

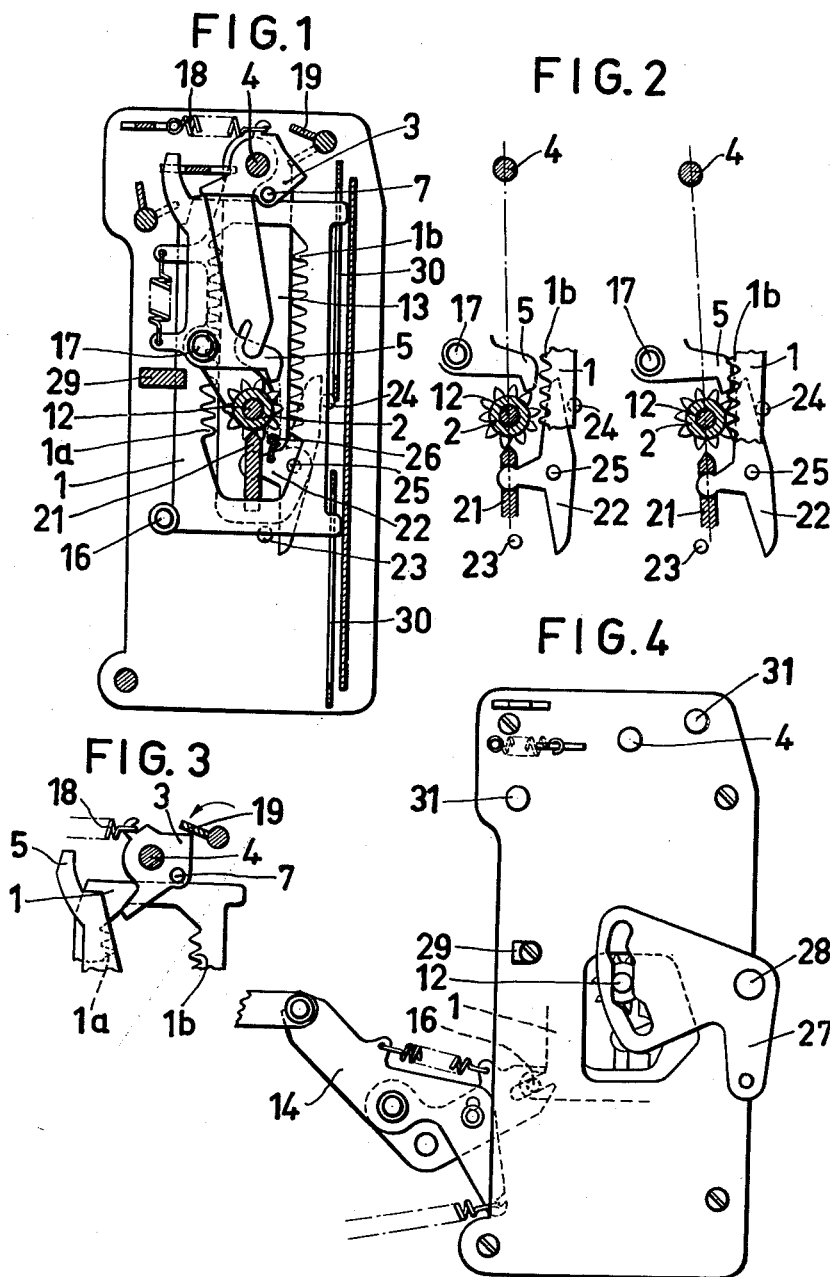
Feb. 19, 1963

S. L. ALMVIDE
REGISTERS FOR ADDING MACHINES, BOOK-KEEPING
MACHINES AND OTHER CALCULATING MACHINES

3,078,038

Filed April 3, 1961

3 Sheets-Sheet 1



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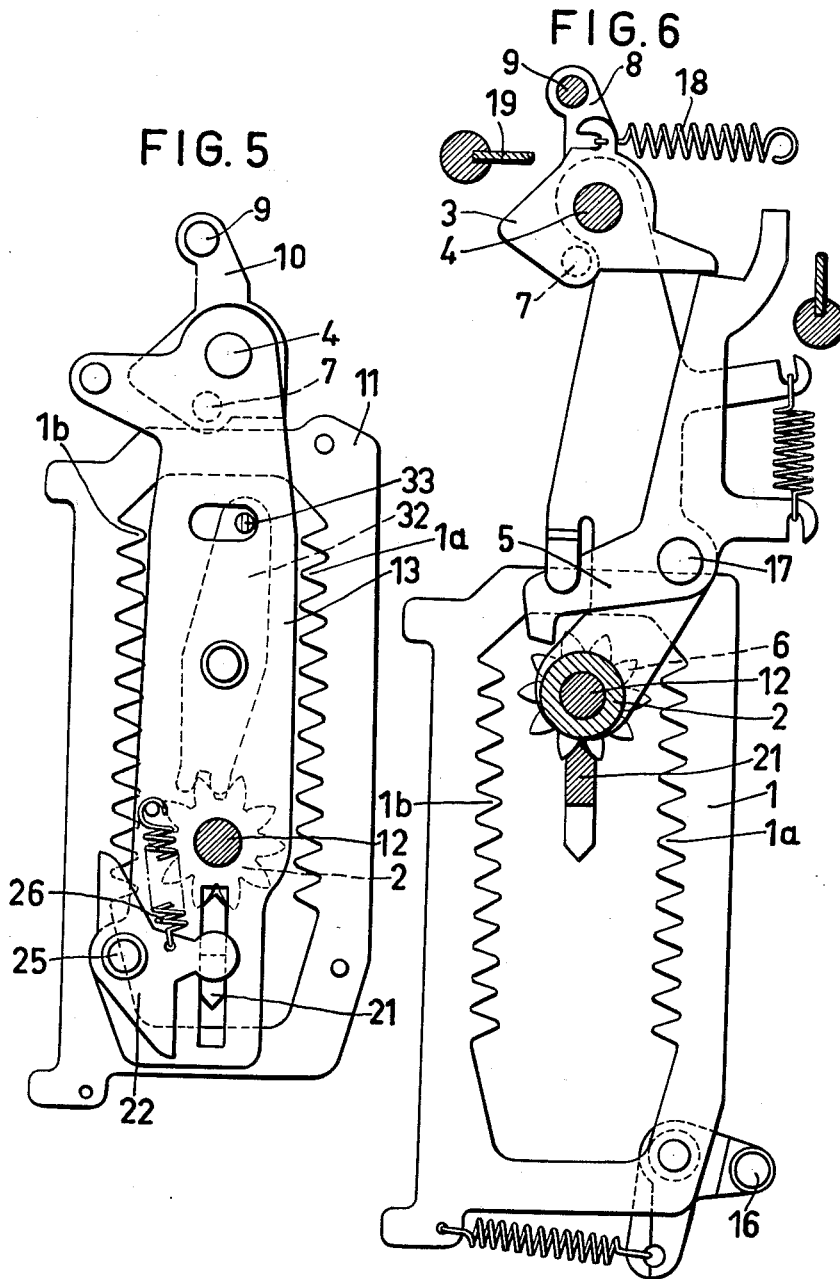
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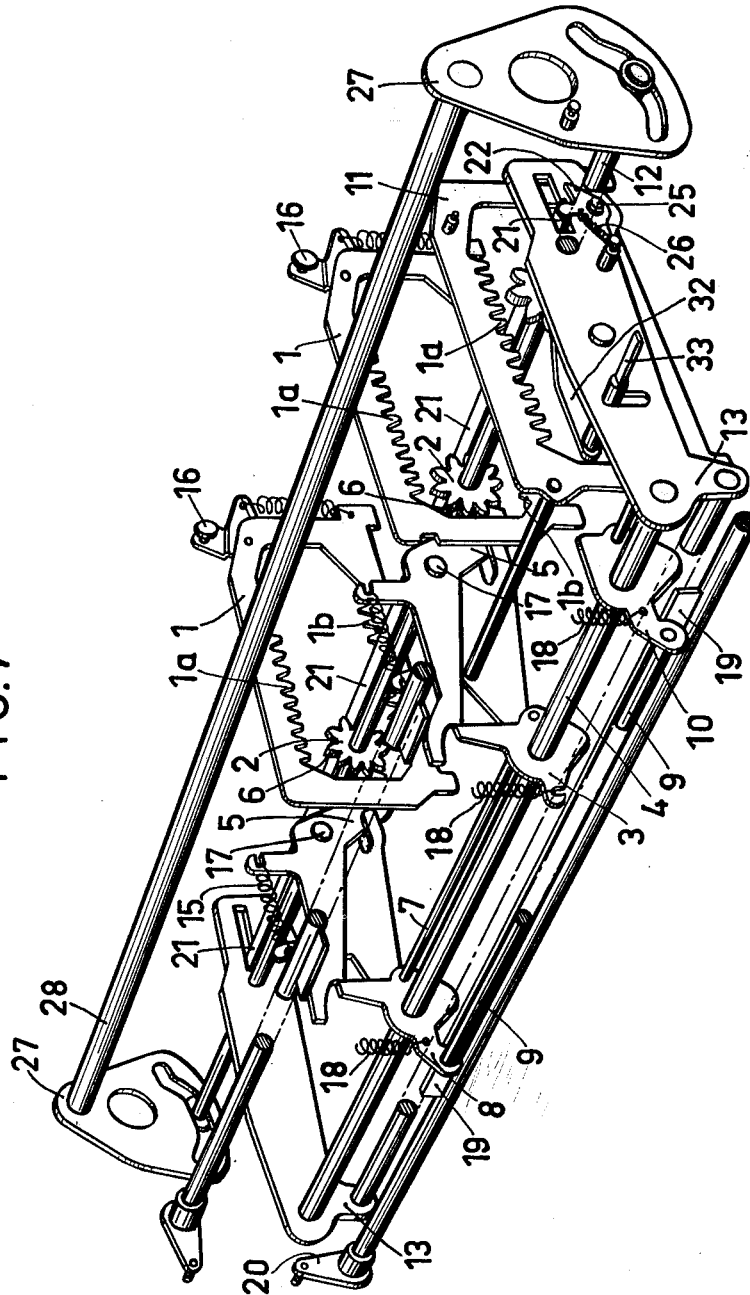
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FIG. 7



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REGISTERS FOR ADDING MACHINES, BOOK-KEEPING MACHINES AND OTHER CALCULATING MACHINES

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2 Claims. (Cl. 235-137)

This invention relates to a complete register for adding machines, writing calculating machines and the like, which operates below as well as above zero and which is formed as a standardized unit comprising all means for independent calculations and adapted to be easily connected to the present control members in conventional adding, bookkeeping and other calculating machines without the need for substantial modifications of the latter.

It is an object of the present invention to provide a register of the kind referred to above which is assembled of simple parts having small dimensions, small inertia and short and simple control movements, to operate swiftly and reliably.

It is another object of the invention to provide a register unit which may be readily dismounted for inspection, adjustment and cleaning.

It is a still further object to provide a register unit having small overall dimensions which may be easily incorporated in office machines having agreeable lines and an anatomically sound shape.

With these and other objects in view, in a register for office machines of the kind referred to which comprises a plurality of calculating wheels having each ten teeth, said wheels being disposed on a common shaft, said shaft being pivotally supported to enable said tooth wheels to be swung into and out of engagement with two interior tooth rows provided on a plurality of rack members the number of which corresponds to the number of tooth wheels, each of said wheels having a transfer tooth adapted to engage and actuate a transfer pawl, said pawl adapted to actuate, in its turn, a stop latch which forms in those decades wherein no tens transfer shall take place, an abutment for said rack members in their zero position when they are returned to non-actuated position by drive means such as a main shaft, but which are actuated to assume a non-latching position in those decades in which a transfer shall take place and which permit that the corresponding rack member moves another step (below zero) so that the corresponding calculating wheel is rotated one step by the rack member and consequently receives a tens transfer increment, the stop latches and a register bail structure are pivotally mounted on a common shaft, said bail structure comprising the shaft with the register wheels as well as the transfer pawls and alignment means for the register wheels, those members thus always taking up the same position relative to each other and to the stop latches when engaging and disengaging said rack members, to eliminate stop and adjustment positions.

A preferred embodiment of a register unit according to the invention will now be described, reference being had to the appended drawings.

In the drawings

FIG. 1 is a side elevation of a register unit with an end wall removed,

FIG. 2 is a view showing certain parts illustrated in FIG. 1 in two different positions,

FIG. 3 is a plan view of a stop latch and members cooperating therewith,

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FIG. 4 is a side elevation view of the register unit from the outside,

FIGS. 5 and 6 are side elevation views of the register with different parts removed for clarity, and

FIG. 7 is an exploded diagrammatical/perspective view of the register unit which shows particularly the credit balance device.

The embodiment illustrated in the drawings comprises a register formed as a cassette-shaped unit with a plurality of rack members 1 arranged in a manner known per se and with register wheels 2 disposed between toothed portions 1a and 1b of the rack members. The rack members are guided laterally in a known manner by slots in a guide member 29 (FIG. 1). Other guide means for the rack members comprise two guide plates 30 and two guide shafts 31 (FIGS. 1 and 4).

The register wheels 2 are journaled on a common shaft 12 which is supported in a pair of arms 13 pivoted on a main shaft 4.

The arms 13 and shaft 12 form together a bail member which is pivoted round the shaft 4 and which mounts the alignment means and tens transfer means 21, 22 for the register wheels 2, said means together with stop latches 3 thus being pivotally mounted on main shaft 4.

The alignment means or bar 21 extends through the whole of the register and is supported at its ends by alignment arms 22 which are pivoted on studs 25 in the arms 13. The alignment arms 22 engage by their outer ends stud members 23 and 24 fast in the end wall which limit the movements of the arms 22 when the bar 21 is engaged or disengaged with the wheels 2. A spring member 26 urges the bar 21 into locking position when the bail 4, 12, 13 takes up its middle position (FIG. 1).

The bail structure 4, 12, 13 and the alignment mechanism 21, 22 are actuated into engagement and disengagement between the register wheels 2 and the rack members 1 by cam members 27 at both sides of the register unit, and those cams are rigidly connected by means of a shaft 28 journaled in the end walls (not illustrated).

The cams are actuated, in turn, by members, known per se, which are driven from the main shaft 4.

The shape of the bail is such that all movable members in the tens transfer mechanism when engaging with and disengaging from the rack members always take up the same position relative to each other and to the register wheels 2. The alignment mechanism further is designed in such a way that it follows the engagement and disengagement motion positively which makes it possible for the register to operate very fast and prevents the transfer pawls 5 (FIG. 2) to be swung out by a possible rotation of the register wheels 2. The stop latches 3 are shaped in such manner and move in such a direction that they push the rack members 1 before themselves upon clearing, to avoid blocking.

As can be seen from FIG. 1 the rack members 1 are moved (downwards in FIG. 7) by setting members 14 (FIG. 4) which move the rack members to the right by the action of spring means 15 (FIG. 7).

During the ensuing operation cycle the rack members 1 are urged back by motor-driven hook means which engage studs 16 at the rack members 1 (FIGS. 1, 4 and 7). The rack members 1 are normally stopped by an abutment 7 on a stop latch 3.

If a register wheel 2 has rotated more than one revolution, a tens transfer shall take place. The transfer tooth 6 of the wheel 2 then has actuated the transfer pawl 5 in the next decade which pivots on a stud 17, so that the transfer pawl is moved out of engagement with the stop latch 3. The latter thus is urged to turn on the shaft 4 by the action of a tension spring 18 (FIGS. 1, 3 and 7).

A clearing bar 19 stops the latch 3 in a position wherein

the stud 7 permits the rack member 1 to move one step backwards (below zero) upon the clearing of the rack members 1. The latter and consequently the register wheel 2 of the corresponding decade thus receives an increment of one unit, and the transfer is complete.

Clearing is effected when the clearing bar 19 is rotated clockwise by means of the crank 20 (FIG. 7) in a known manner. Said bar 19 actuates the latches 3 which are returned so far that the transfer pawl 5 resumes its locking engagement and all rack members 1 are moved by the studs 7 one step backwards, if a transfer has been effected. The clearing is terminated thereby.

Known registers of this type have been provided with transfer means such that a transfer pawl has been actuated by the transfer tooth and released a corresponding stop latch from engagement with the rack members, said stop latch moving essentially perpendicularly to the rack member movement direction. At the subsequent clearing the rack members therefore must be returned in a first step to make it possible to return the stop latches to their non-actuated positions, and not until then the transfer pawls have returned.

By the present invention the advantage is attained, as already mentioned, that the rack members 1 are returned in the same operation as the one which normalizes the stop latch 3 and transfer pawl 5, and that makes for a gain of time for each returning operation which means that the register may operate with greater speed and which is particularly important when totalizing is effected. The security is better than with earlier designs, due to the positive actuation.

The gain of time is made possible by the underlying principle of operation which is that the direction of the stop latch movements coincides wholly or partly with the direction of travel of the rack members 1. To this end it also helps that the alignment means follow the engagement and disengagement movements of the register wheels.

Also the transfer of the "fugitive one" may be said to take place in one single operation instead of, as in the earlier mechanisms, in several complex operations.

The credit balance mechanism comprises the following parts (FIG. 7).

The register wheel 2 in the highest decade actuates in a usual manner a transfer pawl 5 and a stop latch which in this instance is called a credit pawl 8. This pawl is connected over a credit balance bail 9 to a similar stop latch (credit pawl 10) for a credit balance rack member 11 which is disposed before the first rack member proper of the register.

The credit balance rack is connected to the rack member of the first decade in such a manner that, when the credit balance rack 11 is moved a step below zero as a consequence of a transfer from the highest decade of the register, the first rack member 1 is carried along by the credit balance rack 11. The credit wheel (first wheel) lacks the corresponding transfer pawl and actuates upon turning one step a balance latch 32 pivoted to the arm 13. A stud member 33 on the balance latch 32 moves in a slot in the arm 13 and actuates, in a manner known per se, the engagement means in the machine.

The number transferred from the highest decade, the

"fugitive one" thus is entered directly in the first decade of the register without an intermediate operation.

An advantage with this design is that the transfer of the "fugitive one" will take place in one single operation instead of, as by known mechanisms, in several complex operations.

Also when clearing time is gained, since by the invention the rack members 1 and the stop latches 3 return simultaneously while, in older mechanism, the rack members must be returned in a first operation before the stop latches may be moved into engagement.

What I claim is:

1. A register for calculating machines, such as adding machines and the like, of the kind comprising a plurality of calculating wheels having each ten teeth, said wheels being disposed on a common shaft, said common shaft being pivotally supported to enable said tooth wheels to be swung into and out of engagement with two interior tooth rows provided on a plurality of rack members the number of which corresponds to the number of tooth wheels, each of said wheels having a transfer tooth adapted to engage and actuate a transfer pawl, said pawl adapted to actuate, in its turn, a stop latch which forms in those decades wherein no tens transfer shall take place, an abutment for said rack members in their zero position when they are returned to non-actuated position by drive means such as a main shaft, but which are actuated to assume a non-latching position in those decades in which a transfer takes place and which permit the corresponding rack member to move another step (below zero) so that the corresponding calculating wheel is rotated one step by the rack member and consequently receives a tens transfer increment, the improvement comprising pivotally mounting the stop latches and a register bail structure on a second common shaft, said bail structure comprising said first common shaft with said calculating wheels as well as said transfer pawls and alignment means for the calculating wheels whereby said wheels, transfer pawls and alignment means always take up the same position relative to each other and to the stop latches when engaging and disengaging said rack members, thereby eliminating any stop and adjustment positions.

2. A register as claimed in claim 1 wherein a transfer pawl and a stop latch are mounted adjacent to and operated by the calculating wheel in the highest decade and wherein said stop latch is connected by a bail to a similar credit pawl stop latch, a credit balance rack member located adjacent the first rack member proper of the register, said bail operated credit pawl controlling said credit balance rack, said credit balance rack being connected to the first rack member to move said first rack member to directly enter a fugitive one in the first decade of the register, a credit balance wheel having calculating teeth but without transfer teeth, and a balance latch shifted by said credit pawl to position to prevent further tens transfer in the first decade until the register passes through zero in the opposite direction.

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