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H. RAUH

Serial No.

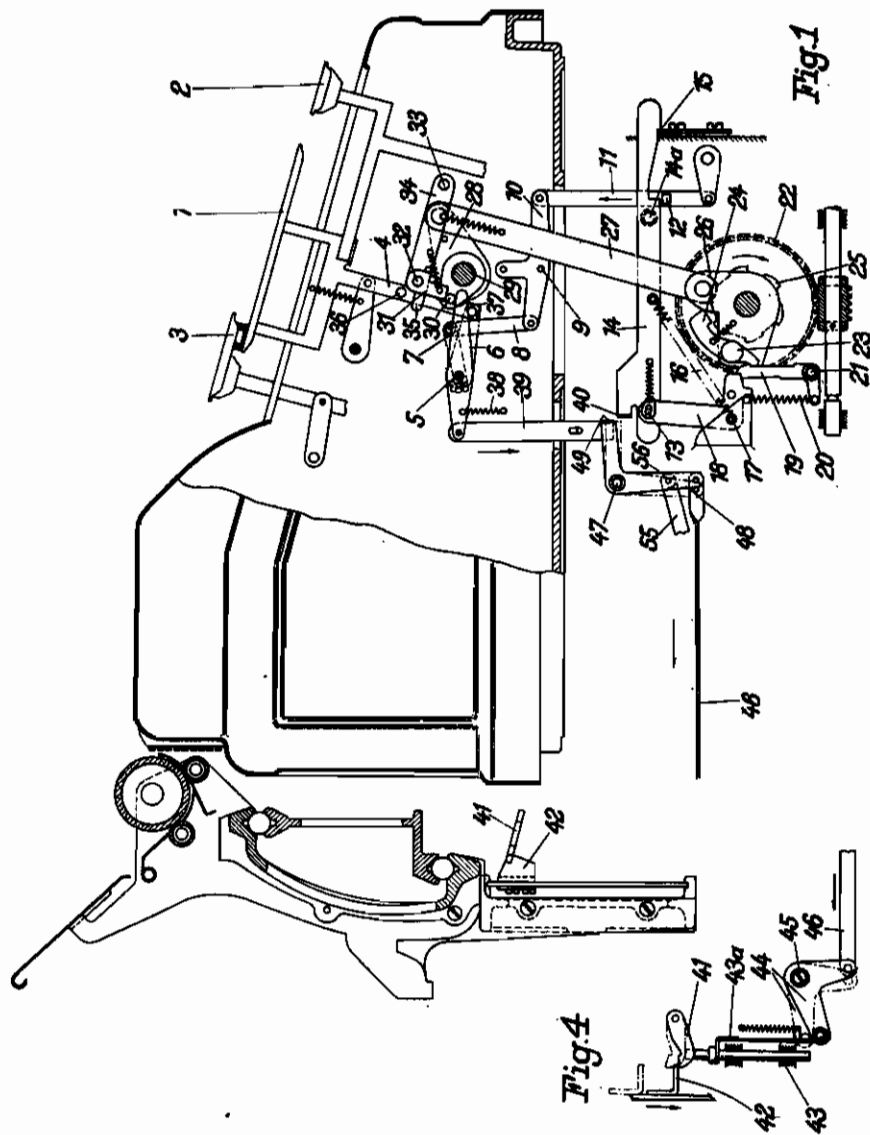
MAY 25, 1943. MOTOR KEY FEEDING FOR ACCOUNTING MACHINES

308,262

BY A. P. C.

Filed Dec. 8, 1939

4 Sheets-Sheet 1



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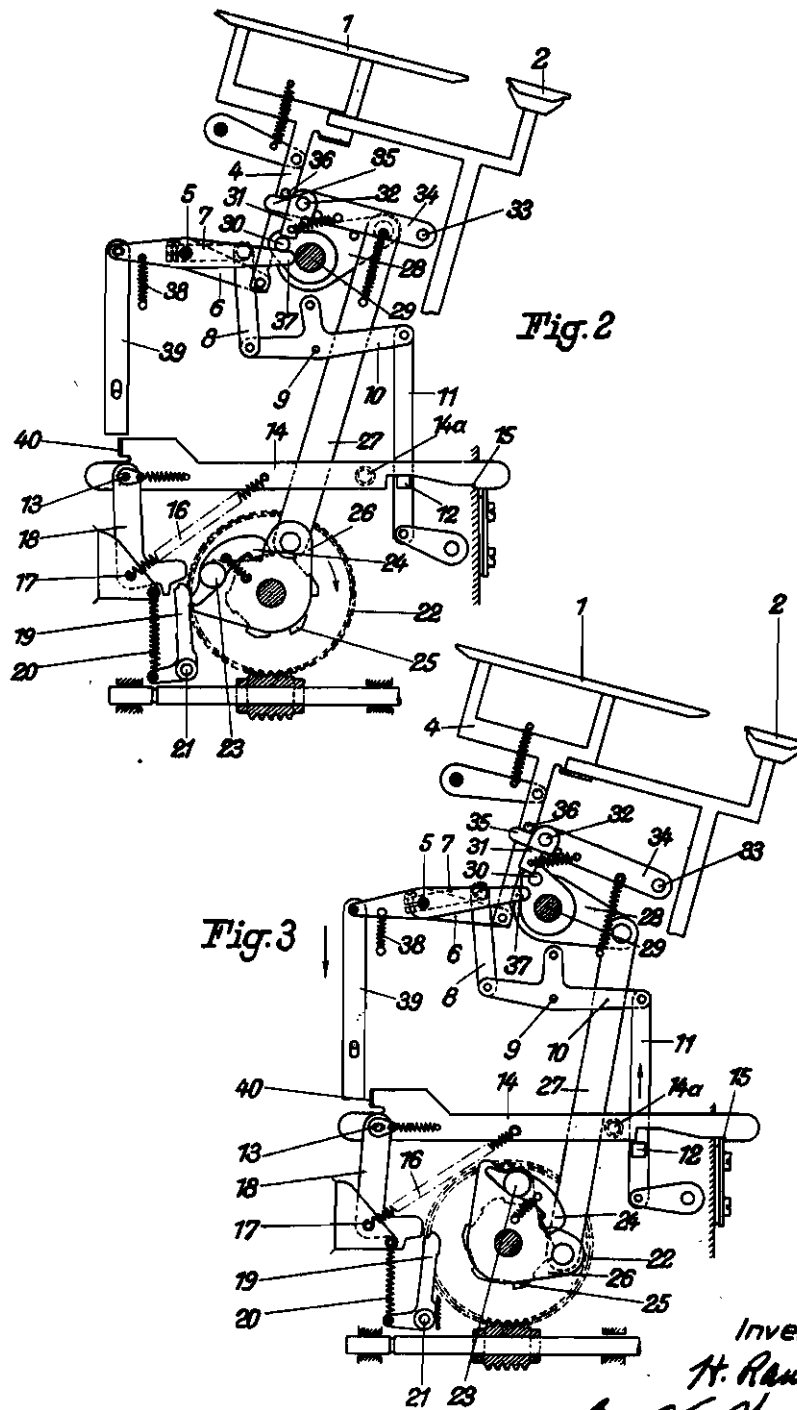


Fig. 2

Fig. 3

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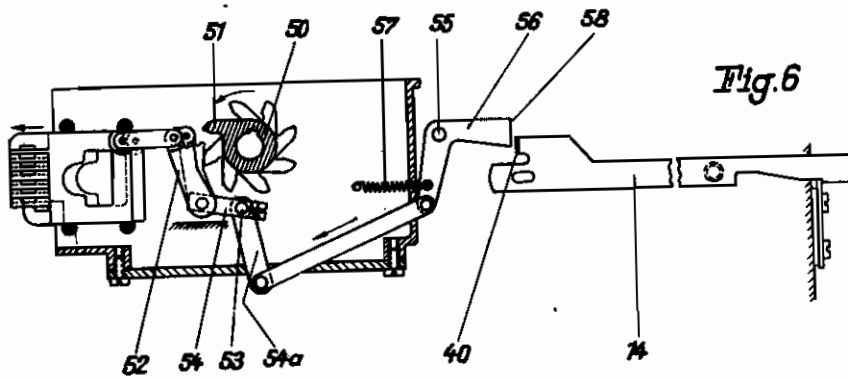
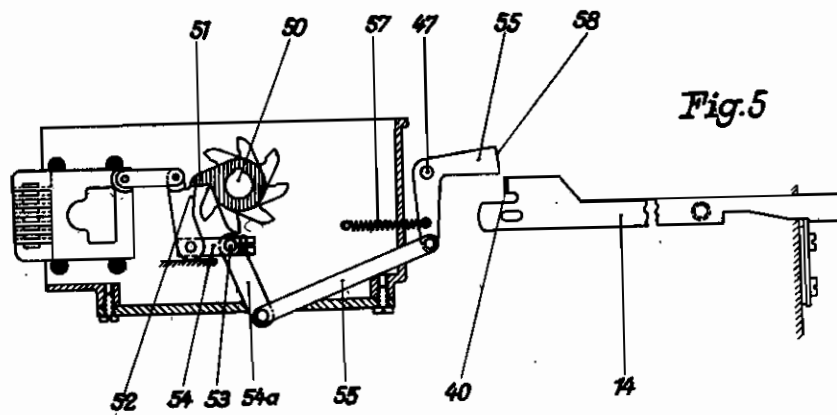
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4 Sheets-Sheet 4

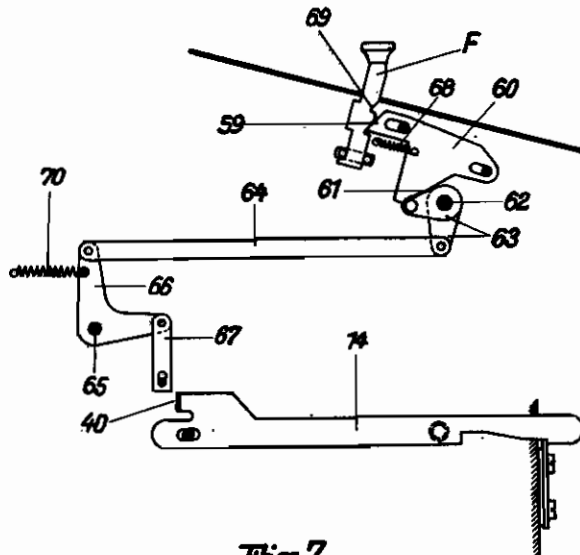


Fig. 7

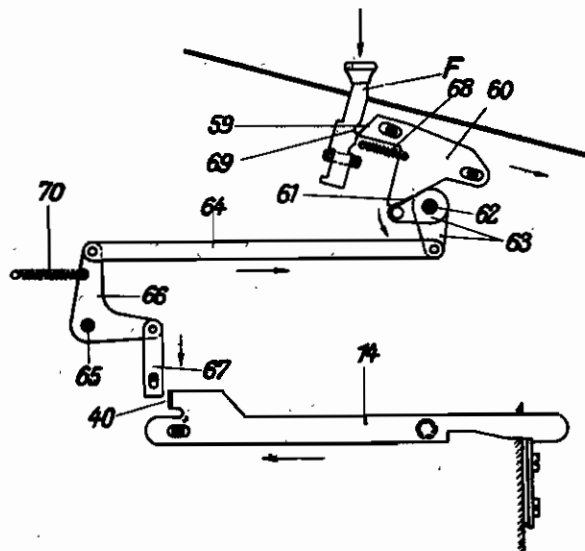


Fig. 8

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ALIEN PROPERTY CUSTODIAN

MOTOR KEY FEEDING FOR ACCOUNTING MACHINES

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Application filed December 8, 1939

In known accounting machines, especially bookkeeping machines, the motor keys are kept locked during the period of an operation in order to avoid disturbances in the machine, so that the motor keys can be connected again only after the expiration of this period. The locking of the motor keys occurs therefore in these known accounting machines

(a) During the feeding period of the calculating shaft,

(b) During the feeding period of the carriage movement,

(c) During the feeding period of the movement of the accumulating mechanism drum,

(d) During the period of the movement of the function keys.

This renders difficult the manipulation of the accounting machine because the calculator must wait each time until the corresponding operation is completed before he actuates a motor key; when a motor key should be depressed prematurely the calculator feels the resistance of the locking so that he becomes unsecure and is disturbed in the actuation of the machine.

The invention has for its object to make it possible that the motor keys, for instance horizontal key, jumping key and vertical key, feed already during the course of the operations of the machine or preliminarily adjust already the next following operating cycle without disturbances occurring in the machine, that is in such a manner that the corresponding operation, for instance the rotation of the calculating shaft, the feeding movement of the carriage or of the accumulating mechanisms or the feeding movement of the function keys, takes place without any serious disturbance, whereupon without renewed depression of the motor keys the fresh operation follows the completed one. In this manner it is possible to operate the machine without hindrance by lockings. The working speed can be increased in spite of the number of rotations of the machine remaining the same.

The solution of this problem is effected in that the locking mechanism, adapted to be disengaged by the motor keys, at the releasing of which the motor transmits the drive, is in turn kept locked by separate locking mechanisms during the different operations until these operations are terminated.

An embodiment of the invention is illustrated by way of example in the accompanying drawings, in which

Figs. 1, 2 and 3 illustrate the additional locking of the locking mechanisms adapted to be released by the motor keys in dependency on the rotation of the calculating shaft,

Fig. 4 shows the additional locking of the locking mechanism adapted to be released by the

motor keys in dependency on the carriage movement,

Figs. 5 and 6 show the additional locking of the mechanism adapted to be released by the motor keys in dependency on the accumulating mechanism drum, whereas

Figs. 7 and 8 show the additional locking mechanism for the locking mechanism adapted to be released by the motor keys in dependency on a function key.

1. The additional locking of the locking mechanism of the motor keys in dependency on the rotation of the calculating shaft.

In Fig. 1 the locking mechanism is shown in elevation which is adapted to be brought by the motor keys into the preparatory position and also the additional locking mechanism which prevents the releasing of the main locking mechanism as long as the calculating shaft revolves.

Figs. 2 and 3 show the gear in similar views but in different intermediate positions.

The horizontal motor key is designated by 1, the vertical motor key by 2 and the jumping over motor key by 3. When any of these keys is actuated from the inoperative position of the machine, a rod 4 is moved downward and oscillates a lever 5 mounted on an axle 5. At the same time a lever 7 pivotally mounted on the same axle 5 is oscillated which lifts, through the intermediary of a link 8 and of a multiarmed lever 10 oscillatable about a pivot pin 9, a link 11 which in turn lifts out of a notch 15, by means of the abutment 12, an oscillatable bar 14 pivotable about a pin 13. This bar 14 can then move to the left under the action of a spring 16 and draw along a bell crank lever 16 pivotally mounted on a pivot pin 17 so that a pawl 19 is oscillated by the action of a spring 20 about its pivot pin 21 and liberates a pawl 24 mounted by means of a spring on a crank 26 and pivotable about a pivot pin 23 so that this pawl 24 can engage into a ratchet wheel 25, thereby completing the coupling between the driving wheel 22 and the driving crank 26. If then, after the coupling the driving crank 26 has moved by 360°, a crank 28 of a calculating shaft 29 is oscillated forward by 90° through the intermediary of a connecting rod 27 and then again oscillated backward by 90°. At the beginning of this oscillating movement a pin 30 on the crank 28, or on a separate crank coupled with this crank 28, engages under the end face of a yieldable pawl 31 which is spring controlled and mounted on a pin 32 of a lever 34 adapted to oscillate about a pin 33. The pawl 31, during the first oscillation by 45° of crank 28, is first positively lifted (position Fig. 3), so that also the depressed motor key is positively returned to its inoperative

position through the intermediary of an extension 35 of the lever 34 against which extension bears a bin 36 of the rod 4. After the crank 28 has terminated this movement through about 45°, the pin 30 moves away from the end face of pawl 31 and thereby releases the lever 34, so that this lever drops into its initial position. During this proceeding the releasing bar 14 has been shifted towards the right into its notched position by the connecting rod 27 through the intermediary of the roller 14a (Fig. 3). It is then possible to again depress the motor key until pin 36 encounters again the abutment 35. At this depressing of the key the bar 14 is again lifted out of notch 15 through the intermediary of the gear 4, 5, 7, 8, 10 and 11 and remains in this lifted out position. It can, however, not yet move sufficiently far towards the left for disengaging the bell crank lever 18 owing to a locking mechanism which prevents this movement. This separate locking mechanism consists of a lever 37 oscillatable about the axle 5 and which, under the action of a pull spring 38, pushes downward a rod 39. As long as the lever 37 is under the action of spring 36, the rod 39 is in the lowered position, so that its lower end is opposite a bent over portion of bar 14. This bar 14 can therefore not shift to the left as long as the rod 39 remains in the lowered position. This takes place during the feeding travel of crank 28. Only when pin 30 during the backward movement of the crank into its inoperative position (Figs. 1 and 2) strikes against the lever 37 and oscillates the same in downward direction, the rod 39 is lifted and liberates the bar 14 so that, if this bar had been previously lifted out of notch 15, it can now shift to the left and effect a fresh feeding of the calculating shaft.

The auxiliary gear which maintains locked the main locking mechanism of the motor drive during the movement of the calculating shaft consists therefore of an auxiliary slide adapted to be brought into the path of the main locking slide.

In accurately the same manner other auxiliary slides, which get into the path of the main locking bar 14, are provided in order to prevent releasing of the motor drive during the movement of the carriage, the movement of the accumulating drum and the movement of the function keys.

II. The locking of the mechanism for releasing the motor in dependency on the carriage movement

As can be seen from the top plan view shown in Fig. 4, a pawl 41 securely holds the carriage on the stop 42 in the actual position. This pawl presses then an axle 43 into the extreme position shown in Fig. 4. In this extreme position a bell crank lever 44 oscillatable about a pin 45 and coupled with the pawl by a rod 43a is held in the position shown in full lines. This bell crank lever 44 engages on a rod 46. If the pawl 41 is pulled out of the path of the stops (Fig. 4, position shown in dash dot lines) the stop 42 jumps upwards into the position shown in dash dot line and oscillates the lever 44 also into the position shown in dash dot lines, that is, the bar 46 is pulled to the left in the direction of the arrow shown in Fig. 4. In Fig. 1 this rod 46 is shown in elevation. It engages in turn on a bell crank lever 48 oscillatable about a pin 47, the end face 49 of the horizontal arm of this bell crank lever being situated according to its posi-

tion in or outside the path of the bent over end 40 of bar 14.

When the pawl 41 is in the position shown in dash dot lines the bell crank lever 48 is also in the position shown in dash dot lines so that its end face 49 is in the path of the bent over end 40, as the slidable locking bar 14 cannot shift to the left and consequently the motor cannot yet be released. Only when the carriage has jumped to the next following column, in which an other stop bears against pawl 41 and presses this pawl into the position shown in Fig. 4 in full lines, the end face 49 of the bell crank lever 48 has been lifted out of the path of the bent over end 40, so that the new calculation operation can be carried out, as the bar 14 has been liberated by the previously depressed motor key.

III. The locking of the releasing mechanism of the motor in dependency on the movement of the accumulating mechanism drum

As can be seen from Figs. 5 and 6, a cam drum 50 rotates with the accumulating mechanism drum until a cam 51 strikes against a coordinated abutment 52. At the beginning of the movement of the accumulating drum, the abutments 52, as is known, are removed from the path of the cam drum 50 (Fig. 6). An angle lever 54, 54a, oscillatable about a pin 53, is coupled with the group of abutments 52. As long as one of the abutments 52 is depressed by a cam 51 of cam drum 50, the angle lever 54, 54a and a rod 55 are in the position shown in Fig. 5 and thus holds the end face 56 of a bell crank lever 56, pivotable about a pin 47, in opposition to the action of a spring 57, out of the path of the bent over end 40 of the main locking bar 14. If at the beginning of the rotation of the accumulating mechanism the abutments 52 are removed from the path of cam 51 (as shown in Fig. 6), the angle lever 54, 54a is oscillated about pin 53, whereby the bell crank lever 56 suddenly moves into the position shown in Fig. 6, in which its end face 58 is on the path of the bent over end 40 of the main locking bar 14, so that this bar cannot move towards the left, and consequently during the movement phase of the accumulating mechanism drum no fresh calculation can be carried out.

IV. The locking of the releasing mechanism of the motor in dependency on the movement of a function key

As can be seen from Fig. 7, which shows an inoperative position and from Fig. 8 which shows an intermediate position, a function key, for instance F when depressed, pushes a slide 60 towards the right by means of its inclined face 59. This slide oscillates by its inclined face 61 a bell crank lever 63 oscillatable about pin 62. This bell crank lever oscillates, through the intermediary of a connecting rod 64, a bell crank lever 66 oscillatable about a pin 65, and thereby lowers a slide 67 so that the lower edge of this slide, during the depression of the function key F, gets into the path of the bent over end 40 of the main locking bar 14. As soon as the function key has been pressed into its lowest position, the slide 60 can suddenly engage, under the action of its tension spring 66, into the notch 69 of the function key provided for this purpose and thus liberate again the angle lever 63, so that under the action of the spring 70 the slide 67 is again pulled out of the path of the main locking bar 14.

HERMANN RAUH.