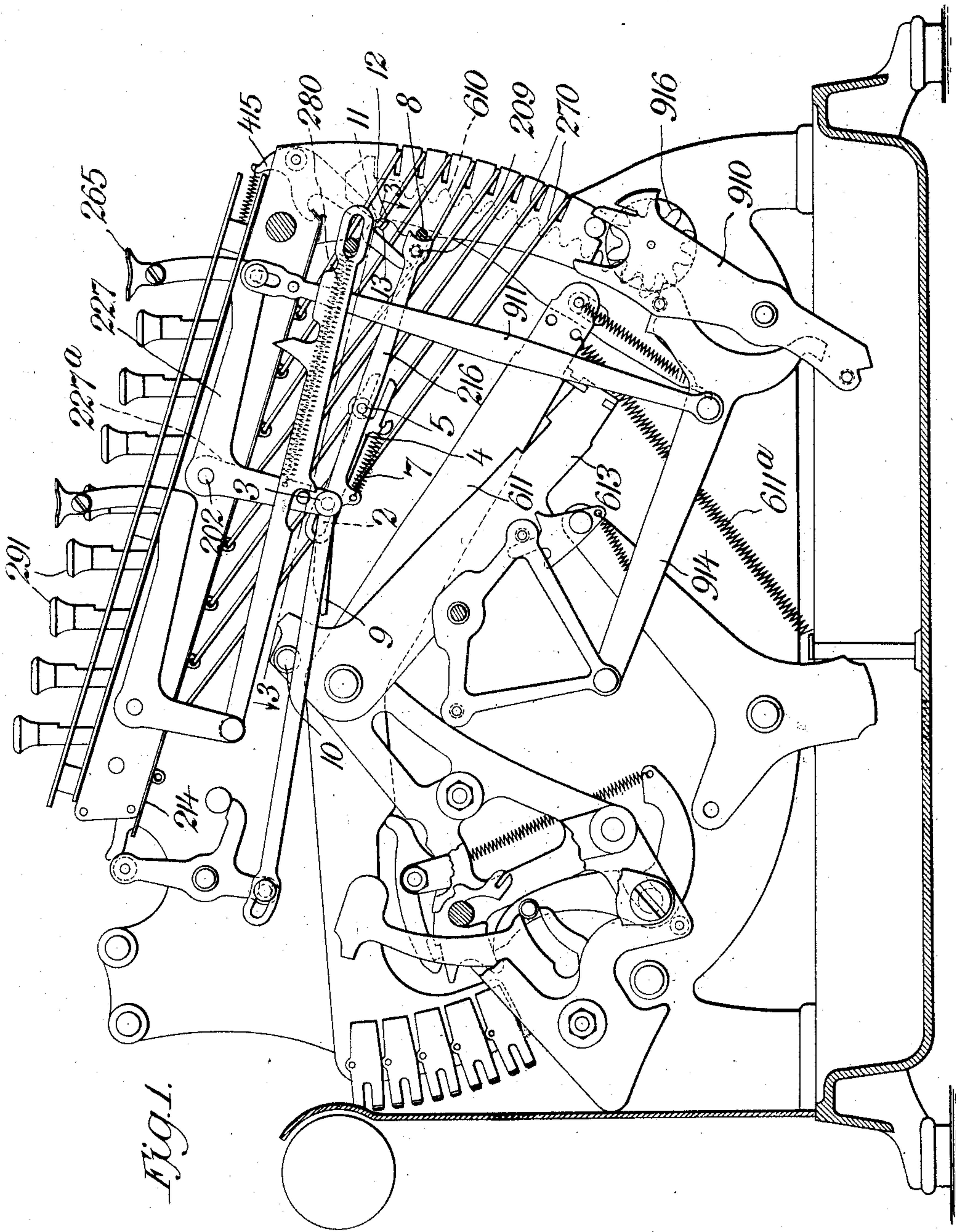


Fig. 1.

Witnesses:

E. R. Barrett
 Louis B. Erwin

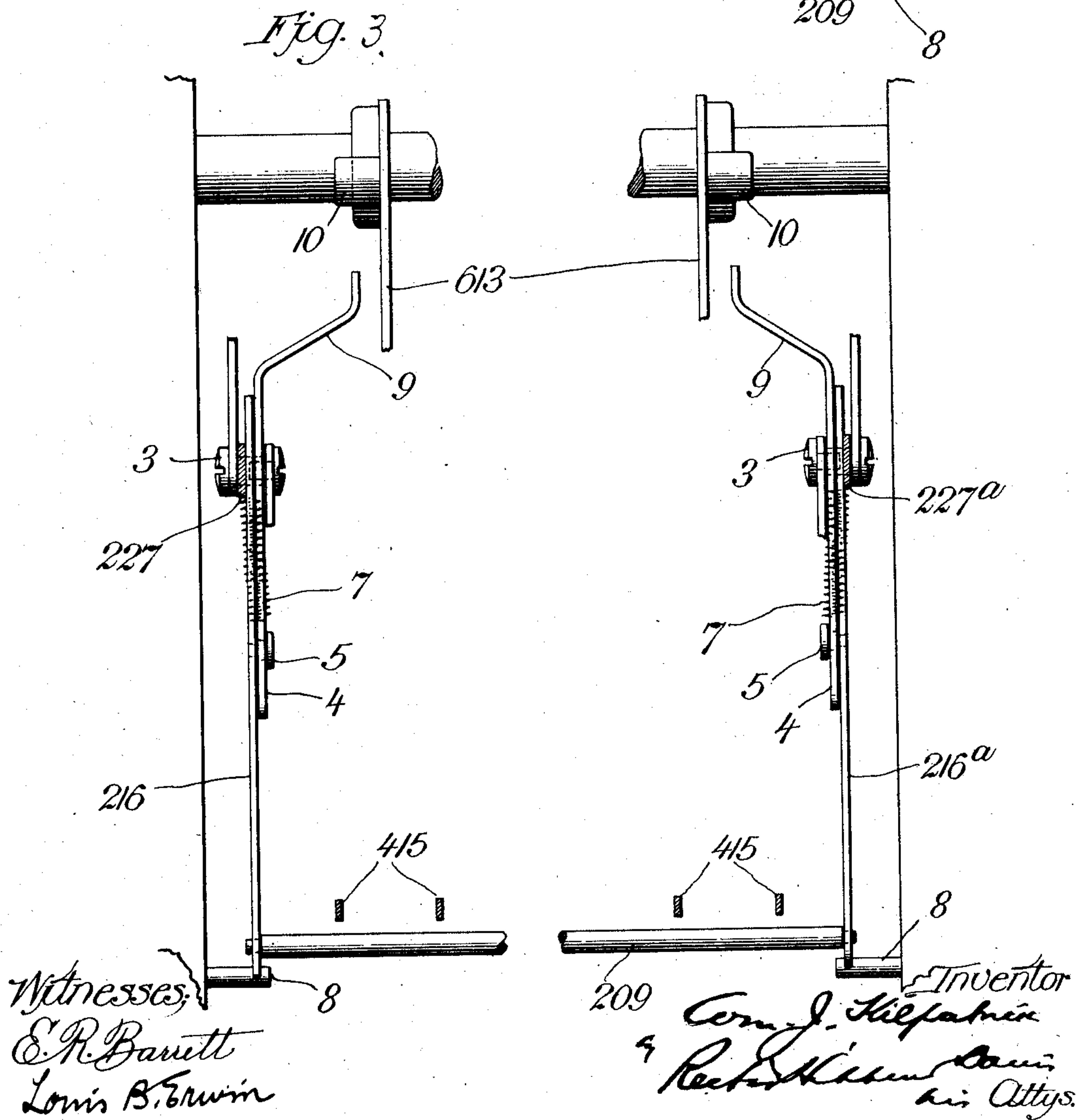
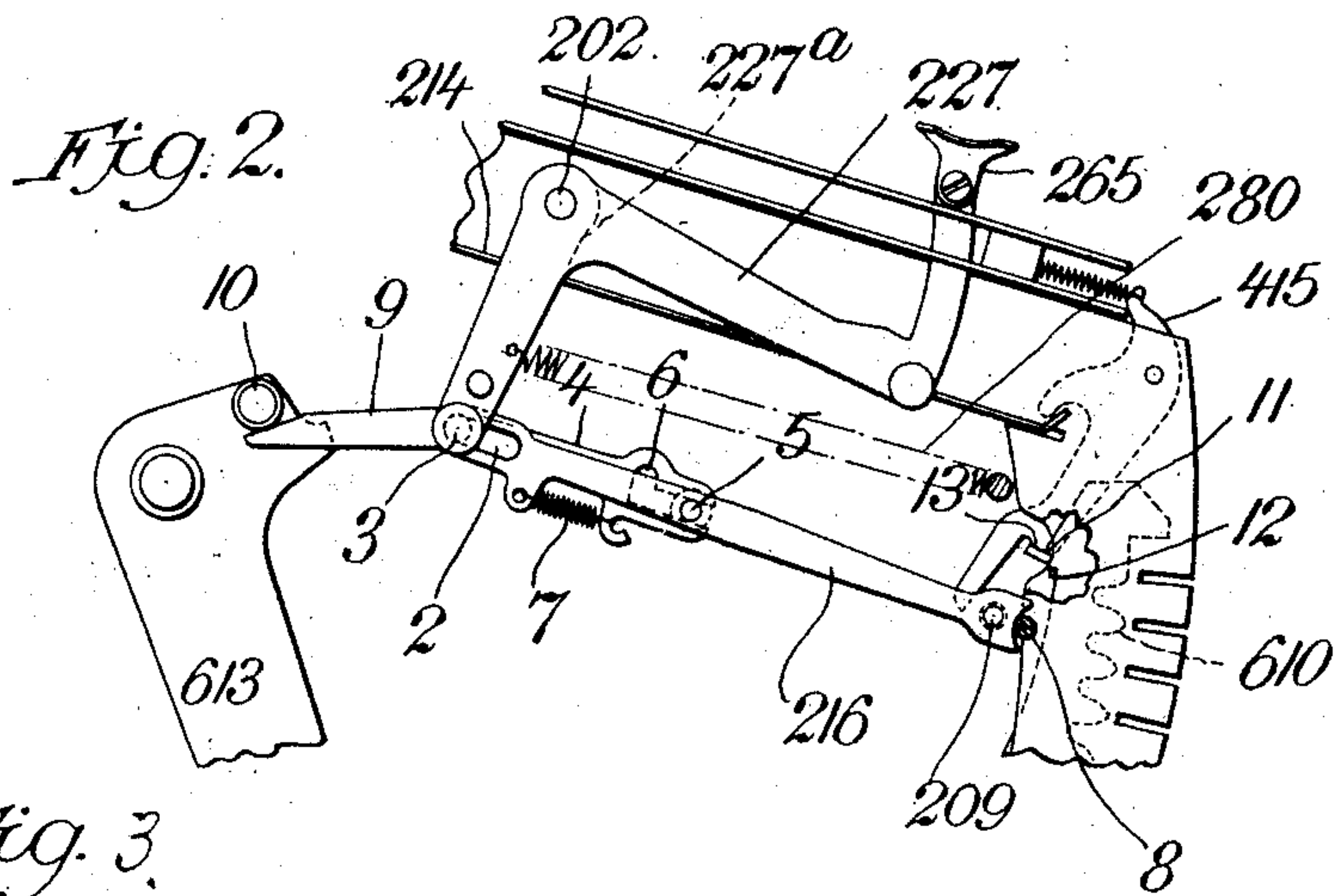
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UNITED STATES PATENT OFFICE.

WILLIAM J. KILPATRICK, OF DETROIT, MICHIGAN, ASSIGNOR TO BURROUGHS ADDING MACHINE COMPANY, OF DETROIT, MICHIGAN, A CORPORATION OF MICHIGAN.

ADDING-MACHINE.

978,168.

Specification of Letters Patent.

Patented Dec. 13, 1910.

Application filed May 6, 1910. Serial No. 559,724.

To all whom it may concern:

Be it known that I, WILLIAM J. KILPATRICK, 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.

The object of the present invention is to provide an improved form of means in an adding machine for preventing the advance movement or discharge of spring-actuated racks or like actuating devices in the operation of the machine for taking a total which leaves the adding wheels clear. In adding and listing machines it is common to extract the total by keeping the adding wheels in mesh with their actuating racks during the first part of the operation of the machine, as during the forward pull of an operating crank handle, and then causing the wheels to become disengaged from the racks, the wheels having been turned backward to zero positions. The racks are ordinarily individually restrained in normal position by latches severally controlled by the columns of amount keys and collectively displaceable by the total key or its connections. It will be of course understood that the common method of extracting or taking a total is to press down a key especially provided for the purpose, and pull the operating handle of the machine or touch off the motor, and it will be further understood that the depression of that special key causes the adding wheels to be so controlled during the operation that they will remain in mesh with their racks during the descent or advance of the racks and be disengaged therefrom during the rise or return of the racks to normal. In such an operation no amount keys are brought into play so that the latches for the racks will not be displaced through connection with amount keys as they are in the case of the registering or recording of an amount or number. Consequently the latches are required to be collectively displaced by the total key and as no amount key stops are set all of the racks ordinarily would be free to move on to extreme positions upon disengagement of the wheels from them. In the case of racks whose corresponding wheels already stand at zero and which therefore partake of no appreciable advance movement during the first part of the operation,

this would mean that upon disengagement of the wheels these racks would spring forward the full distance or in other words discharge under the greatest tension. This is objectionable both on account of the noise and the strain occasioned by the concussion.

The present invention provides for restoration of rack latches before the adding wheels disengage from the racks so that any racks which have not moved appreciably (on account of their wheels already being at zero) will be reengaged by the latches and prevented from discharging; and the invention takes the form of separable couplings between the usual latch-displacing bail and the total key so that while depression of the latter effects displacement of the latches through direct thrust in the couplings, yet the latter will be disconnected at the proper time to permit reengagement of latches with racks for the purpose above described.

In the drawings which accompany and form part of this specification Figure 1 represents in left side elevation an adding and listing machine of the well-known Burroughs type equipped with a construction embodying the present invention; Fig. 2 similarly illustrates parts which appear at the upper right-hand corner of Fig. 1 but under different conditions; and Fig. 3 is a fragmentary horizontal section taken substantially on the line 3—3 of Fig. 1.

For details of the machine proper reference may be had to Patent No. 913,860, issued March 2, 1909, to Burroughs Adding Machine Company on the invention of Jesse G. Vincent and prior patents mentioned in the Vincent specification. In view of the disclosure in these and many other issued patents it will not be necessary to enter into a detailed explanation of the familiar construction and mode of operation of the Burroughs adding and listing machine.

The numeral 291 designates the usual amount keys which operate the stop wires 270 and the slide strips 214, the latter engaging respectively the rack latches 415.

The numeral 310 designates the racks which have the usual slot, pin and spring connection with levers 611 carrying at their rear ends the type plates 618. These levers are connected to the base of the machine by springs 611^a normally under tension by rea-

son of the engagement with the levers of the customary restoring frame 613. Of course in every operation of the machine this restoring frame swings down and back but the racks only descend when released from the additional restraint of the latches 415 except that any rack which has risen one step beyond normal for carrying purposes will be drawn down to normal position or into engagement with its latch by movement of its lever 611 in following the restoring frame down. Levers 611 of racks already at normal would simply move a distance measured by the slots in the racks in case the latter had not been released by their latches 415.

The numeral 916 designates the usual adding pinions carried on a rocking frame 910 and move into and out of engagement with the racks by a pitman 914 shifted in the usual manner and connected as usual through a link 911 with a total key bell crank lever 227 carrying the ordinary total key 265. Depression of the latter effects disengagement of all of the latches 415 from the racks and it is in this particular connection that the present invention has its place.

Instead of the depending arm of the bell crank 227, and a similar arm 227^a at the opposite side of the machine, being merely pivotally connected to the side-pieces 216 and 216^a respectively of the latch-displacing bail of which 209 designates the cross-rod extending in front of the latches, as is ordinarily the case, this bail in the present instance is capable of movement independently of the total key bell crank lever 227 and the arm 227^a. It will be understood that this lever and arm are both secured to a rock shaft 202 extending across the machine and so act as one and that ordinarily depression of the total key simply draws back the latch-displacing bail and holds it back as long as the key is depressed. In carrying out the present invention longitudinal slots 2 are provided in the rear portions of the side-bars 216 and 216^a of the bail and studs 3 carried by the bell crank 227 and the arm 227^a engage these slots respectively. On these same studs there are pivotally mounted a pair of couplers in the form of levers having forwardly-extending arms 4 bifurcated to embrace studs 5 upon the bars 216 and 216^a respectively and notched in the upper inner portions of the bifurcations, as shown at 6. Springs 7 connect under portions of the arms 4 with rear portion of the bars 216 and 216^a respectively, thus tending to enforce an engagement between the notches 6 and the studs 5 and also tending to move the bail forward. Normally the side-bars of the latter abut studs 8 in the framework to limit forward movement.

Normally the studs 3 of the total key

structure are at the forward ends of the slots 2 of the bail, as illustrated in Fig. 1, the notches 6 are engaged with the studs 5, and the bail is forward against the studs 8 of the framework. When the total key is depressed the coupler arms 4 will of course be drawn rearward and inasmuch as the forward sides of their notches 6 will act with direct thrust rearward upon the studs 5, the bail will necessarily be drawn rearward and the latches 415 displaced as usual. However, as it is the purpose of the present invention to restore the latches before the total key is restored the bail is disconnected from the latter at a middle point in the operation of the machine. To this end the coupler levers have rearwardly-projecting arms 9, which when the total key is depressed are carried into the paths of movement of roller studs 10 on the restoring frame 613. It results that when said frame is finishing its downward swing these roller studs encounter said arms and rock the coupler levers on their pivots, thereby disengaging the notches 6 from the studs 5, whereupon the springs 7 pull the bail back to its normal position, illustrated in Fig. 2, and free the latches 415 so that such of them as pertain to racks whose wheels already stood at zero may be caught and detained by their latches before the adding wheels disengage from the racks. It will be understood that according to the customary order of operation of the Burroughs adding machine the wheels do not disengage from the racks until the last half of the operation begins or in other words until, in a hand-operated machine, the operating handle starts rearward. As in practice there is some slight degree of lost motion which permits racks engaged with wheels already standing at zero to settle or move a slight extent downward, each rack has an extra shoulder 11 for its latch 415 to engage in a totaling operation. The regular shoulder which the latch normally engages is designated 12 and it will of course be understood that at the end of any operation the racks are carried far enough up to take the shoulders 12 past the engaging lips 13 of the latches 415.

At the conclusion of a totaling operation, the total key is restored by the usual spring 280 and the coupler levers carried forward so that the notches 6 in their arms 4 will re-engage the studs 5 of the bail and the springs 7 will be again tensioned.

It will be obvious that the construction above described is well calculated to effectively accomplish the object primarily stated. The invention, however, is not necessarily limited to the exact details, which may be varied from what is here specifically described. At the same time it is to be understood that I do not claim broadly the idea of reengaging the usual rack-detaining

latches to prevent advance or discharge of racks in the totaling operation when the wheels are disengaged from the racks.

What I claim is:

5 1. In a machine of the character described, the combination of adding wheels; actuating racks; means for engaging and disengaging the same and said wheels; means for reciprocating the racks; latches
10 for detaining the latter; a bail for displacing the latches; a total key and connections for reversing the order of engagement and disengagement of racks and wheels; couplings between said key and the bail, with
15 provisions for operating the latter by the key through direct thrust in the couplings; and means for uncoupling the total key and bail before the wheels and racks disengage in the taking of a total.

20 2. In a machine of the character described, the combination of adding wheels; actuating racks; means for engaging and disengaging the same and said wheels; means for reciprocating the racks; latches
25 for detaining the latter; a bail for displacing the latches; a total key and connections for reversing the order of engagement and disengagement of racks and wheels; a movably-mounted coupler shouldered to effect
30 a direct thrust engagement between the bail and the key; and means for displacing the coupler before the wheels and racks disengage in the taking of a total.

35 3. In a machine of the character described, the combination of adding wheels; actuating racks; means for engaging and disengaging the same and said wheels; means for reciprocating the racks; latches
40 for detaining the latter; a bail for displacing the latches; a total key and connections for reversing the order of engagement and disengagement of racks and wheels; a pivoted coupler-piece carried by the key connections and shouldered for direct thrust
45 engagement with the bail; and means for disengaging said coupler-piece from the bail before the wheels and racks disengage from each other in a totaling operation.

50 4. In a machine of the character described, the combination of adding wheels; actuating racks; means for engaging and disengaging the same and said wheels; means for reciprocating the racks; latches
55 for detaining the latter; a bail for displacing the latches; a total key and connections for reversing the order of engagement and

disengagement of racks and wheels; a pivoted coupler-piece carried by the key connections and shouldered for direct thrust engagement with the bail and spring-connected to the latter; and means for disengaging said coupler-piece from the bail before the wheels and racks disengage from each other in a totaling operation.

5. In a machine of the character described, the combination of adding wheels; actuating racks; means for engaging and disengaging the same and said wheels; means for reciprocating the racks including
65 a restoring frame; latches for detaining the racks; a bail for displacing the latches; a total key and connections for reversing the order of engagement and disengagement of racks and wheels; and a coupler-piece carried by the key-connections and shouldered
70 for engagement with the bail and adapted to be displaced by the aforesaid restoring frame.

6. In a machine of the character described, the combination of adding wheels; actuating racks; means for engaging and disengaging the same and said wheels; means for reciprocating the racks including
80 a restoring frame; latches for detaining the racks; a bail for displacing the latches; a total key and connections for reversing the order of engagement and disengagement of racks and wheels; and a pivoted coupler-piece carried by the key-connections and shouldered for engagement with the bail
85 and having an arm adapted to be carried into the path of the restoring frame.

7. In a machine of the character described, the combination of adding wheels; actuating racks; means for engaging and
90 disengaging the same and said wheels; latches for detaining the racks; a bail for displacing said latches having slotted side bars and studs on the latter; a total key bell-crank structure with studs engaging the
100 slots of the bail side-bars; coupler-pieces pivoted on the latter studs and bifurcated and notched to engage the bail studs; springs connecting said coupler-pieces and the bail; and a rack-restoring frame having
105 studs to act upon arms of the coupler-pieces; substantially as and for the purpose described.

WILLIAM J. KILPATRICK.

Witnesses:

J. G. VINCENT,
ARTHUR W. FRENZEL.