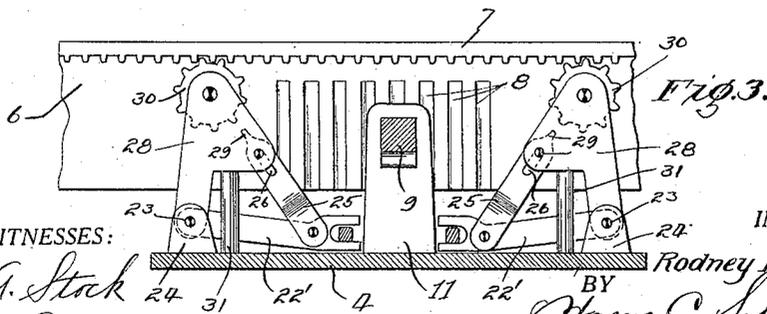
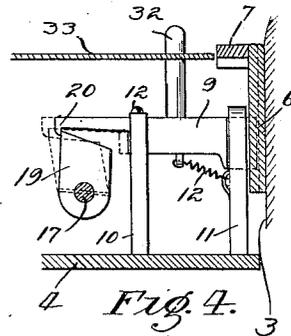
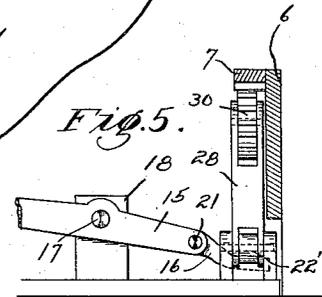
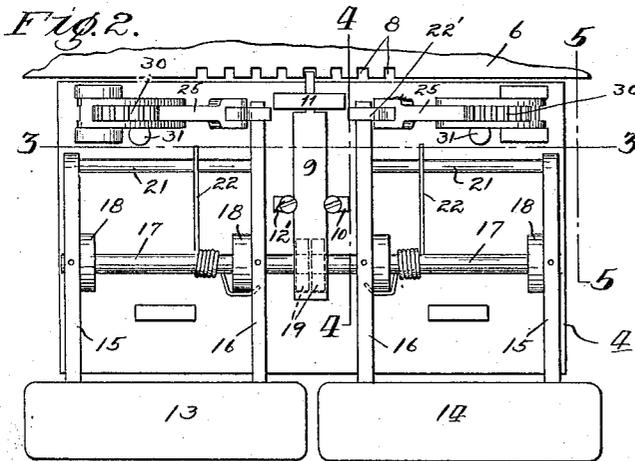
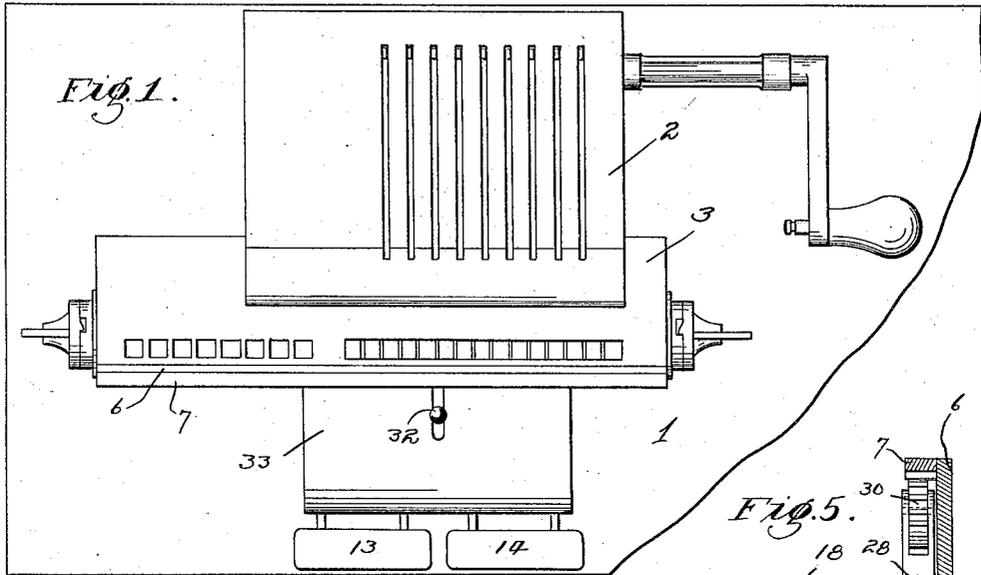


R. H. MARCHANT.
 CALCULATING MACHINE.
 APPLICATION FILED NOV. 13, 1914.

1,172,817.

Patented Feb. 22, 1916.



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UNITED STATES PATENT OFFICE.

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CALCULATING-MACHINE.

1,172,817.

Specification of Letters Patent.

Patented Feb. 22, 1916.

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To all whom it may concern:

Be it known that I, RODNEY H. MARCHANT, a citizen of the United States, residing at Oakland, in the county of Alameda and State of California, have invented certain new and useful Improvements in Calculating-Machines, of which the following is a specification.

This invention relates to improvements in calculating machines of the type wherein the multiplicand is set up on the stationary portion and the result is obtained on a movable carriage, which is shifted to successive positions when multiplying by the units, tenths, and hundredths of the multiplier. In machines of this character at present in use the carriage is unlatched and moved manually to the right or left, which requires considerable effort, both mental and manual, on the part of the operator in order that the carriage be shifted the correct number of spaces. Not only is considerable effort required, but it is necessary to watch the carriage thus removing the eyes from figures being multiplied to see that it is not shifted more than the required number of spaces.

The object of my invention is to overcome this difficulty by providing keys that when depressed cause the carriage to be shifted one position to the right or to the left according to the key depressed, thus eliminating the mental effort and disturbance required to watch the shifting of the carriage.

Another object of my invention is to securely lock the carriage in position while calculating operations are being performed and to provide means whereby the locking means may be withdrawn independent of the shifting mechanism to allow the free shift of the carriage throughout any portion of its travel.

In general my invention aims to provide a simple and effective mechanism for accomplishing the above objects and consists in the novel constructions, combination, and arrangements of parts as herein described and set forth in the appended claims.

Referring to the drawing forming a part of this specification, Figure 1 is a view in plan of a calculating machine showing the position in which my improved shifting mechanism is attached thereto. Fig. 2 is an enlarged plan view of the shifting mechanism with the cover plate removed. Fig. 3 is a view in section on the line 3—3, Fig. 2.

Fig. 4 is a view in section on the line 4—4, Fig. 2. Fig. 5 is a view in section on the line 5—5, Fig. 2.

Referring to corresponding parts in the several views by the same numerals of reference, 1 denotes a base whereon is mounted a stationary portion of the calculating machine 2, the latter having a guide, not shown, wherein is slidably mounted the movable carriage 3.

My present invention relates to means for shifting this carriage and consists of the plate 4 mounted on the base 1 in fixed relation to the calculating machine, or which may be formed as part of the frame of the stationary portion 2. On the front of carriage 3 is provided a longitudinal plate 6 having along the upper edge thereof a tooth rack 7. This plate is also provided on its face with a plurality of vertically disposed slots 8, which are spaced apart an amount equal to the movement of the carriage 3 between its various operating positions. The carriage 3 is locked in position by means of a bolt 9, slidably mounted in the upright brackets 10 and 11 and urged into engagement with slots 8 by means of spring 12 attached to the bolt and bracket 11.

The longitudinal shifting of the carriage 3 is secured by depression of the bars 13 and 14, the former moving the carriage to the left and the latter to the right. These bars are secured to the lever arms 15 and 16, which are keyed to shafts 17 and the latter are pivotally mounted in suitable bearings 18.

In order to withdraw bolt 9 and unlatch the carriage before the shifting movement takes place, the shafts 17 are extended under the end of bolt 9 and have keyed thereon latches 19 adapted to engage a catch 20 formed on this bolt. The latches 19 are approximately half the width of the bolt 9 so that either one may independently pick up the latter. The forward ends of the arms 15 and 16 are connected by means of a rod 21, and 22 is a coil spring surrounding the shaft 17, with one end resting on the rod 21 while the other abuts against the back of bearings 18, these springs being so coiled that the bar 21 is pressed downwardly. The arms 16 are extended forwardly and engage in the bifurcated ends of lever arms 22', which latter are pivotally mounted on pins 23 in the bearings 24. Pivotaly attached

to the arms 22' adjacent the bifurcated ends thereof are pawls 25 having adjacent their opposite ends slots 26, which are guided by pins 27 to the oscillatable bearing plate 28. The other end of pawl 25 is pointed as shown at 29, this point being adapted to engage between the teeth of the spur gears 30, the latter are pivotally mounted in the upper end of plate 28 and engage the rack 7. The plates 28 are pivotally mounted on pins 23, and stops 31 limit their downward movement. Bolt 9 is provided with an upwardly extending arm 32 passing through a slot in the cover plate 33 enabling the bolt 9 to be drawn back without the aid of the shaft bars 13 and 14.

In use the depressing of either of the shaft bars 13 and 14 causes the rotation of the corresponding shaft 17, and the upward movement of the opposite end of arm 16, which raises the corresponding lever arm 22 and pawl 25, but owing to the slot 26 the point 29 does not immediately engage between the teeth of the wheel 30. In the meantime the latch 19 through the catch 20 pulls back the bolt 9 out of engagement with the slot 8 so that by the time this bolt is withdrawn from the slot the pawl end 29 has entered the teeth of the gear wheel 30 locking the latter against rotation. Further downward movement of the shift bar causes the bearing plate 28 to be rotated about the pin 23 and the carriage 3 to be shifted to the left or right depending whether 13 or 14 is depressed. Before the completion of the downward stroke of these latch bars and the bolt 9 is released as shown in Fig. 5, and the spring 12 causes the bolt to move against the face of plate 6 so that when the succeeding slot 8 is reached the bolt drops into position and prevents further movement of the carriage regardless of whether the shift bars are fully depressed or not.

It will be noted that spring 12 is so depressed that it exerts a downward action on the bolt as well as a forward pull, and bracket 10 permits the rear of the bolt to raise slightly. When the shift bar is released springs 22 pull down the arms 16, which withdraws the pawl from the gear teeth and allows the rotation of this gear on the rack as further movement of the arm 16 in engagement with lever 22 rotates the plate 28 to its normal position. During this return movement of the latch bars and other attached parts the shaft 17 rotates and the latch 19 raises the rear end of bolt 20 a sufficient distance to enable the point to become engaged back of the catch 20, thus restoring all parts to their normal position. On the other hand, if it becomes necessary to shift the carriage from one extreme to another this operation may be readily accomplished by a backward movement of the handle 32, which withdraws the

bolt 9 enabling the carriage to be shifted to the desired position.

The advantage of this device will be readily apparent in that the shifting of the carriage becomes automatic to the operator and his full attention may be concentrated to following the digits of the number which may appear on the sheet from which he is operating.

While I have shown the preferred embodiment of my invention it will be understood that various modifications may be made without effecting its utility, as for instance, the wheels 30 may be done away with and the pawls 25 extended a sufficient distance to directly engage the teeth of rack 7.

What I claim as new and wish to cover by Letters Patent is:—

1. A shift mechanism for calculating machines, comprising the combination with the carriage and base thereof, of a slidable bolt adapted to hold said carriage in a fixed position, a toothed rack formed on said carriage, oscillatable bearing plates pivotally mounted on said base, toothed pinions carried by said plates and meshing with said toothed rack, pawls having one end slidably mounted in said bearing plates and the points normally held out of engagement with said pinions, pivotally mounted shift bars operating said pawls to cause the same to engage and lock said pinions and then to oscillate said bearing plates and pinions to shift the said carriage, and means operated by said shift bars for withdrawing said bolt before said pawls engage said pinions.

2. A shift mechanism for calculating machines, comprising the combination with the carriage thereof, of a slidable bolt normally engaging slots in said carriage, a catch formed in said bolt, pivotally mounted shafts carrying shift bars, one bar for effecting movement of the carriage to the right and one for effecting movement to the left, latches carried by said shafts normally engaging the catch of said bolt, said latches being adapted to withdraw said bolt during the initial movement of said shift bars and to release the same before the completion of the movement, and spring means for urging said bolt into engagement with said carriage.

3. A shift mechanism for calculating machines, comprising the combination with the carriage thereof, of a spring operated slidable bolt adapted to engage slots in said carriage, shift bars attached to pivotally mounted shafts, one for effecting movement to the right and one for effecting movement to the left, oscillatable bearing plates mounted adjacent said carriage, toothed pinions carried by the free end of said bearing plates, a toothed rack attached to said carriage and engaged by said pinions, pawls adapted to engage the teeth and lock said

gear wheels, said pawls being slidably mounted in said bearing plates and normally held out of engagement with said pinions, and connecting means between said shift bars and said pawls whereby the initial movement of the former causes the latter to enter into engagement with said pinions and further movement causes the shifting of said carriage.

4. In a calculating machine comprising a base, a carriage movable on said base, a toothed rack carried by said carriage, a shifting and locking mechanism mounted on said base comprising oscillatable bearing plates, toothed gears carried by said plates and engaging said toothed rack, shift bars pivotally mounted on the said base, pawls pivotally attached to said shift bars, said pawls having a slotted connection with said bearing plate so as to first lock the corresponding gear and then oscillate the bearing plate when said shift bar is actuated.

5. In a calculating machine the combination with the base and a carriage movable longitudinally thereon, of a shifting mechanism mounted on said base comprising pivotally mounted shift bars, oscillatable bearing plates adapted to be moved by said shift bars, toothed gears pivotally mounted in said bearing plates, a toothed rack carried by said carriage engaged by said gears,

pawls having one end pivotally mounted on said shift bars and the other end slidably mounted on said bearing plates, points on said pawls adapted to enter between the teeth of said gears and lock the same when said shift bars are operated.

6. In a calculating machine, the combination with the base and a carriage movable longitudinally thereon, of a shifting mechanism mounted on said base comprising a pair of pivotally mounted shift bars, oscillatable bearing plates, levers having one end pivotally mounted on the bearings of said bearing plates and the other ends attached to said shift bars, toothed gears pivotally mounted in said bearing plates, a toothed rack attached to said carriage and engaging said gears, pawls attached to said levers, slidable in said bearing plates and adapted to engage said gears when said shift bars are operated, a sliding bolt adapted to engage slots in said carriage, and means operated by said shift bars for withdrawing said bolt during the initial operation of either of said shift bars.

In testimony whereof I affix my signature in presence of two witnesses.

RODNEY H. MARCHANT.

Witnesses:

W. A. STOCK,
R. M. OYARZO.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."