

May 16, 1933.

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1,909,715

SELECTING MECHANISM FOR MULTIPLE COUNTER CALCULATING MACHINES

Filed Aug. 6, 1928

4 Sheets-Sheet 1

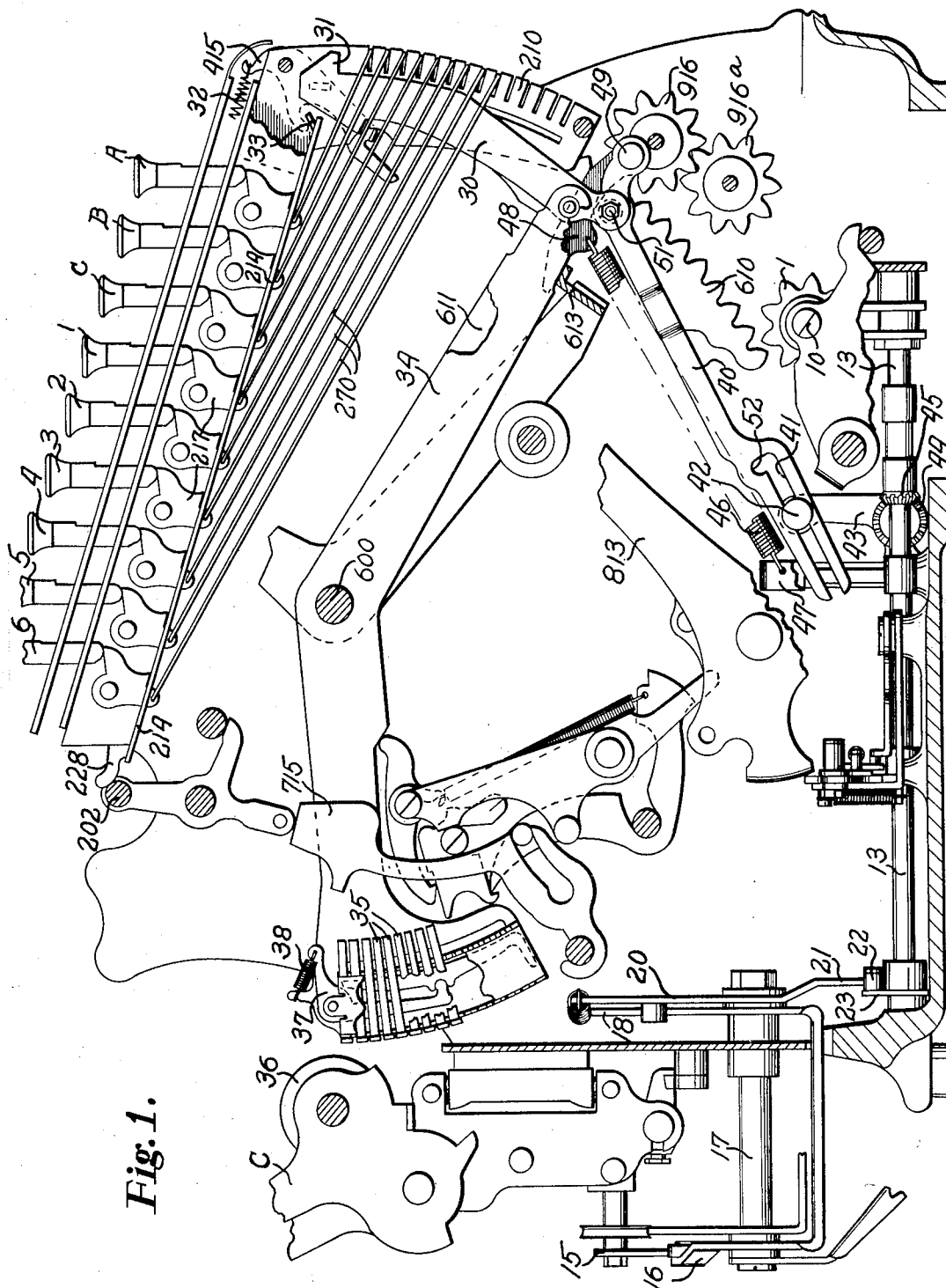


Fig. 1.

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4 Sheets-Sheet 2

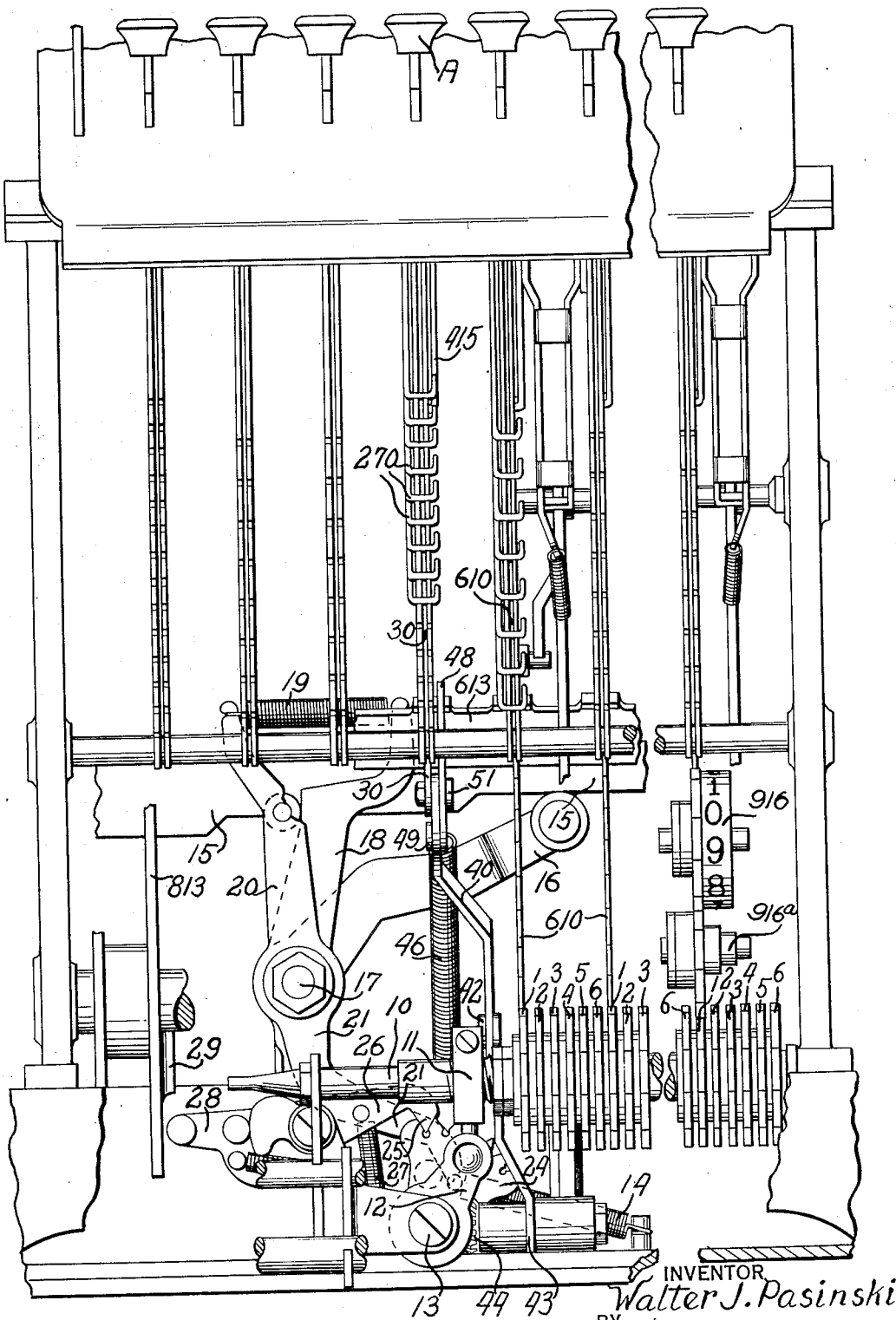


Fig. 2.

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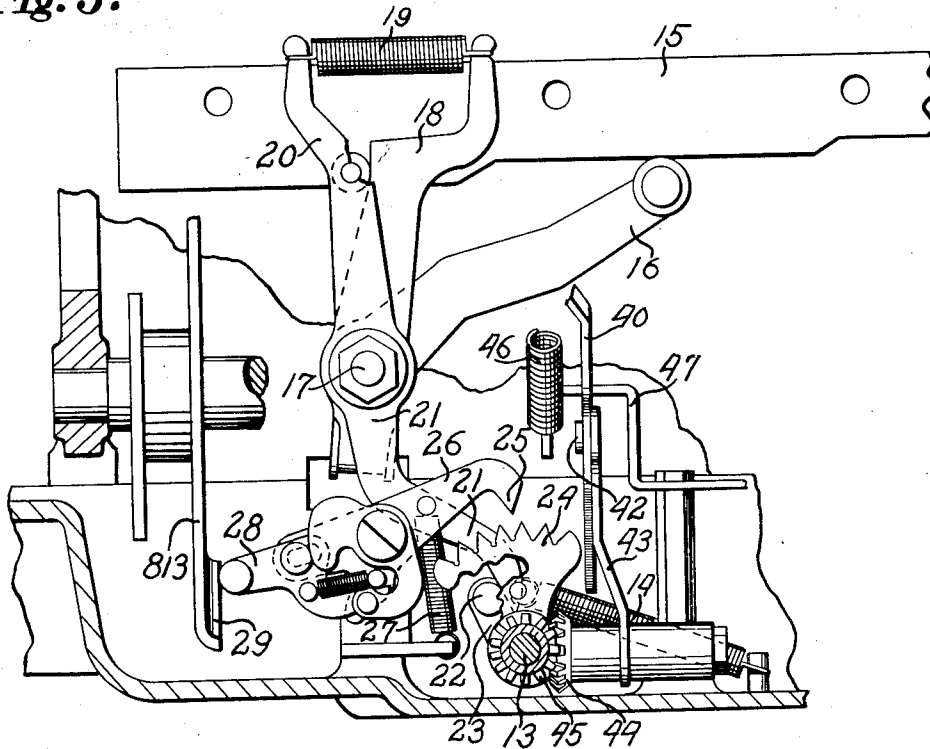
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4 Sheets-Sheet 3

Fig. 3.



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4 Sheets-Sheet 4

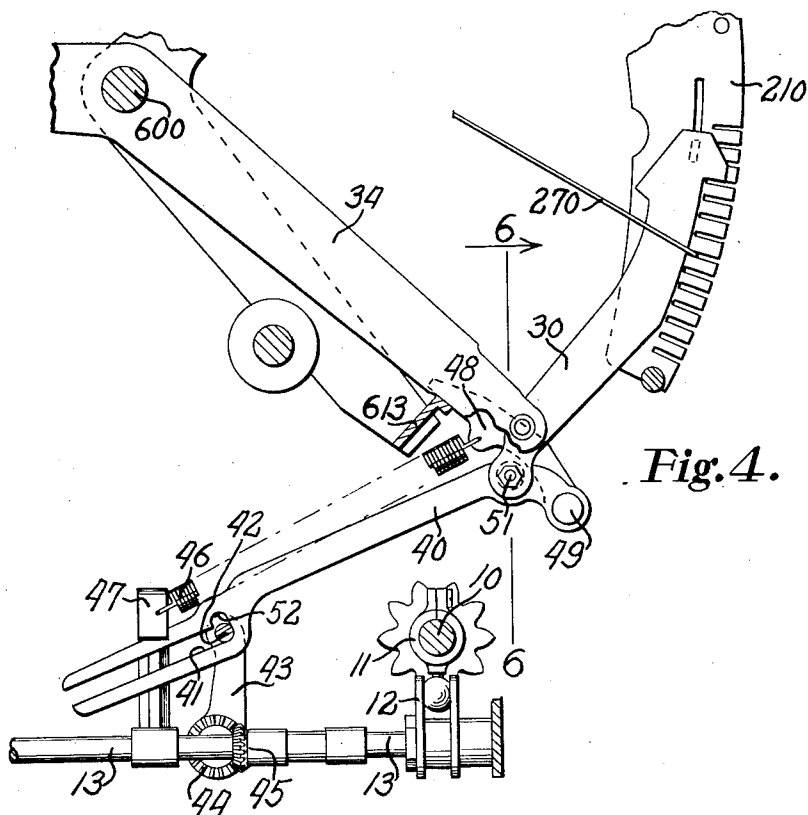


Fig. 4.

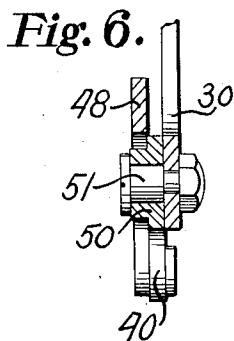


Fig. 6.

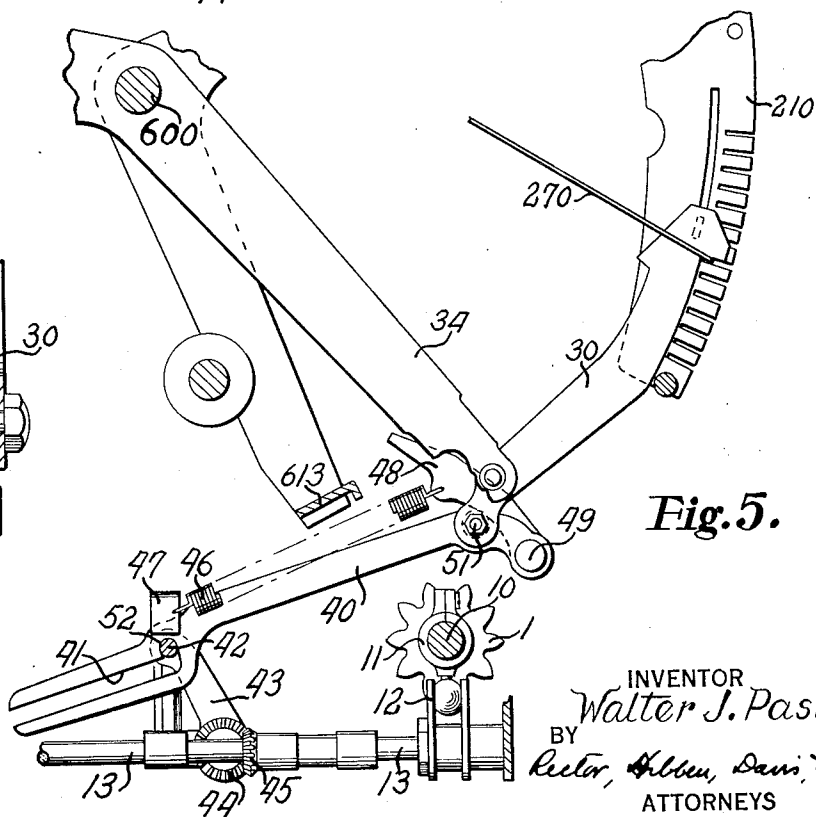


Fig. 5.

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UNITED STATES PATENT OFFICE

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SELECTING MECHANISM FOR MULTIPLE COUNTER CALCULATING MACHINES

Application filed August 6, 1928. Serial No. 297,851.

This invention relates to a selecting mechanism for multiple counter calculating machines, particularly to a mechanism by means of which any one of a plurality of counters may be quickly and easily selected for operation by manipulation of a manually operable member such as a key.

The general object of the invention is to provide an improved selecting mechanism for multiple counter calculating machines.

A more particular object is to provide a key controlled selecting mechanism for multiple counter machines by means of which any one of a plurality of counters may be selected by the depression of an appropriate key.

Another object is to provide a mechanism of the character described which will act to select certain counters irrespective of whether or not certain other counters have been chosen by other selecting means.

Other objects and advantages of the invention will appear from the specification and drawings.

An embodiment of the invention is shown in the accompanying drawings in which:

Figure 1 is a sectional side elevation of a Burroughs accounting machine with the invention applied thereto, the casing being removed and the view showing only such parts of the machine as are necessary for an understanding of the present invention.

Fig. 2 is a partial front elevation of the machine with the invention applied thereto, some of the parts of the machine being omitted in order to illustrate the invention more clearly.

Fig. 3 is a sectional elevation of a portion of the rear of the machine taken from the front, the view showing particularly the carriage connection for controlling the selection of multiple counters.

Fig. 4 is a left side elevation and section of a portion of the improved selecting mechanism, the parts being shown in the position they occupy just before the end of a forward stroke of the machine when the No. 5 counter has been selected.

Fig. 5 is a view similar to Fig. 4 showing

the parts in the position they occupy at the end of the forward stroke of the machine.

Fig. 6 is a detailed section on the line 6-6 of Fig. 4.

The invention is shown applied to a Burroughs machine, the general principles of which are so well known in the art that only a brief description will be given here.

The machine includes a plurality of actuator racks 610 carried by arms 611 pivoted on shaft 600. The racks are held elevated individually by latches 415 which are released in the familiar manner in any one bank by a slide plate 214 which is moved rearwardly by depression of an amount key in that bank. The racks are also held elevated collectively by a bail 613 which, when the machine is operated, moves away from the arms 611 and permits the descent of such actuator racks as may have been individually released. Upon the return stroke of the machine the bail 613 picks up all of the arms 611 and returns them together with their actuator racks to normal position. Cooperating with the actuator racks is a counter comprising a plurality of counter pinions 916 with which are associated subtraction pinions 916^a. The counter pinions are rocked into and out of engagement with the racks by the movement of arm 813 having appropriate connections with the counters, said connections not being illustrated as they are shown in numerous prior patents on the Burroughs machine. A traveling paper carriage *c* is mounted at the rear of the machine for receiving the paper or forms upon which the calculations are recorded.

A second set of counters, of which six are shown, is associated with the actuator racks, said counters comprising sets of pinions numbered from 1 to 6 inclusive in Fig. 2. These pinions are mounted on a longitudinally movable shaft 10, there being a set of pinions for each actuator rack and provision being made for preventing the rotation of any pinion except those that are in alignment with the actuator racks at the time the counter shaft is rocked to move the pinions into engagement with the racks.

These counters and their controlling con-

nections will be described only briefly here as it is not necessary to understand all of the details for an understanding of the present invention, the construction being fully described in co-pending application Serial No. 170,869, filed February 25, 1927.

The counter-carrying shaft 10 has a clamp 11 fixed to it which is connected to one end of an arm 12 fixed to a shaft 13 that extends toward the rear of the machine. The shaft 13 is urged in a clockwise direction by a spring 14 so that the counter shaft 10 is always urged in a direction to position the No. 1 counter for operation, that is, the pinions of the No. 1 counter are in alignment with the actuator racks 610 so that when the counter shaft is rocked to move the pinions into engagement with the racks the No. 1 pinions will be engaged. The means for rocking the counter into and out of engagement with the racks is not a feature that need be understood as far as the present invention is concerned, said means being fully described in Pasinski Patent No. 1,778,506.

The multiple counters may be automatically selected by means of a cam bar 15 carried by the traveling paper carriage C. This cam bar engages a roller on the end of one arm 16 of a yoke-shaped member pivoted at 17 and having an upstanding arm 18. The latter arm is connected by a spring 19 to the upper end 20 of a lever pivoted on the shaft 17 and having a downward extension 21 positioned to engage a stud 22 on an arm 23 fixed to the shaft 13. When a raised portion of the cam bar 15 engages the arm 16, as would occur if the bar 15 were moved to the right in Fig. 3, the arm 16 is rocked clockwise which, in turn, moves the arm 20—21 clockwise and results in rocking the shaft 13 counter-clockwise against the tension of spring 14 to move the counter shaft 10 toward the left as viewed in Fig. 2. Conversely, when a lower surface or a cut-out portion of bar 15 registers with the end of the arm 16, the connections including the lever 20—21 are released, whereupon the spring 14 rocks the shaft 13 clockwise and moves the shaft 10 to the right as viewed in Fig. 2. In this manner the counters are automatically selected by the paper carriage, which positions predetermined counters for operation in certain predetermined columnar positions of the carriage.

In order to latch the selected counter in position, the shaft 13 is provided with a notched sector 24 with which the pointed end 25 of a latch 26 is adapted to engage. This latch is urged toward latching position by a spring 27 and it is provided on the end opposite to its nose with a pass-by pawl 28. The arm 813 is provided with a lateral rib 29 for engaging the end of the pass-by pawl. During the forward stroke of the machine the end of the arm 813 having the

rib 29 on it is moved downwardly and the rib engages the pass-by pawl 28 to raise the latch to the position shown in Fig. 3 thereby releasing the counter selecting mechanism so that it may be moved to selected position. During the return stroke of the machine the rib 29 passes the pawl 28 without releasing the latch 26 because, when the rib is moving in this direction, the pass-by pawl 28 yields. The counter controlling mechanism is thus released for movement during the forward stroke of the machine which is the time when the counters must be selected because, in normal operations, they are in engagement with the racks during the return stroke of the machine.

An additional means for selecting the counters is provided in the present invention which enables them to be manually selected. This selecting means may be used either with or without the carriage selecting means just described.

The manual selecting means includes a bank of depressible keys which are numbered from 1 to 6 inclusive in Fig. 1 to correspond to the counters which they control and which are similarly numbered in Fig. 2. These keys are like the usual amount keys on the Burroughs machine. Each of them operates a detent 217 having a stop wire 270 connected to it, the wires operating in a division plate 210 of the usual type except that the pitch of the slots is less than in the division plates associated with the banks of amount keys. The change in pitch is employed for greater convenience in arranging the parts. The stop wires 270 are adapted to differentially position a member 30 which is similar to the usual rack bars 610 except that it has no teeth in it and is made shorter, a shoulder 31 on the member engaging whichever stop wire has been pulled rearward when said member descends. The member 30 is held elevated by latch 415 of usual form which is urged to position by a spring 32. Whenever one of the counter selecting keys in the bank illustrated in Fig. 1 is depressed, its detent 217 moves a slide 214 rearwardly which slide has an upwardly extending lug 33 on it that engages a tail on the latch 415 to move the latch rearwardly to release the member 30 for descent. The member 30 is held upwardly by the same bail 613 that holds the racks 610 elevated and is released and returned to normal in the same manner as said racks. An arm 34 like the standard arms 611 carries the member 30, said arm being pivoted on the shaft 600 and carrying a plurality of types 35 on its rear end adapted to be positioned relative to the printing line of a platen 36 on the carriage C. The types 35 are driven to printing position on the paper carried by the platen by means of a hammer 715 operated

by a printing mechanism of well-known form. A single member 37 actuated by a spring 38 serves to return the types to normal position after they have been driven forward by the hammer. These types have characters on them corresponding to the several multiple counters for the purpose of printing a character indicating which counter has been positioned for operation.

Pivoted to the lower end of the member 30 is a link 40 having a slot 41 in its lower end engaging over a stud 42 on the end of an arm 43 fixed to a bevel gear 44 which meshes with a corresponding gear 45 fixed to the shaft 13. It will be evident that, if the link 40 is moved downwardly until the end of the slot 41 engages the stud 42, any further movement of the link will rotate the gear 44 counterclockwise which will move the shaft 13 counterclockwise as viewed in Fig. 2 to move the shaft 10 to the left against the tension of the spring 14.

A novel mechanism has been provided for urging the link 40 downwardly and for latching it in and unlatching it from its moved position. The link 40 and the member 30 are urged downwardly by a spring 46 connected at its lower end to a standard 47 and at its upper end to approximately the center of a pawl 48 pivoted at 49 to a laterally-extending end of the link 40. The opposite end of the pawl rests on the bail 613. The pawl is positioned above a bushing 50 on the pivot pin 51 connecting the link 40 to the member 30 as illustrated in Fig. 6. When the parts are in the position illustrated in Fig. 1, the end of the pawl rests on the bail 613 and the tension of the spring 46 tends to rock the pawl 48 about the bail as a fulcrum, thereby urging the link 40 in a clockwise direction about its pivot to the member 30. As the bail 613 moves downwardly during the forward stroke of the machine the member 30, if it has been released by depression of one of the keys, moves down with the bail until the end of the slot 41 strikes the stud 42 as shown in Fig. 4. The link 40 is then stopped and the bail 613 moves away from the pawl 48 as shown in Fig. 5 whereupon the spring 46 pulls the pawl against the bushing 50 which acts as a fulcrum. In this condition of the parts, the spring tends to rock the pawl 48 counterclockwise which tends to move the link 40 counterclockwise. It will be observed that the slot 41 in link 40 has an offset portion 52 at its ends and, when the link descends and reaches a point such that the lateral part of the slot is in register with the stud 42, the action of spring 46 snaps the link 40 counterclockwise to move the offset portion 52 of slot 41 over the stud 42 as shown in Fig. 5 where it is held by the tension of the spring 46. In other words, the link 40 moves downwardly

until the end of the slot 41 strikes the stud 42 whereupon the link is latched to the stud. This provides a positive latch for holding the member 30, the link 40, and the arm 43 in the indexed position to which they are moved. During the return stroke of the machine the bail 613 is moved upwardly again and it strikes the end of the pawl 48. As soon as this occurs the pawl is lifted away from the bushing 50 and the direction of action of the spring 46 is again changed to urge the link 40 clockwise to unlatch it from the stud 42 to permit the link to be restored by the bail.

The operation of the keys in selecting the counters will be most easily understood by following through an operation for one of them.

Assume, for example, that the No. 5 key is depressed to position the No. 5 counter for operation. When the key is depressed the stop wire 270 corresponding to it is moved into the path of the shoulder 31 on the member 30. Depression of the key moves the slide 214 rearwardly and releases the latch 415 to release the member 30. During the forward stroke of the machine, the bail 613 moves downwardly and the member 30 and link 40 descend with it until the end of slot 41 strikes the stud 42. Further downward movement of the bail 613 releases the pawl 48 as heretofore described so that the spring 46 urges the link 40 counterclockwise to latch the link 40 to the arm 43. The member 30 and the link 40 continue to descend under the influence of the spring 46 and the end of the slot 41 engaging the stud 42 moves the arm 43 counterclockwise until the member 30 is arrested or indexed by the stop wire that was positioned by the No. 5 key. The parts are proportioned so that this movement is just enough to rock the shaft 13 to move shaft 10 laterally far enough to position the No. 5 counter for operation. It will be understood that this movement takes place during the forward stroke of the machine and after the shaft 13 has been unlocked by the movement of arm 813 as previously described. After the No. 5 counter is moved to position, it is held in this position by the latch 25-26. During the return stroke of the machine the bail 613 picks up the pawl 48, unlatches the link 40 from the stud 42 and moves the link together with the member 30 back to normal position, but the No. 5 counter remains in position.

As the selecting mechanism including the member 30 moves downwardly, the arm 34 carrying said member moves a corresponding distance and one of the types 35 corresponding to the No. 5 counter is moved up to the printing line so that when the hammer 715 is fired, an impression is made on

the paper indicating that the No. 5 counter has been used.

The same selecting operation of the counters takes place when any one of the other keys from 1 to 6 inclusive are depressed except that, in the case of the No. 1 key, it is not necessary to move the shaft 10 because it is normally in a position for the No. 1 counter. In such event the end of slot 41 merely strikes stud 42 without moving the arm 43.

If it should happen that the No. 6 counter is in position, having been used during the preceding operation, and it is desired to select the No. 2 counter, for example, the operation is the same except that, in such event, the link 40 is indexed in position but it does not move the arm 43. Instead, when the shaft 13 is released by the latch 25—26, the shaft 13 is rocked clockwise by the spring 14 which moves the arm 43 causing the stud 42 to move upward in slot 41 until the stud strikes the end of the slot 41 which positions the shaft 13 so as to position the No. 2 counter for operation.

In the event one of the counters has been automatically selected by the paper carriage, it is still possible to select a higher numbered counter by means of the keys. For example, if the No. 2 counter is selected by the carriage, it is possible to select Nos. 3, 4, 5, and 6 by means of the keys. Similarly, if No. 3 is selected by the carriage it is possible to select Nos. 4, 5, and 6 by means of the keys. In the event, for example, that the carriage has selected the No. 2 counter and it is desired to select the No. 5 counter, the 5 key is depressed in the usual manner and the machine given a stroke of operation. The link 40 moves down as usual, strikes the stud 42 and moves the arm 43 counterclockwise to move the No. 5 counter to position. During such movement the stud 22 on arm 23 on shaft 13 moves away from the arm 21.

In the machine illustrated the first three keys marked A, B, and C, are not used for selecting counters but for indexing the bar 34 to print special characters opposite any work that may be done. When they are used the link 40 does not descend far enough to strike stud 42. These keys do not interfere in any way with the selection of counters. In case more counters are employed these keys may be arranged to control counters Nos. 1, 2, and 3 by proportioning the parts slightly different.

It is to be understood that the structure shown is for purposes of illustration only and that variations may be made in it without departing from the spirit and scope of the invention as defined by the appended claims.

I claim:

1. In combination, in a calculating ma-

chine having a plurality of counters adapted to be selectively moved to active position, a movable member having connections for selecting said counters, a spring for moving said member, and a bank of keys controlling stops for differentially arresting said member and connections, said connections having provisions by means of which said actuating spring acts to latch the connections in position when they are arrested.

2. In combination, in a calculating machine having a plurality of counters adapted to be selectively moved to active position, a plurality of actuator racks, a bail for releasing said racks during the forward stroke of the machine and for returning them during the return stroke, a member released by said bail for movement with said racks having connections for selecting said counters, a spring for moving said member, a bank of keys controlling stops for indexing said member, and means associated with said connections and controlled by said bail for automatically latching said connections in indexed position and for automatically releasing said connections as the bail acts to restore said member to normal.

3. In combination, in a calculating machine having a plurality of counters adapted to be selectively moved to active position, a traveling paper carriage, means controlled by said carriage for automatically moving a desired counter to active position in a predetermined columnar position of said carriage, a key controlled differential mechanism, and means controlled by said differential mechanism, upon operation of the machine after manipulation of said differential mechanism keys, acting to move a counter to active position in a given columnar position of the carriage other than the counter selected by said carriage and for rendering said carriage-selected counter inactive.

4. In combination, in a calculating machine having a plurality of counters mounted on a common shaft, a traveling paper carriage, mechanism controlled by said carriage for automatically moving said shaft longitudinally to selectively move a counter to active position in a predetermined columnar position of the carriage, a key controlled differential mechanism, and means controlled by said differential mechanism upon operation of the machine, when one of the keys of said mechanism has been manipulated, for moving said shaft longitudinally to select a counter other than the one selected by the carriage and for moving said carriage-selected counter to inactive position.

5. In combination, in a calculating machine having a bail that is given a forward and a return stroke of movement during

operation of the machine, a differential member released by said bail during the forward movement of the latter, a spring for moving said released member to differential position, means for indexing said released member, and connecting means actuated by said spring for automatically latching said member in its indexed position, said connecting means being released by said bail upon its return movement.

6. In a calculating machine, a plurality of counters adapted to be selectively moved to active position, a traveling paper carriage, means controlled by said carriage for automatically selecting desired counters in predetermined columnar positions of said carriage, and key controlled differential mechanism operable to select one of a plurality of counters during an operation of the machine, said mechanism acting automatically during a machine operation when one of its keys is depressed to dominate said carriage controlled means in the selection of counters.

7. In a calculating machine, a plurality of counters mounted on a shaft that is movable longitudinally to selectively move the counters to active position, a traveling paper carriage, means controlled by the carriage for moving said shaft longitudinally to automatically select desired counters in predetermined columnar positions of the carriage, and key controlled differential mechanism released for operation by an operation of the machine, said mechanism acting, when released, to move said shaft longitudinally and to dominate the carriage control of the shaft.

8. In combination, in a calculating machine having a bail that is given a forward and a return stroke of movement during operation of the machine, a member urged by a spring to follow said bail during its forward stroke, means for arresting said member in differential positions, an arm adapted to be operated by said member, said arm controlling the conditioning of a portion of the machine, and means acting to automatically latch said member to said arm as said member is indexed, said bail acting to unlatch said latching means during its return stroke.

9. In combination, in a calculating machine having a plurality of counters selectively movable to active position, a member released by operation of the machine, a spring for moving said member, means for arresting said member in differential positions, connecting means adapted to be operated by said member to selectively move said counters to active position, and means acting to latch said member to said connecting means when said member is indexed to thereby latch the selected counter in active position.

10. In combination, in a calculating machine having a plurality of counters selec-

tively movable to active position and a bail having a forward and a return stroke of movement at each operation of the machine; a movable member released by said bail, a spring for moving said member, key controlled stops for differentially arresting said member, connecting means adapted to be operated by said member to selectively move said counters to active position, and means acting to automatically latch said member to said connecting means when said member is arrested in its differential position, said latching means being released by said bail during its return stroke.

11. In combination, in a calculating machine, a differential member moved during each operation of the machine, a link having one of its ends pivoted to said member, said link having a lateral extension near its pivoted end and an offset slot in its opposite end engaging over a movable stud, a lever pivoted at one end to said lateral projection of said link, a spring connected to said lever intermediate its ends, and a bail normally engaging the free end of said lever, said bail being movable away from said lever as the machine is operated whereby said spring moves said member and link to move said stud and urges said lever in a direction to tend to cause the offset portion of said slot to move over said stud, said bail again engaging said lever during the latter portion of the operation of the machine to restore said member and link to normal and to cause said spring to urge said link about its pivot to disengage the offset portion of said slot from said stud.

12. In combination, a calculating machine, a differential member moved during each operation of the machine, a link having one of its ends pivoted to said member, said link having a lateral projection adjacent its pivoted end and an offset slot in its opposite end engaging over a movable stud, a lever pivoted to said lateral projection, said lever extending toward said link and over a fulcrum, a spring connected to said lever between its free end and said fulcrum, and a bail normally engaging the free end of said lever to hold it out of engagement with said fulcrum, said bail moving away from said lever upon operation of the machine to permit said spring to move the lever into engagement with said fulcrum to thereby swing said link on its pivot to cause the offset portion of said slot to engage over said stud, said bail again engaging the free end of said lever during the latter part of operation of the machine to move said lever out of engagement with said fulcrum to cause said spring to tend to swing said link about its pivot to disengage said offset end of said slot from said stud, said bail also acting to return said lever, member and link to normal position.

13. In combination, in a calculating machine, a differential member released for movement during operation of the machine, a spring for moving said member to differential position, means for indexing said member, and means actuated by said spring for latching said member in the position in which it is indexed.

14. In combination, in a calculating machine, a bail having a forward and a return stroke of movement during operation of the machine, a differential member released by said bail during the forward movement thereof, a spring for moving said differential member, means for indexing said member, and means actuated by said spring to automatically latch said differential member in its indexed position, said means being engaged by said bail upon the return movement of the latter to unlatch said member for return by said bail to normal.

15. In combination, in a calculating machine, a differential member released for movement during operation of the machine, a bail having a forward and return stroke of movement for releasing said member and for restoring it to normal, a spring for moving said member, a bank of keys controlling stops for indexing said member, and means actuated by said spring and controlled by said bail for automatically latching said member in the position in which it is indexed, said bail acting to automatically unlatch said member as it returns to return said member to normal.

16. In a calculating machine, a differentially movable member released for operation during operation of the machine, a spring for moving said member, means for indexing said member, an arm engaged by said member as the latter moves to indexed position, said arm controlling the operation of a portion of the machine, and means actuated by said spring to automatically lock said member to said arm when said member is indexed.

17. In a calculating machine, a counter selecting mechanism, a differential member released for movement during operation of the machine, a spring for moving said member, means for indexing said member, an arm controlling said counter selecting mechanism, and connecting means between said differential member and said arm for moving said arm as said member moves to indexed position, said connecting means being actuated by said spring to automatically latch said arm and connecting means together when said member is indexed.

In testimony whereof, I have subscribed my name.

WALTER J. PASINSKI.