July 5, 1927. 1,634,990

C. M. F. FRIDEN

CALCULATING MACHINE

Filed Oct. 8, 1924 4 Sheets-Sheet 1

FIG. 1.

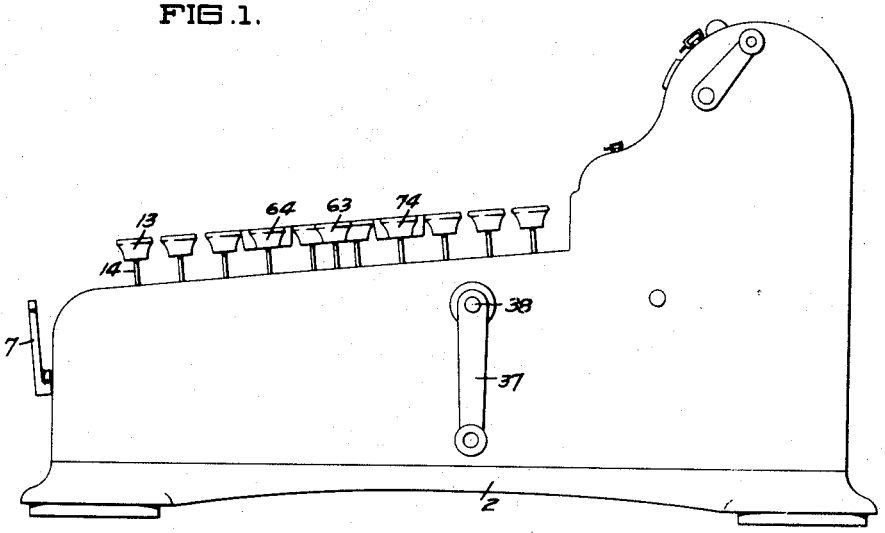
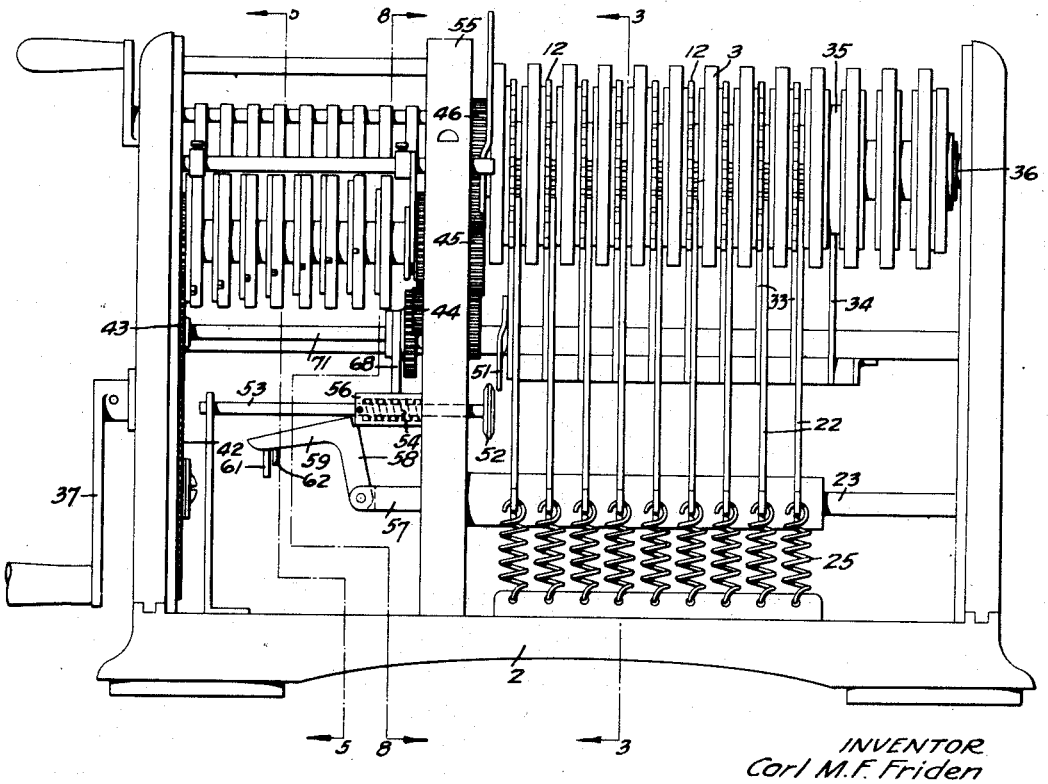


FIG. 2.



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July 5, 1927. 1,634,990

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CALCULATING MACHINE

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FIG. 4.

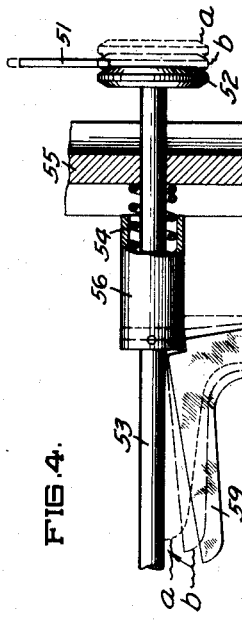
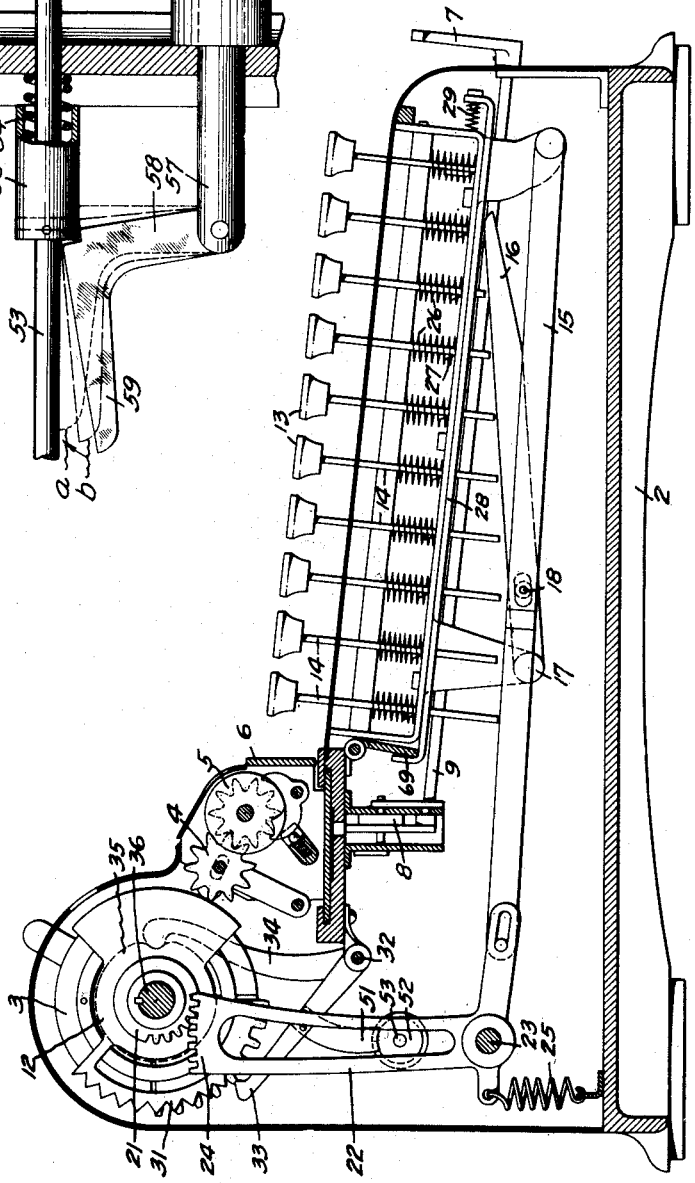


FIG. 3.



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CALCULATING MACHINE

Filed Oct. 8, 1924 4 Sheets-Sheet 3

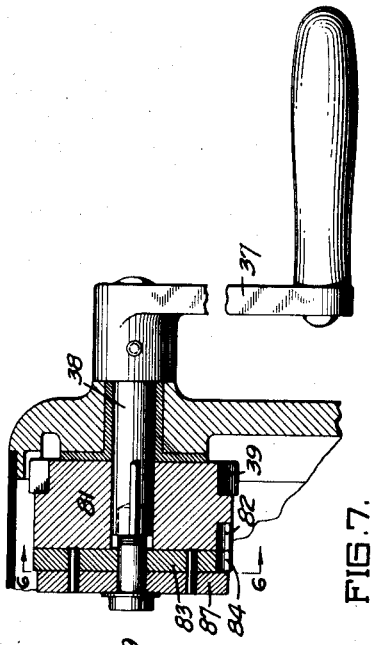

FIG. 7.

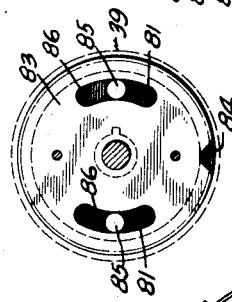

FIG. 6.

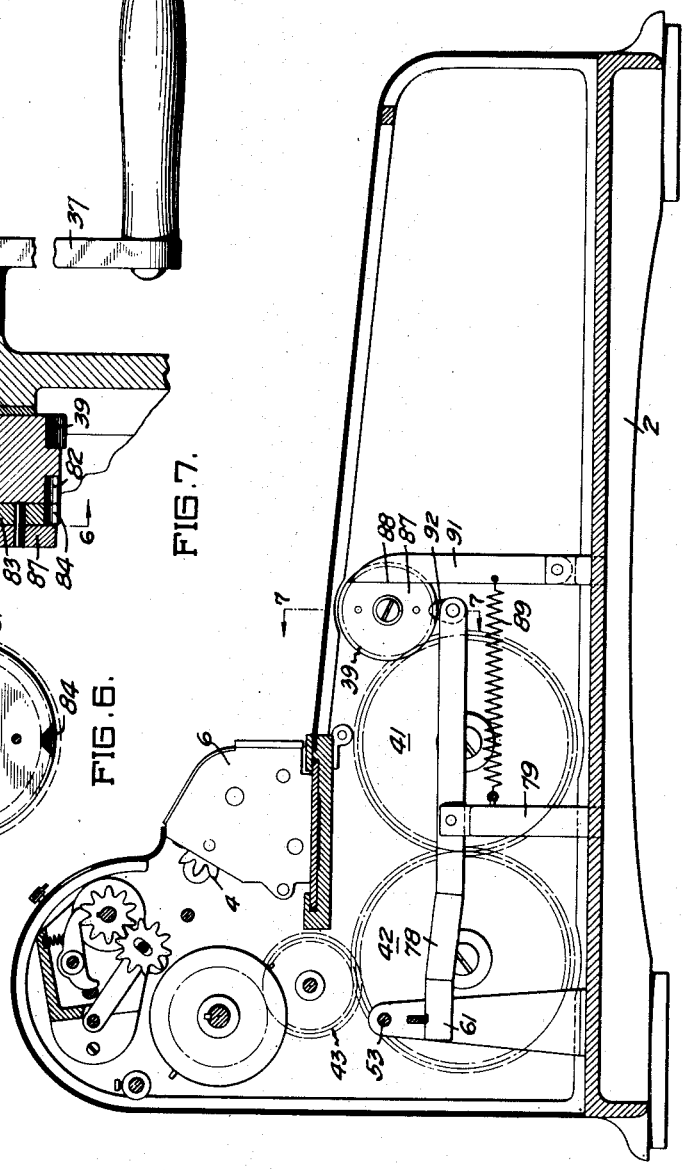

FIG. 5.

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July 5, 1927. 1,634,990

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CALCULATING MACHINE

Filed Oct. 8, 1924 4 Sheets-Sheet 4

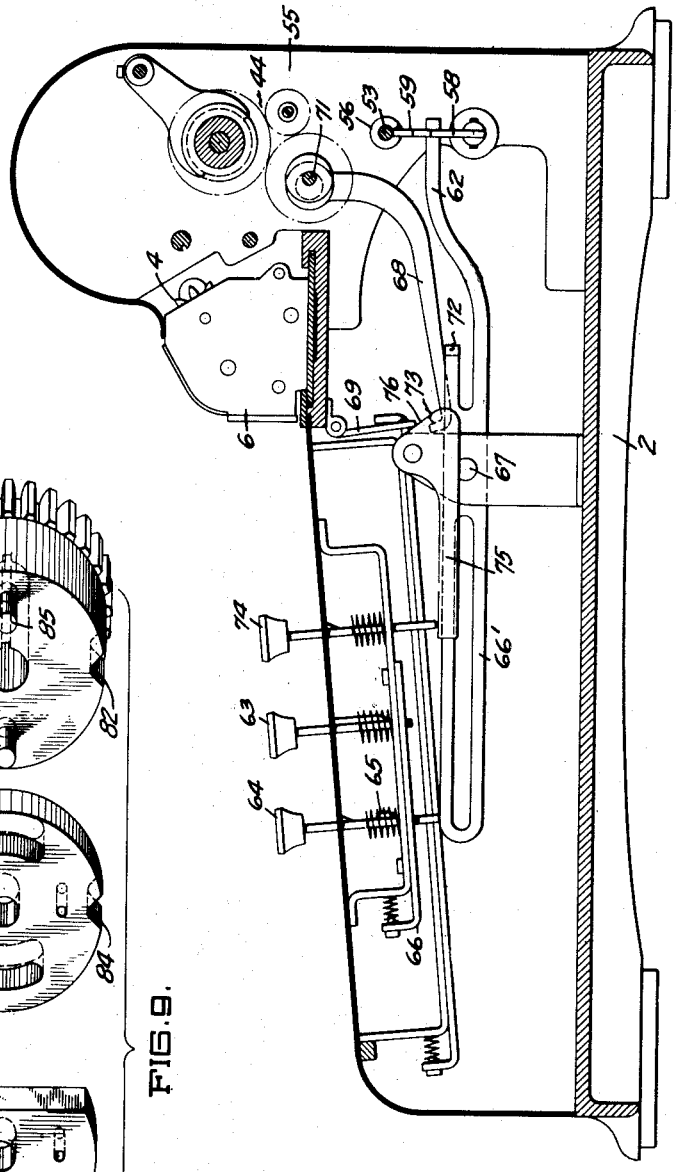

FIG. 8.

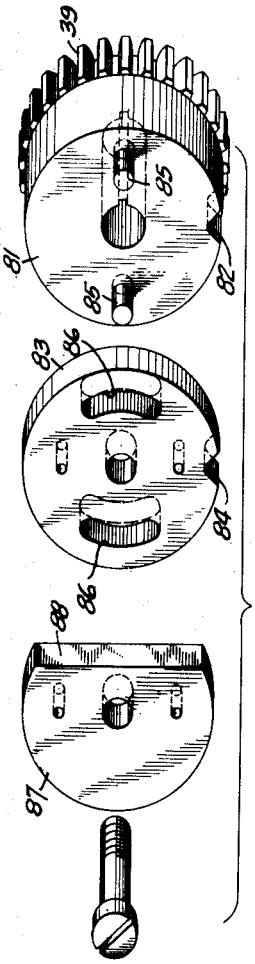

FIG. 9.

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Patented July 5, 1927. 1,634,930

UNITED STATES PATENT OFFICE.

CARL M. F. FRIDEN, OF PIEDMONT, CALIFORNIA.

CALCULATING MACHINE.

Application filed October 8, 1924. Serial No. 742,353.

The invention relates to calculating machines and particularly to calculating machines of the rotary type which are operated by the movement of a crank from neutral position through one or more cycles either back to neutral position or through neutral position a plurality of times, depending upon the calculating operation. The invention is particularly adapted for use in connection with the calculating machine shown in my copending application Serial No. 539,422, filed February 27, 1922, but it is to be understood that the invention is not limited for use in connection with the calculating machine disclosed in my prior application.

Machines of the type disclosed in my prior application are operated by means of a hand crank which is movable from neutral position through one or more cycles of operation or through the neutral position a plurality of times. Machines of this type have been provided with means for locking the handle in neutral position and this means has heretofore usually comprised a handle pin such as is shown in the Muller Patent No. 878,413 which was movable transversely with respect to the plane of rotation of the handle, to operate devices for either clearing the keyboard or clearing the calculating mechanism. The handle pin which was carried by the crank handle, must be alined with and dropped into a socket disposed at the neutral position of the handle in order to operate the clearing devices and this handle pin on account of the necessity of accurately alining it with the socket and dropping it into the socket and the necessity of holding the handle pin out and away from the socket when it is desired to rotate the crank a number of times, as in multiplication, is objectionable to users of the machine and it is one of the objects of the present invention to eliminate the handle pin.

In machines of the type shown in my copending application, means are provided which are operated by the initial movement of the crank handle from neutral position for locking the adjusted parts of the calculating mechanism in position. These means are also shown in my prior Letters Patent No. 1,476,197, of December 4, 1923, and in my Letters Patent No. 1,524,924, of February 3, 1925, to which reference is hereby made for a more complete disclosure thereof. This means is effective to lock the adjusted parts during the time that the crank is out of neutral position and each time that the crank passes through neutral position, the adjustable parts are unlocked. This feature is objectionable since it permits the introduction of errors into the machine during the time that the adjusted parts are unlocked and one of the objects of the present invention is to provide means whereby the adjusted parts are continuously locked during the operation of the machine, to perform a calculating operation.

Another object of the invention is to provide means for holding the adjusted parts of the calculating mechanism locked in adjusted position during the time that a rotational force is applied to the crank handle, so that regardless of the speed of rotation of the crank, the adjusted parts will not become unlocked as the crank passes through neutral position.

Another object of the invention is to provide means for positioning, without locking, the crank in neutral position, thereby rendering the operation of the machine much easier and less fatiguing. A further object of the invention is to provide means for controlling the operation of the locking mechanism, so that in performing problems in addition the locking mechanism is released at each rotation of the crank handle and in performing operations in multiplication, the locking mechanism is kept continuously in engagement with the adjusted parts, during the application of a rotational force to the crank handle.

The invention possesses other advantageous features, some of which with the foregoing, will be set forth at length in the following description, where I shall outline in full that form of my invention which I have selected for illustration in the drawings accompanying and forming part of the present specification. In said drawings I have shown one form of apparatus embodying my invention, but it is to be understood that

I do not limit myself to such form, since the invention, as set forth in the claims, may be embodied in a plurality of forms. In the drawings I have shown the invention embodied in the calculating machine disclosed in my said copending application, but it is to be understood that the present invention is not limited to use in connection with said prior calculating machine but may be used in connection with any calculating machine in which its functions are desirable.

Referring to said drawings:

Figure 1 is a side elevation of a calculating machine embodying my invention.

Figure 2 is a rear elevation of a calculating machine embodying my invention, the housing being removed to disclose the interior construction.

Figure 3 is a longitudinal section of the calculating machine taken on the line 3—3 Figure 2.

Figure 4 is a detail of a portion of the locking device, showing the locking stop in its different positions.

Figure 5 is a longitudinal section taken on the line 5—5 Figure 2.

Figure 6 is a section taken on the line 6—6 Figure 7.

Figure 7 is a vertical section through the crank handle and the means associated therewith for holding the locking means in engagement with the adjusted parts of the calculating mechanism during the time that a rotational force is applied to the crank handle.

Figure 8 is a longitudinal section taken on the line 8—8 of Figure 2.

Figure 9 is a perspective view of the separated parts of the device shown in Figure 7.

The invention relates to calculating machines of the type embodying a rotatable calculating mechanism which, during its rotation, is effective on a counting mechanism to effect the calculation. In the present instance I have shown the invention embodied in a machine of the keyboard type, in which the values are introduced into the calculating mechanism by the depression of the keys. Depression of a key introduces a value corresponding to the numeral on the key, into a rotatable drum or calculating mechanism within the machine, rotation of the drum being effected by a crank or handle which projects to the outside of the machine. The values introduced into the drum are transmitted, on rotation of the crank handle, to the figure discs of the counter mechanism, which, for the purpose of making the direct action of the selected values on the figure disc of highest value possible, is disposed in parallel displaceable relation to the calculating mechanism axis.

The values are introduced into the machine while the crank handle is in neutral position and means are provided for normally holding the crank handle in such position. The crank handle is connected to the rotatable drum or calculating mechanism and the initial rotation of the handle operates to lock the elements of the calculating mechanism in adjusted position, such adjusted position being effected by the depression of the value key. The calculating mechanism remains locked in adjusted position while the crank handle is out of neutral position and the release of the adjusted parts is determined by the movement of the crank handle and the setting of the machine for the problem to be performed. In performing operations of addition and subtraction (the operation of addition being performed by rotation of the crank handle in one direction and the operation of subtraction being performed by rotation of the crank handle in the opposite direction), the locking means is released as the crank handle reaches neutral position, so that the calculating mechanism and the keyboard is cleared at the end of each cycle of movement or rotation of the crank handle, so that the machine is ready to receive the figures of the next amount to be added or subtracted. When the machine is used for solving problems in multiplication and division, which problems require a plurality of rotations of the crank handle, either in one direction or the other, depending upon the problem, means are provided for holding the adjusted parts of the calculating mechanism in locked position as the crank handle passes through neutral position. This locking means is effective as long as a rotational force is applied to the crank handle and is effective whether such force is applied to rotate the handle slowly or quickly. Thus, in performing problems of multiplication and division, the calculating mechanism remains locked in adjusted position continuously during the movement of the handle through its cycle of operation and through neutral position.

The machine comprises a suitable base 2 upon which the various elements of the mechanism are mounted. The calculating mechanism or rotatable drum 3 is preferably mounted in the upper portion of the machine and, on rotation of the drum 3, the actuating elements thereon engage the intermediate wheels 4 of the counting mechanism 5, which is mounted on the longitudinally movable carriage 6. The carriage is shifted longitudinally by means of the lever 7 which is arranged at the front of the machine and which is connected to suitable carriage shifting mechanism 8 by the rod 9. The calculating mechanism and the carriage shifting mechanism are fully disclosed in my prior application above identified. The calculating mechanism includes a plurality of value

selecting discs 12, each disc being associated with a row of value keys 13. The stems 14 of the keys are operatively associated with a duplex lever comprising the main lever 15 pivoted to a fixed support at the front of the machine, and a supplementary lever 16 pivoted to a fixed support 17 adjacent the center of the machine and fulcrumed at 18 to the main lever 15. Several of the key stems 14 cooperate directly with the main lever 15 and other of the key stems 14 cooperate with the supplementary lever 16, depression of any of the keys in a bank serving to move the value selecting discs 12 through an arc corresponding to the value of the key. Each value selecting disc 12 is provided with a gear 21 which is connected to the main lever 15 by the bell crank lever 22 pivoted on a fixed axis 23 and provided on its upper end with a rack 24 in engagement with the gear 21. The value selecting discs 12 are normally held in zero position and are returned to zero position from adjusted position by the springs 25 connected to the bell crank levers 22. It is understood that there is a plurality of units forming the calculating and selecting mechanisms, each unit comprising a disc 12, a bell crank lever 22, an actuating lever 15 and a row of keys 13.

The keys are normally held in elevated position by springs 26 associated with the key stems and means are provided for holding the depressed keys temporarily in depressed position. Each key stem 14 is provided with a cam shoulder 27 and the key stems extend through apertures in the slide bar 28, there being one slide bar for each row of keys. The slide bar is normally held backward by a spring 29 and when a key is depressed, the cam 27 slides the bar 28 forward and then the bar 28 moves backward, with the shoulder of the cam 27 in engagement with the underside of the bar, thus holding the keys in depressed position. The slide bar 28 moves forward each time a key is depressed.

The depression of a key causes the value selecting disc 12 to be set in adjusted position and such disc is initially held in such position by virtue of the fact that the depressed key is held in depressed position. Other means, operative upon the operation of the calculating mechanism, are effective to lock the discs 12 in adjusted position, so that the values entered into the calculating mechanism may not be changed after the calculating mechanism has been moved from neutral position. Each disc 12 is provided with an arcuate rack 31 and means are provided for engaging this rack to lock the disc 12 in adjusted position. Secured to the shaft 32, journalled within the machine, are a plurality of detents 33, one for each rack 31. Secured to the shaft 32 is a finger 34, the upper end of which is in engagement with a cam 35 forming part of the calculating drum and secured to the drum shaft 36. The cam 35 has one low spot and, when the calculating drum is in neutral position, the arm 34 engages the low spot, positioning the detents 33 in spaced relation with respect to the rack 31. Upon initial rotation of the shaft 36, the low spot on the cam moves out from under the end of the arm 34, causing the arm 34 to move, thus rocking the shaft 32 and bringing the detents 33 into engagement with the arcuate racks 31 to lock the selecting discs in adjusted position. The discs are held in such position by the detents 33 during substantially the complete rotation of the shaft 36, and, when the calculating drum returns to neutral position, after completing its rotation, the detents are released from engagement with the rack 31. This operation occurs in performing problems in addition and subtraction and in such instances the selecting disc returns to neutral position when the calculating drum is brought to neutral position but, in performing problems in multiplication and division, other means are provided for holding the discs 12 in adjusted position continuously during a plurality of rotations of the drum. These other means hold the discs 12 locked in adjusted position continuously during the rotation of the crank handle, so that the discs are not freed as the crank passes through neutral position.

The shaft 36 and the calculating drum 12, which is secured thereto, are rotatable by any suitable means, such as the crank 37 which is disposed at the exterior of the casing. The crank 37 is preferably arranged about midway of the depth of the machine, so that it is closely associated with the keyboard, thus reducing the extent of movement of the operator's hand in moving from the keyboard to the crank and vice versa. The crank handle is rotatable from neutral position in either direction, depending upon the problem to be performed. In operations of addition and subtraction, the crank handle is moved from neutral position through a circle and back to neutral position and in problems of multiplication and division the crank handle is moved from neutral position through a plurality of circles before it is returned to neutral position, the number of rotations of the crank depending upon the factor being entered into the machine. Secured to the crank shaft 38 is a gear 39 which is connected by the meshing gears 41 and 42 with the gear 43. This latter gear is connected through a train of gears 44 and 45 to the gear 46, which is secured to the shaft 36 of the calculating drum. The gear trains 44 and 45 include adjustable reversing gears, so that the rotation of the tens-carrying drum 40 of the revolutions counter may be

in the same or in the reverse direction with respect to the rotation of the crank handle.

Means are provided for continuously holding the detents 33 in engagement with the racks 31, during the operations of multiplication and division, so that the discs 12 are not released by the locking mechanism, as the crank handle moves through its neutral position. Secured to one of the detents 33 is an arm 51 which is movable in time with the means for locking the adjusted parts of the calculating drum in position. Associated with the arm 51 is a stop 52 which is moved into position under the arm when the arm is raised by the engagement of the locking means with the drum and this stop is held in such position continuously during repeated rotations of the crank shaft when the machine is set to perform problems in multiplication and division. The stop 52 is secured to a longitudinally slidable rod 53 suitably supported within the machine, and the stop normally lies to one side of the lower end of the arm 51, as is shown in full lines in Figure 4. The stop 52 is normally held in this position by a spring 54 bearing at one end against the partition wall 55 in the machine and bearing at the other end against the end wall of a cup 56 which is secured to the rod 53, the cup being employed instead of a disc secured to the rod, for the purpose of containing the spring 54. Means are provided for moving the rod 53 longitudinally to either position the stop 52 directly below the arm 51 or to move the stop past the arm 51. The stop 52 preferably comprises a disc having its opposite faces bevelled at the periphery, as shown in Figure 4, so that longitudinal movement of the rod 53 when the arm 54 is in its lower position, will cause the arm to be raised to permit the stop either to position itself below the arm or to move past the arm in either direction. In solving problems in addition and subtraction, the stop is moved past the arm and in solving problems in multiplication and division, the stop is moved into position below the arm and operates to hold the arm in elevated position, so that the locking means is not released when the low spot on the cam 35 passes under the end of the finger 34.

Pivotally mounted within the machine on a stud 57 is a bent lever 58, one arm of the lever being substantially vertical and the other arm 59 of the lever being substantially horizontal, but being normally inclined to the horizontal. The corner of the bent lever is in engagement with the end wall of the cup 56, which is secured to the rod 53, so that as the end 59 of the lever is raised, the rod 53 is shifted longitudinally to alter the position of the stop 52 with respect to the arm 51. Engaging under the substantially horizontal portion 59 of the lever 58 are two levers 61 and 62, the lever 61 being effective to move the lever 58 during the operation of the machine in solving problems in multiplication and division and the lever 62 being operated to move the lever 58 during the operation of the machine in solving problems in addition and subtraction. The control of the machine in solving these problems is effected by the control keys 63 and 64, the key 63 controlling the operation of the machine in problems of multiplication and division and the key 64 controlling the operation of the machine in problems of addition and subtraction. The key 64 is provided on its shank with a shoulder 65 which engages under the slide bar 66 when the key 64 is depressed, to hold such key in the depressed position. Disposed under the end of the shank of such key and in operative relation therewith, is the end of a lever 66′ fulcrumed at 67 and having an extension 62 positioned under the substantially horizontal arm 59 of the lever 58. As the key 64 is moved to its depressed position, the lever 66′ is rocked, raising the end 62 thereof and moving the horizontal arm 59 of the lever 58 to the position (*a*) indicated in Figure 4. This causes a longitudinal movement of the rod 53, moving the stop 52 to the position (*a*), in which position it is out of operative relation with respect to the arm 51. Thus, when the machine is to be used for performing problems in addition and subtraction, the key 64 is depressed, disabling the holding mechanism as exemplified in the stop 52, so that the detents 33 are released from the racks 31 when the crank handle reaches its neutral position and the end of the arm 34 has moved into the depression of the cam 35. Thus, in the operation of addition or subtraction, the locking means is released as the crank handle reaches neutral position. The depressed keys 13 are released during the rotation of the crank handle and before the crank handle reaches neutral position, by engagement of the oscillating arm 68 with the gate 69 which is arranged in operative relation with all of the slide bars 28. The arm 68 is eccentrically mounted on the shaft 71 which rotates in time with the calculating mechanism, so that the free end of the arm is oscillated during the rotation of the crank handle. The arm rests on a projection 72 on the lever 66′ and such projection is raised by the depression of the key 64 to cause the finger 73 on the end of the arm 68 to engage the gate 69 on the backward movement of the arm 68, thereby moving all of the latch bars 28 and releasing the depressed keys 13.

The key 63 is depressed when it is desired to employ the machine in solving problems in multiplication and division. Depression of the key 63 merely serves to move the slide bar 66 to release the depressed key 64

and permit the lever 66′ to return to neutral position, this being the position indicated in Figure 8. When the lever 66′ is in this position, the path of movement of the finger 73 does not intercept the gate 69, so that the depressed keys 13 are not released by the rotation of the crank handle. When the machine is set for performing problems in multiplication and division, the keyboard is cleared by depression of the key 74. Disposed below the stem of this key is a lever 75 having a cam shaped end 76 which is in contact with the gate 69. When the key 74 is depressed, the lever 75 is rocked about its fulcrum, moving the gate 69 to move all of the latch bars 28 to release the depressed keys 13.

When the machine is set to perform problems in multiplication and division, the end 62 of the lever 66′ is in its depressed position, so that the stop 52 is in the position indicated in full lines in Figure 4. Means are provided for moving the lever 58 to move the stop 52 into the position (*b*) Figure 4, in which position the stop operates to hold the arm 51 elevated, thus holding the detents 33 in engagement with the rack 31. The stop 52 is moved to the position (*b*) by moving the horizontal arm 59 of the lever 58 to the position (*b*) indicated in Figure 4. The arm 59 is moved to this position by the lever 78 fulcrumed on the post 79 and having one end 61 positioned below the lever arm 59 and having its other end cooperating with the crank handle 37. Means are provided whereby the initial movement of the crank from neutral position depresses the end of the lever 78 which cooperates with the crank, thus raising the lever arm 59 to the position (*b*) and thus shifting the stop 52 laterally into position below the raised arm 51. This lateral movement of the stop 52 may be prior to or simultaneous with the movement of the arm 51, due to the action of the cam 35. By providing the disc stop 52 with bevelled side faces, a lateral movement of the stop will cause the end of the arm 51 to ride up onto the periphery of the disc stop, thereby moving the detents 33 into engagement with the racks 31. Means are provided for causing the initial movement of the crank from neutral position to move the lever 78 about its fulcrum to shift the stop 52 to the position (*b*).

Secured to or formed integral with the gear 39 which is secured to the shaft 38 of the crank 37, is a disc 81 having a depression 82 therein. Supported on the shaft 38 and having a limited degree of freedom of movement with respect to the rotational movement of the disc 81, is a second disc 83 having a depression 84 therein which is alined with the depression 82 when the crank handle is in neutral position. The freedom of movement of the disc 81 with respect to the disc 83 is controlled by studs 85 on the disc 81 which extend into arcuate slots 86 in the disc 83. The disc 83 therefore has a movement with respect to the disc 81 equal to the arcuate length of the slot. Means are provided for causing the disc 83 to drag behind the disc 81 as the crank 37 is rotated, so that during the time that the crank is being rotated or during the time that a rotational force is being applied to the crank, whether or not such force is sufficient to rotate the calculating mechanism, the depressions 82 and 84 are held out of alinement. Secured to the disc 83 is a third disc 87 having a flattened face 88 which face, in the present construction, is vertically disposed when the crank is at rest in neutral position. Pressed against the periphery of the disc 87 by a spring 89 is a centralizing bar 91, which, in its engagement with the periphery of the disc 87, offers a frictional resistance to the rotation of the disc, so that the disc 87 and the attached disc 83 drag behind the disc 81 as the crank 37 is rotated. The bar 91 also operates, by virtue of its action on the flat face 88 of the disc 87, to position said disc in neutral position when the disc is brought to rest in a position adjacent to neutral position. The pressure of the arm 91 against the end of the flat surface 88 tends to rotate the disc 87 to bring the surface of the arm 91 in full contact with the flat surface 88 as shown in Figure 6.

The lever 78 is provided on the end adjacent the crank 37 with a projection or tooth 92 which lies partly in the plane of the disc 81 and partly in the plane of the disc 83. This tooth 92 in its normal position, extends into the alined depressions 82 and 84. As either disc 81 or 83 is rotated, the tooth 92 is forced out of the depression, thus rocking the lever 78 and operating the stop 52. The initial movement of the crank handle 37 therefore causes movement of the lever 78 to move the stop 52 to the position (*b*). The frictional drag of the arm 91 causes the disc 83 to lag behind the disc 81, so that the two depressions 82 and 84 are held out of alinement during the application of a rotational force to the crank handle 37. As the crank handle 37 passes through the neutral position as when in performing problems in multiplication or division, the disc 83, lagging behind the disc 81, causes the depressions 82 and 84 to be staggered, so that the wide tooth 92, which underlies both discs, cannot move into a depression and consequently the crank handle may be moved through neutral position without causing a movement of the lever 78 and therefore without releasing the locking means. As long as the force applied to the crank handle as it passes through the neutral position, is greater than the force of the spring 89, such spring cannot return the disc

83 to neutral position at the same time that the disc 81 is in neutral position, and unless these two discs are in neutral position at the same time, the locking means cannot be released. At the end of the multiplying operation, the handle 37 is stopped at neutral position and the arm 91 thereupon returns the disc 83 to neutral position, causing an alinement of the depressions 82 and 84 and causing a release of the locking means. The handle 37 is held in neutral position by use of the well known centralizing lever, such as is shown in my copending application, Serial No. 693,546, filed February 18, 1924. It is apparent therefore that as the crank handle is rotated, the locking means is held in effective engagement with the adjustable parts of the calculating mechanism, regardless of the speed of rotation of the crank. The movement of the crank may be very slow, but as long as a force is applied to the crank which tends to rotate the crank, the disc 81 will be held in advance of the disc 83, so that the depressions 82 and 84 cannot move into alinement and, unless these depressions move into alinement, the locking means cannot be released.

I claim:

1. In a calculating machine, a rotatable calculating mechanism, a device for rotating said mechanism, means for introducing values into said mechanism, means for locking the parts of the calculating mechanism in adjusted position and means including two rotary elements having relative rotational lag for holding said locking means in engagement with said parts during the application of a rotational force to said rotating device.

2. In a calculating machine, a rotatable calculating mechanism including adjustable value selecting parts, adjusting means positively connected to said parts, keys associated with said adjusting means, depression of a key serving to position the associated value selecting part, means for locking the value selecting parts in adjusted position, a crank for rotating said mechanism, said crank having a neutral position and being movable through neutral position a plurality of times to effect a calculating operation and means operated by the initial movement of the crank from neutral position to move the locking means into enagement with the said parts and to hold said locking means continuously in engagement with said parts during a plurality of rotations of the crank and to release the locking means when the crank is held stationary in neutral position.

3. In a calculating machine, a rotatable calculating mechanism, means for moving parts of said mechanism to adjusted positions, means for locking said parts in adjusted position, a crank for rotating said mechanism and two rotatively movable rotary elements actuated by the initial rotational movement of the crank for locking said locking means in engagement with said adjusted parts.

4. In a calculating machine, a rotatable calculating mechanism, means for moving parts of said mechanism to adjusted positions, means for locking said parts in adjusted position, a crank for rotating said mechanism, means actuated by the initial movement of the crank from neutral position for moving the locking means into engagement with said parts and for holding the locking means in engagement with said parts during movement of the crank thru neutral position.

5. In a calculating machine, a rotatable calculating mechanism, means for moving parts of said mechanism to adjusted positions, means for locking said parts in adjusted position, a crank for rotating said mechanism, an arm movable with said locking means, a stop adapted to be positioned behind said arm when the locking means is in engagement with said parts for holding the locking means in engagement and means actuated by the rotational movement of the crank for positioning said stop behind said arm.

6. In a calculating machine, a rotatable calculating mechanism, means for moving parts of said mechanism to adjusted positions, means for locking said parts in adjusted position, a crank for rotating said mechanism, an arm movable with said locking means, a stop adapted to be positioned behind said arm when the locking means is in engagement with said parts for holding the locking means in engagement and means actuated by the application to the crank of a rotational force insufficient to rotate said mechanism for positioning said stop behind said arm.

7. In a calculating machine, a rotatable calculating mechanism, means for moving parts of said mechanism to adjusted positions, means for locking said parts in adjusted position, a crank for rotating said mechanism, a stop movable into position to hold said locking means in engagement with said parts, a spring tending to move said stop from said position and means actuated by the application of a rotational force to said crank for holding said stop in said position.

8. In a calculating machine, a rotatable calculating mechanism, means for moving parts of said mechanism to adjusted positions, means for locking said parts in adjusted position, a crank for rotating said mechanism, a stop movable into position to hold said locking means in engagement with said parts, a spring tending to move said stop from said position, and means actuated

by the initial movement of the crank for moving said stop to said position and by the continued application of a rotational force to said crank to hold said stop in said position.

9. In a calculating machine, a rotatable calculating mechanism, means for moving parts of said mechanism to adjusted positions, means for locking said parts in adjusted position, a crank for rotating said mechanism, said crank being movable from neutral position and being rotatable a plurality of times through neutral position to perform a calculating operation, said locking means being out of engagement with said parts when the crank is at rest in neutral position, means actuated by the initial movement of the crank from neutral position for moving said locking means into engagement with said parts, a stop movable into position to hold said locking means in engagement with said parts, means actuated by the initial movement of the crank for moving said stop into said position and for holding said stop in said position during subsequent movements of the crank through neutral position.

10. In a calculating machine, a rotatable calculating mechanism, means for moving parts of said mechanism to adjusted positions, means for locking said parts in adjusted position, a crank for rotating said mechanism, said crank being movable from neutral position and through neutral position a plurality of times to effect a calculating operation, the locking means being normally out of engagement with said adjustable parts when the crank is in neutral position, means operated by the initial movement of the crank from neutral position for moving said locking means into engagement with the adjustable parts and means operative by the application of a rotational force to the crank to prevent the operation of the latter means to release the locking means as the crank moves through neutral position.

11. In a calculating machine, a rotatable calculating mechanism, means for moving parts of said mechanism to adjusted position, means for locking said parts in adjusted positions, a crank for rotating said mechanism, said crank being normally in neutral position, a plurality of means operative by the initial rotation of the crank for moving the locking means into engagement with the adjusted parts, one of said means operating to release the locking means as the crank reaches neutral position, the other of said means operating to hold the locking means in engagement as the crank passes through neutral position, and controllable means for rendering said other means operative or inoperative.

12. In a calculating machine, a rotatable calculating mechanism, means for moving parts of said mechanism to adjusted position, means for locking said parts in adjusted positions, a crank for rotating said mechanism, said crank being normally in neutral position, a disc having a depression therein rotatable in time with said crank, a second disc associated with the first disc and having a limited freedom of rotational movement with respect thereto, said second disc having a depression alined with the depression in the first disc when the crank is at rest in neutral position, means for moving said locking means into engagement with said adjustable parts and a projection on said latter means seated in said depressions when the crank is at rest in neutral position, movement of said crank serving to eject said depression from said depressions and to move the depressions out of alinement.

13. In a calculating machine, a rotatable calculating mechanism, means for moving parts of said mechanism to adjusted position, means for locking said parts in adjusted positions, a crank for rotating said mechanism, said crank being normally in neutral position, a disc having a depression therein rotatable in time with said crank, a second disc associated with the first disc and having a limited freedom of rotational movement with respect thereto, said second disc having a depression alined with the depression in the first disc when the crank is at rest in neutral position, means for moving said locking means into engagement with said adjustable parts, a projection on said latter means seated in said depressions when the crank is at rest in neutral position, movement of said crank serving to eject said projection from said depressions and move the depressions out of alinement and means for re-alining the depressions when the crank is brought to rest in neutral position.

14. In a calculating machine, a rotatable calculating mechanism, means for moving parts of said mechanism to adjusted positions, means for locking said parts in adjusted positions, said means being normally out of engagement with said parts, a crank for rotating said mechanism, means having a limited freedom of rotational movement with respect to the crank, means operated by the initial movement of the crank for moving said locking means into engagement with said parts and by the relative movement of the crank and the relatively movable means for holding said locking moving means in position to hold the locking means in engagement with said parts.

15. In a calculating machine, a reversible cycle calculating mechanism, means for moving parts of said mechanism to adjusted position, a crank for rotating said mechanism, a driving shaft by which said crank

is secured, means operative by the movement of the crank from full cycle position in either direction for locking the adjusted parts in adjusted positions, and means mounted on said shaft and operative upon movement of the crank from full cycle position for locking the locking means in adjusted position and holding said locking means locked during subsequent movement of the crank thru full cycle position.

In testimony whereof, I have hereunto set my hand.

CARL M. F. FRIDEN.