

H. BURDICK.
TRANSFER DEVICE FOR CALCULATORS.
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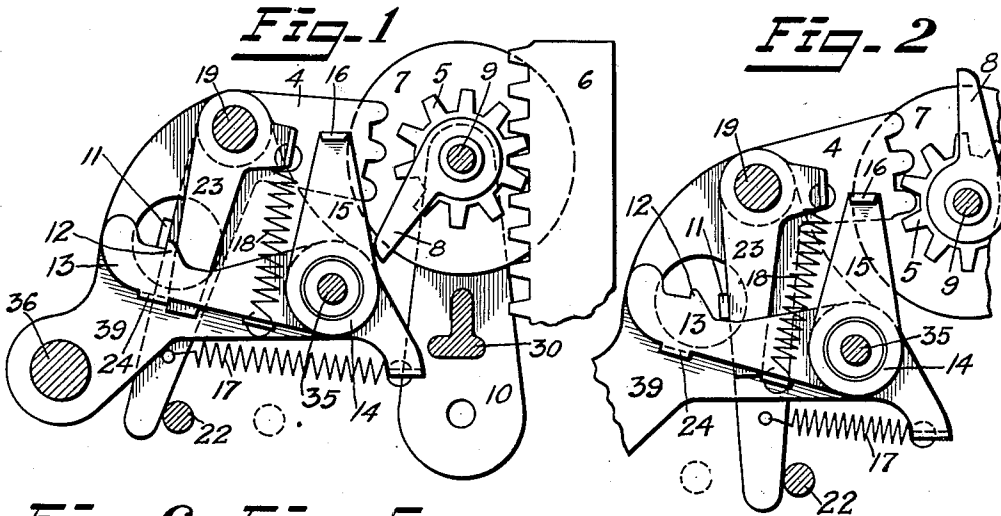


Fig-6 Fig-5

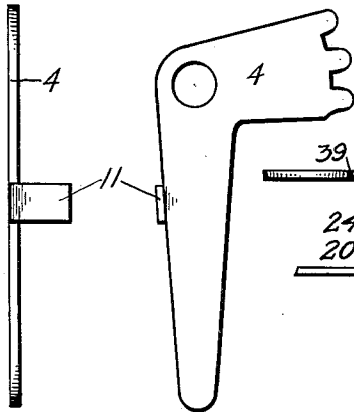
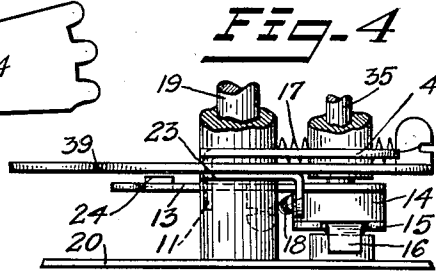
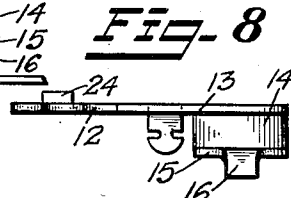
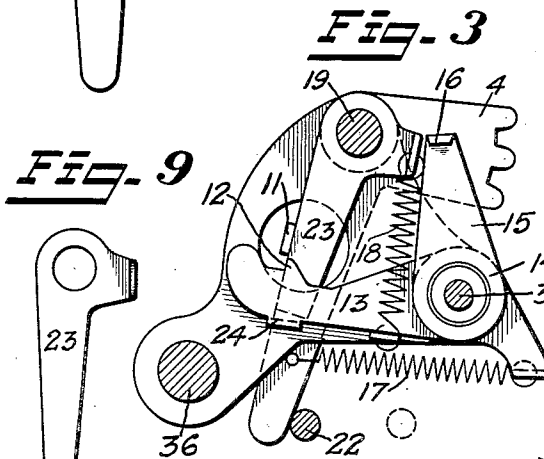
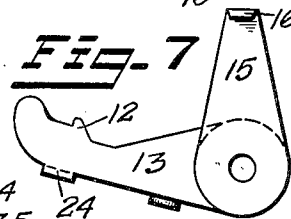
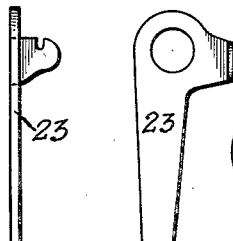


Fig-10



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UNITED STATES PATENT OFFICE.

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TRANSFER DEVICE FOR CALCULATORS.

1,231,999.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, HERBERT BURDICK, a citizen of the United States, and a resident of East Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Transfer Devices for Calculators, of which the following is a specification.

The principal object of the present invention is to provide an improved form of locking means in a transfer or carrying device for adding machine, wherein the detent, when unlatched from the carrying lever, is held to prevent its relatching again, until the carrying operation has been effected.

In the accompanying drawings illustrating embodiments of my invention, Figure 1 shows in elevation enlarged the transfer mechanism. Fig. 2 is a similar view at the end of a carrying operation. Fig. 3 shows an intermediate stage in the carrying operation. Fig. 4 is a plan of the parts shown in Fig. 3. Fig. 5 shows in side elevation, and Fig. 6 shows in front elevation, the toothed lever for carrying. Fig. 7 shows in side elevation, and Fig. 8 in plan, the carrying detent. Fig. 9 shows in side elevation, and Fig. 10 in front elevation, the stop plate for the transfer device.

The transfer device herein set forth is designed to be employed with a set of nine adding pinions and wheels, for a machine having nine banks of keys. Each of these are practically duplicates and a description of one set will suffice, except that it will be understood that the cam connected with each adding pinion except the highest in order coöperates with the transfer device for operating on the pinion and wheel of the next higher order. In Figs. 1-4, I show a numeral pinion 5 connected with an indicating disk 7, and provided with a cam 8. The indicating wheels turn freely on a shaft 9 mounted in a frame 10. This frame in this form of machine is mounted to oscillate to move the adding wheels bodily back and forth. In Fig. 1 the pinions are moved to engage rack bars 6 that reciprocate vertically. In Fig. 2 the pinions are shown shifted forwardly on the machine to engage the teeth of the toothed levers 4, for the carrying operation.

It is understood in this form of machine, that the cam on the pinion strikes a detent or lever while the pinion is being turned in

mesh with the rack bar. Since the toothed carrying lever does not engage the pinion at this time it is not allowed to move. At a later stage in the operation, the pinions are shifted from the racks over to engage the toothed levers, and thereupon the toothed levers are given the necessary movement to turn the pinions a unit distance to carry. In the arrangement set forth the toothed levers 4 are each provided with an ear 11 that is adapted to engage with a tooth 12 on a detent arm 13. The latter arm is connected through a hub 14 with a detent arm 15 provided with a lug 16, which latter is engaged by the cam 8 when the pinion 5 and disk are turned from the "9" position to the "0" position. This engagement of the cam with the detent arm will swing it forward to the position indicated in Fig. 3, and the arm 13 will be moved downward to disengage the tooth 12 from the ear 11. The lever 4 is connected by a spring 17 tending to draw it forward and it is pressed thereby against a restoring bar such as the restoring bar 22 hereinbefore set forth. But the engagement of the ear with the tooth 12 will prevent swinging of the lever by its spring when the restoring bar is moved as has been set forth. A spring 18 connected with the arm 13 of the detent, draws it upward to engage the ear 11, which spring is stretched when the cam 8 strikes the arm 15 to move the tooth 12 away from ear 11 of the lever 4. It will be understood that when the cam swings the detent to the position as indicated in Fig. 3, since the restoring bar does not permit movement of the lever 4, when the cam on continued turning of the pinion, passes beyond the lug on the arm 15, the detent arm 13 would be drawn by its spring to reengage the ear 11. In certain forms of this construction, such as set forth in patent granted to J. C. Lotterhand, No. 1,102,063, the restoring bar permits a slight advance of the lever 4 at this stage, that when the detent is released, will prevent relatching of the ear 11 as the tooth would strike the edge of the ear. But in this latter position it has been found that the lever 4 is likely to be slightly shifted on the reengagement of the pinion with its teeth, and is liable to become relatched. This would prevent the carrying operation when the restoring bar is subsequently shifted and thus introduce error into the operation.

To prevent this occurrence I provide a lock plate that serves to hold the detent in its unlatched position as soon as unlatched. As shown I provide a plate 23 that swings on shaft 19, which plate is connected with the spring 18 to be drawn thereby against the ear 11 as indicated in Figs. 2 and 3. But in the normal position of the detent and lever 4 with the detent tooth engaging the ear 11, the lock plate 23 engages by one edge a lug 24 on the detent arm 13, as shown in Fig. 1, and in this position the lock plate 23 is held a short distance removed from the ear 11. But when the cam swings the detent to move the arm 13 downward and release the tooth 12 from the ear 11, the lug 24 is moved beyond the lower end of the lock plate 23 and the latter is free to be swung by its spring 18 until it engages the ear 11. From Fig. 3 it will be seen that in this position the lower end of the lock plate 23 now lies above the lug 24 on the detent arm; and hence when the cam releases the detent, and the arm 13 is drawn upward by spring 18, the lug 24 will strike the end of the lock plate 23. These parts are so relatively positioned that the arm 13 is now held by the lock plate so that it cannot rise sufficiently to permit engagement between the tooth 12 on the detent, and the ear 11. In the subsequent operation of the machine, after the numeral pinion has been shifted over to engage the toothed lever 4, the restoring bar 22 moves toward the rack bar 6 and hence permits the unlatched toothed arm 4 to be swung by its spring 17, that is sufficient to move the pinion a unit distance to carry. The conclusion of this carrying movement is indicated in Fig. 2. Compared with the position of Fig. 3, it will be seen that the ear 11 will engage the lock plate 23 and move it toward the rack bars, it being understood that the force and leverage of the spring 17 is sufficient to overcome the operation of the spring 18 on the lock plate. The ear 11 will carry the lock plate toward the rack bar from the position of Fig. 3 to that of Fig. 4, and consequently the lug 24 on the detent arm will be released from the lock plate, and the arm 13 will move upward. When at a subsequent operation the restoring bar 22 returns the arm 15 to its normal position as in Fig. 1, the ear 11 will engage the inclined face of the tooth 12 and move the arm 13 downwardly. The spring 18 will hold the lock plate against the ear 11 and these two members will move together, until the lock plate strikes the edge of the lug 24 that will arrest its return movement. The ear 11 will hence move beyond the lock plate and will engage the straight face of the tooth 12, the upward movement of the arm 13 of the detent not being restricted by the lug 24 since the arm now engages the edge of the lock plate. The parts are now

in their normal position. It is of course understood that only those detents are unlatched where pinions pass the "9" to carry and their cams unlatch the detents from the carrying levers. At each operation of the machine the restoring bar 22 moves toward the rack bars, but the carrying levers 4 will not advance except where they were unlatched.

Having thus described my invention, what I claim is:—

1. In a calculator transfer device, the combination with an adding pinion provided with a cam, a second pinion, and actuators for moving the pinions, of a detent arranged to be engaged by said cam, a toothed lever arranged to engage the second pinion when shifted away from its actuator, a spring for moving the toothed lever to turn the pinion to carry, an ear projecting from the lever, the detent and ear having engaging means to hold the toothed lever in latched position until the detent is tripped by said cam, a restoring bar normally engaging the lever to hold it against carrying movement when released from the detent and until a later stage in the operation of the machine, a stop plate, a spring on the stop plate, a connection between the stop plate and the detent comprising a lug on one member normally pressed against the other member by said stop plate spring, the stop plate being swung by its spring upon the detent being unlatched from said ear by the cam, whereby said lug will engage its co-operating member to prevent reengagement of the ear and detent, and upon release of the unlatched toothed lever by movement of the restoring bar, the said lever ear will swing the lock plate to release the detent, whereby to permit reengagement of the detent and ear upon retraction of the toothed lever by the restoring bar.

2. In a calculator transfer device, the combination with an adding pinion provided with a cam, a second pinion, and actuators for moving the pinions, of a detent arranged to be engaged by said cam, a toothed lever arranged to engage the second pinion when shifted away from its actuator, a spring for moving the toothed lever to turn the pinion to carry, an ear projecting from the lever, the detent having a tooth engaged by said ear to hold the toothed lever in latched position until the detent is tripped by said cam, a restoring bar normally engaging the lever to hold it against carrying movement when released from the detent and until a later stage in the operation of the machine, a stop plate, a spring on the stop plate, a connection between the stop plate and the detent comprising a lug on one member normally pressed against the other member by said stop plate spring, the stop plate being swung by its spring upon the detent tooth being un-

latched from said bar by the cam, whereby the lug will engage its cooperating member to prevent reengagement of the ear and tooth, and upon release of the unlatched
 5 toothed lever by movement of the restoring bar, the said lever ear will swing the lock plate to release the detent, whereby to permit reengagement of the tooth and ear upon retraction of the toothed lever by the restoring
 10 ing bar.

3. In a calculator transfer device, the combination with an adding pinion provided with a cam, a second pinion, and actuators for moving the pinions, of a detent arranged
 15 to be engaged by said cam, a toothed lever arranged to engage the second pinion when shifted away from its actuator, a spring for moving the toothed lever to turn the pinion to carry, an ear projecting from the lever,
 20 the detent and ear having engaging means to hold the toothed lever in latched position until the detent is tripped by said cam, a restoring bar normally engaging the lever to hold it against carrying movement when re-
 25 leased from the detent and until a later stage in the operation of the machine, a lug on the detent, a stop plate, a spring normally pressing the stop plate against the lug on the detent, the stop plate being swung by its
 30 spring upon the detent being unlatched from said ear by the cam, whereby said lug engages the stop plate to prevent reengagement of said ear and detent at such stage, and upon release of the unlatched toothed lever
 35 by movement of the restoring bar, said ear will swing the lock plate to release the detent, and thereby permit reengagement of the detent and ear upon retraction of the toothed lever by the restoring bar.

4. In a calculator transfer device, the combination with an adding pinion provided with a cam, a second pinion, and actuators for moving the pinions, of a detent arranged to be engaged by said cam, a toothed
 45 lever arranged to engage the second pinion

when shifted away from its actuator, a spring for moving the toothed lever to turn the pinion to carry, an ear projecting from the lever, the detent having a tooth engaged by said ear to hold the toothed lever in
 50 latched position until the detent is tripped by said cam, a restoring bar normally engaging the lever to hold it against carrying movement when released from the detent and until a later stage in the operation of the
 55 machine, a lug on the detent, a stop plate, a spring normally pressing the stop plate against the lug on the detent, the stop plate being swung by its spring upon the detent tooth being unlatched from said ear by the
 60 cam whereby said lug will engage the stop plate to prevent reengagement of said ear and tooth at such stage, and upon release of the unlatched toothed lever by movement of the restoring bar, said ear will swing the
 65 lock plate to release the detent, and thereby permit reengagement of the detent tooth and ear upon retraction of the toothed lever by the restoring bar.

5. In a calculator transfer device, the combination with an adding pinion and a cam, of a detent engaged and moved by the cam, a toothed lever arranged to cooperate with the pinion, an ear projecting from the lever, a
 70 tooth on the detent arranged to engage said ear, a spring for pressing the detent against the said ear, a lug on the detent, a stop plate, a spring arranged to press the stop plate against said lug when the detent engages
 75 said ear, said tooth when the detent is first swung by the cam releasing said ear and upon further movement said lug releasing the stop plate to permit it to move over the said lug extremity and prevent retraction of
 80 the detent to hold the tooth away from said ear, the stop plate being moved away from said lug by said ear on shifting of the lever to permit reengagement of the tooth and ear.

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