Dec. 25, 1951 G. W. HOPKINS ET AL 2,580,298

AUTOMATIC STOP FOR CALCULATING MACHINES

Filed Sept. 7, 1946 3 Sheets-Sheet 1

FIG. 1

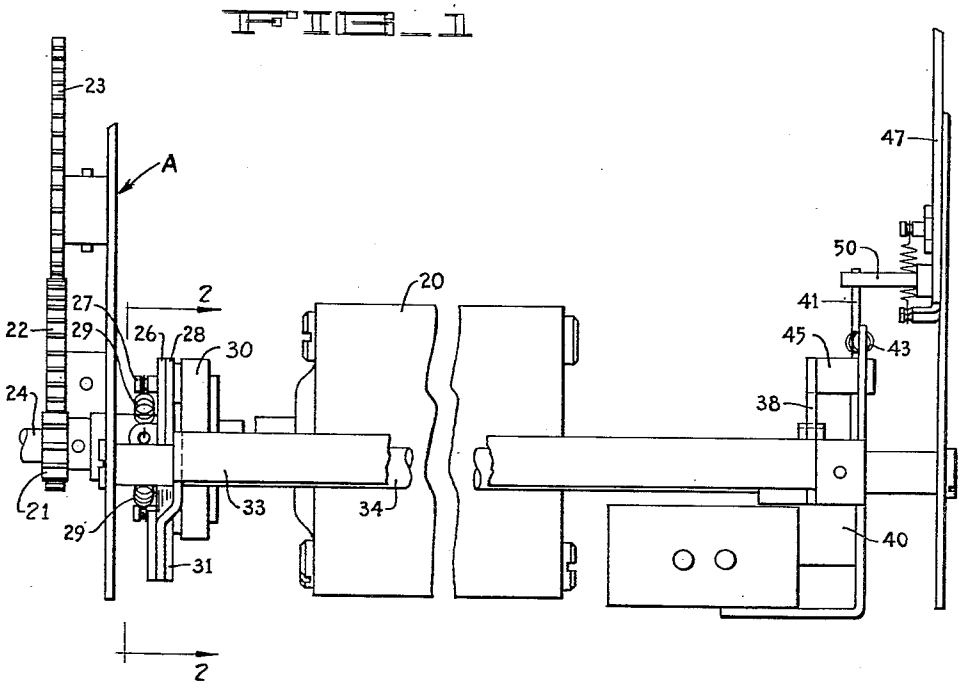
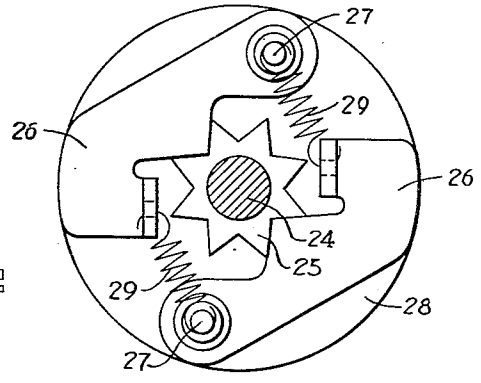


FIG. 2



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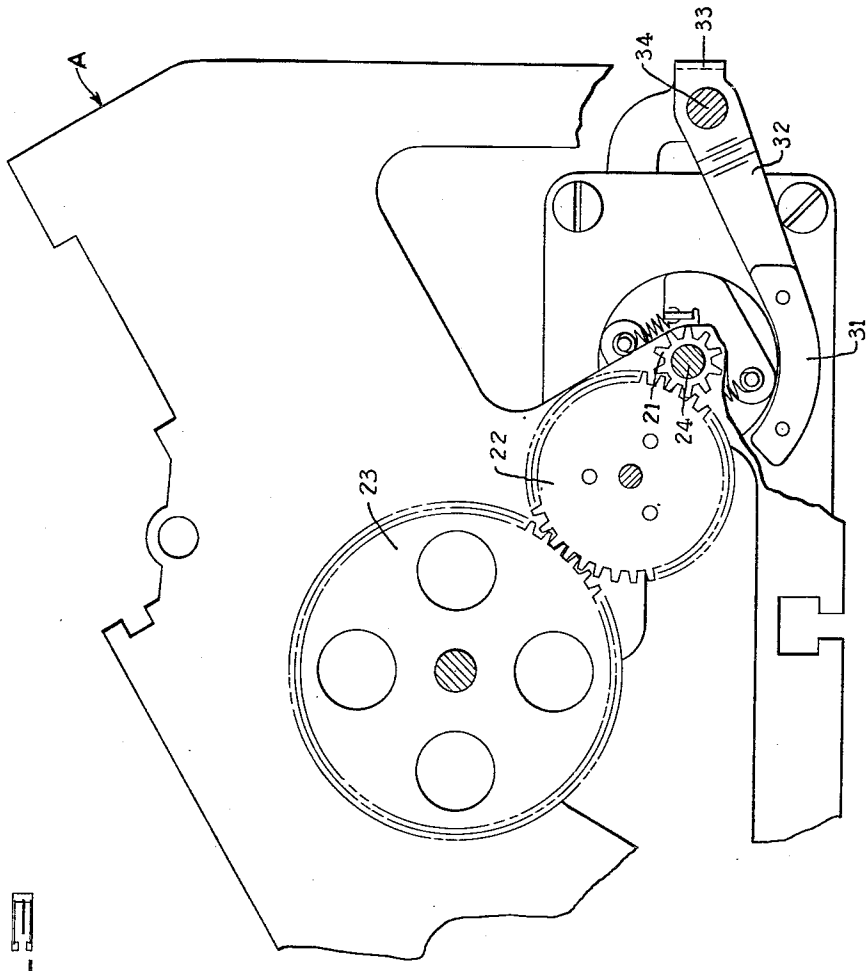


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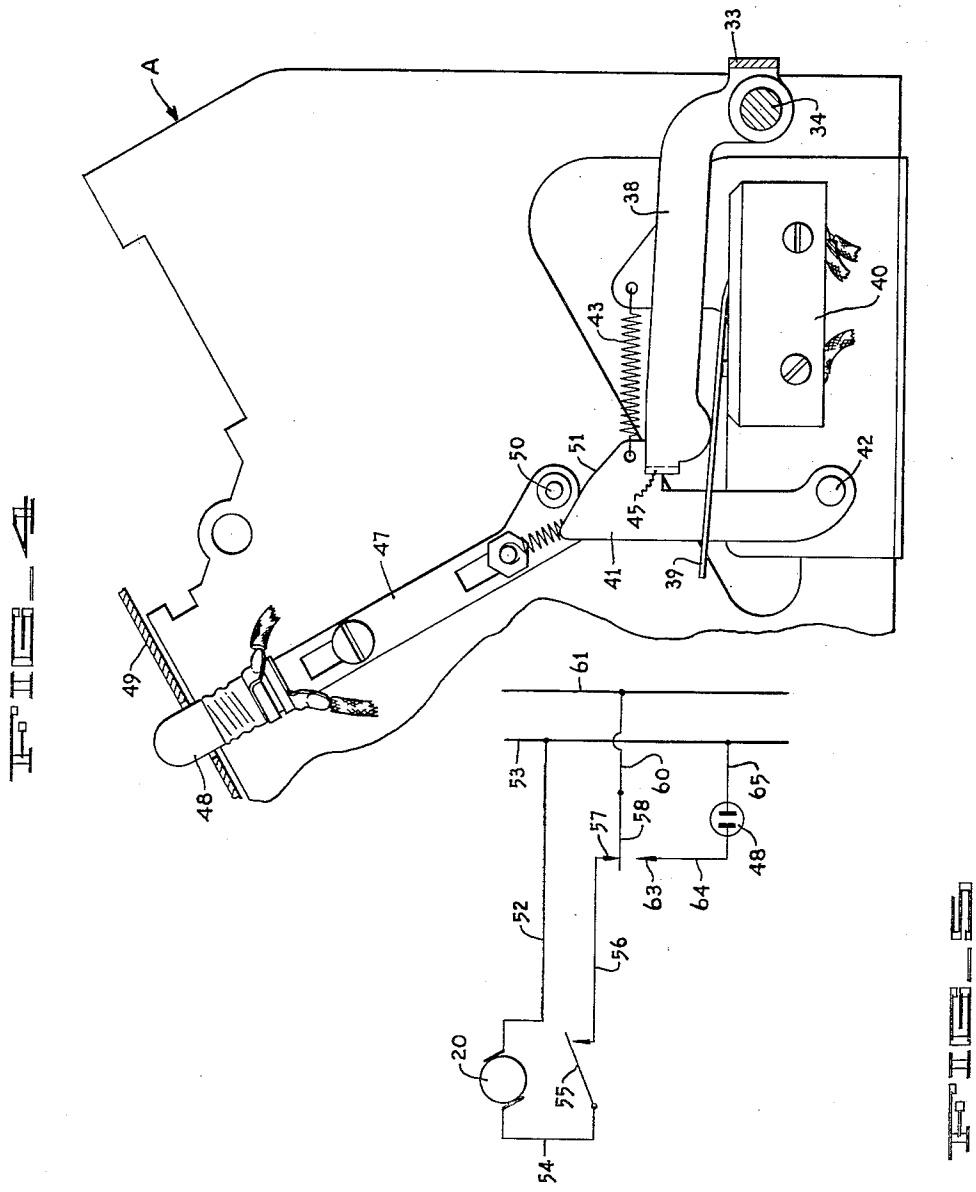


FIG. 4

FIG. 5

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AUTOMATIC STOP FOR CALCULATING MACHINES

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Application September 7, 1946, Serial No. 695,364

8 Claims. (Cl. 318—475)

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This invention relates to calculating machines and particularly to the drive mechanism thereof.

The object of the invention is to provide means for automatically stopping the motor when the mechanism of the calculating machine becomes locked or jammed.

In the drawings:

Figure 1 is a rear elevation of the mechanism.

Figure 2 is a section of the clutch taken on the line 2—2 in Figure 1.

Figure 3 is a side elevation.

Figure 4 is an elevation of the switch and starting key.

Figure 5 is a wiring diagram.

The mechnaism of this invention is adapted to be employed in an office machine, e. g., a calculating machine of the type disclosed in the patent to Friden 2,229,889 issued January 28, 1941, in which all of the parts are mounted on a frame A. In machines of that type the power for operating the calculating mechanism is derived from an electric motor 20 (Fig. 1) which rotates a pinion 21 through means presently to be described. The pinion 21 (Fig. 3) meshes with an intermediate gear 22 which drives gear 23 which is secured to the driving side of a pawl and ratchet clutch (not shown). As disclosed in the aforementioned patent, upon depression of an operation control key the motor switch is closed, causing the motor to start, and the clutch is engaged thereby causing rotation of the main drive shaft.

In accordance with this invention, the motor 20 drives the pinion 21 (Fig. 1) through a yieldable clutch shown in detail in Figure 2. The pinion 21 is secured to a shaft 24 suitably mounted in the frame, and the shaft 24 has a star wheel 25 (Fig. 2) secured thereto. A pair of drive and trip pawls 26 pivoted at 27 on a disc 28 are normally held in engagement with the teeth of the star wheel 25 by means of springs 29. The disc 28 is rotatably mounted on the shaft 24 and is connected by a conventional coupling 30 (Fig. 1) to the armature shaft so that the disc 28 is the driving member of the clutch and the star wheel 25 is the driven member. The tension of the springs 29 is such that sufficient torque will be transmitted from the disc 28 through the pawls 26 to the star wheel 25 to operate the calculating mechanism. However, in the event that any power driven part of the calculating mechanism is prevented from operating, or becomes locked, the pawls 26 yield and rock outwardly from the star wheel 25. In so doing, they engage a shoe 31 on an arm 32 of a bail 33 pivoted on a tie rod 34 rocking the bail counter-clockwise as viewed in Figure 3. The bail 33 has an arm 38 (Fig. 4) which moves the spring leaf 39 of a microswitch 40 downwardly. As will presently appear, the switch 40 is in series with the main motor switch

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so that the motor circuit is opened and the motor stopped.

The switch 40 is held open by a latch 41 pivoted at 42 and urged clockwise by a spring 43 which urges the latch into engagement with an ear 45 on the arm 38. As long as the arm 38 is latched down it is impossible to start the machine by any of the regular operation control keys. In order to re-start the machine, a key 47 is provided which is slidably mounted on the frame. The key 47 has a small electric lamp 48 secured to the top thereof and projecting through an aperture in the cover 49 of the machine. The lamp serves as the key top. The switch 40, when operated by the bail 38 as previously described, causes the lamp 48 to light as an indication to the operator that the machine has locked and the motor has stopped. The operator may then depress the key 47 which has a pin 50 therein which engages the upper inclined cam edge 51 of the latch 41 and rocks it counter-clockwise on its pivot 42 thereby releasing the ear 45 so that the bail 33 may rotate clockwise to its original position. When this occurs the motor is restarted.

The wiring diagram is shown in Figure 5 where the motor 20 is connected by a line 52 to one side 53 of the power supply. The other side of the motor is connected by a line 54 to the main motor switch 55 which is connected by a line 56 to a normally closed pair of contacts 57, 58. Contact 58 is connected by a line 60 to the other side of the power supply 61. The contacts 57, 58 are in the microswitch 40 and when the leaf 39 is moved downwardly, the contact 58 is removed from the contact 57 and is placed in engagement with the contact 63 which is connected by a line 64 to the lamp 48 which is connected by a line 65 to the power supply line 53. Thus it will be seen that even though the switch 55 is held closed, whenever the arm 38 (Fig. 4) is rocked counter-clockwise, the motor circuit is broken and the lamp circuit is established. When the arm 38 is unlatched the motor circuit is re-established and the lamp is extinguished.

One of the advantages of this invention is that the objectionable noise caused by conventional safety clutches is eliminated. Another advantage is that many service troubles may be corrected by the operator himself because very often the calculating machine can be unlocked by disconnecting the electric cord and re-connecting it. Also, with the conventional safety clutch the driving force is continuously applied thereby tending to aggravate the locked condition, while in accordance with this invention, if parts of the calculating mechanism are jammed the force which is tending to jam them tighter is immediately removed so that they may unlock of their own accord.

We claim.

1. In a device of the character described, a power supply, a motor, a lamp, a driven means, means for connecting said motor to said power supply including a normally closed switch, means for connecting said lamp to said power supply including a normally open switch, means for transmitting torque from said motor to said driven means including a yieldable clutch, means operated by said clutch upon yielding thereof for opening said normally closed switch and closing said normally open switch, a latch operable in response to operation of said clutch operated means for releasably holding said clutch operated means in operated position, and a depressible key for releasing said latch, said lamp serving as the key top of said key.

2. In an office machine, a frame, power operable mechanism mounted on said frame, a motor mounted on said frame, means for connecting said motor to a power supply including a normally closed switch mounted on said frame, a manually operable resetting member mounted on said frame, a signal light so mounted on said member as to serve as a finger piece for manual resetting operation of said member, a normally open switch mounted on said frame and being in circuit with said signal light, means mounted on said frame and being responsive to overloading of said motor for opening said normally closed switch and closing said normally open switch, and means mounted on said frame and being actuatable by manual operation of said member for resetting said normally closed switch to closed position and resetting said normally open switch to open position.

3. In a calculating machine, calculating mechanism, a motor for driving said mechanism, a cover for said motor and said mechanism and having an aperture, means for connecting said motor to a power supply including a normally closed switch, a manually operable resetting member disposed under said cover, a signal light so mounted on said member as to extend upwardly through said aperture to serve as a finger piece for manual resetting operation of said member, a normally open switch in circuit with said signal light, means responsive to overloading of said motor for opening said normally closed switch and closing said normally open switch, and means actuatable by manual operation of said member for resetting said normally closed switch to closed position and resetting said normally open switch to open position.

4. In an office machine, a frame, power operable mechanism mounted on said frame, a motor mounted on said frame, means including a normally closed switch mounted on said frame for connecting said motor to a power supply, a signal lamp mounted on said frame, means including a normally open switch mounted on said frame for connecting said lamp to a power supply, a member mounted on said frame and being operable in response to overloading of said motor for opening said normally closed switch and closing said normally open switch, and a spring-urged latch mounted on said frame for automatically engaging said member when the latter is operated and holding it in its operated position.

5. In an office machine, a frame, power operable mechanism mounted on said frame, a motor mounted on said frame, means including a normally closed switch mounted on said frame for connecting said motor to a power supply, a

member mounted on said frame and being operable in response to overloading of said motor for opening said switch, a spring-urged latch mounted on said frame for automatically engaging said member when the latter is operated and holding it in its switch-opening position, an inclined cam edge on said latch, and a resetting element mounted on said frame and having a part engageable with said cam edge for disengaging said latch from said overload-responsive member.

6. In an office machine, a frame, power operable mechanism mounted on said frame, a motor mounted on said frame, means including a normally closed switch mounted on said frame for connecting said motor to a power supply, a signal lamp mounted on said frame, means including a normally open switch mounted on said frame for connecting said lamp to a power supply, a member mounted on said frame and being operable in response to overloading of said motor for opening said normally closed switch and closing said normally open switch, a spring-urged latch mounted on said frame for automatically engaging said member when the latter is operated and holding it in its operated position, an inclined cam edge on said latch, and a resetting element mounted on said frame and having a part engageable with said cam edge for disengaging said latch from said overload-responsive member.

7. In a device of the character described, a motor, driven means, an overload release clutch for transmitting drive from said motor to said means and having a trip element normally set in non-tripping position but being movable to tripping position in response to overloading of said motor, a normally closed switch for connecting said motor to a power supply, a rockable bail, a part associated with said bail and being engageable by said trip element when the latter is in tripping position for rocking said bail, and a part operated by rocking of said bail for opening said switch.

8. In a device of the character described, a motor, driven means, an overload release clutch for transmitting drive from said motor to said means and having a trip element normally set in non-tripping position but being movable to tripping position in response to overloading of said motor, a normally closed switch for connecting said motor to a power supply, a rockable bail, an arm on said bail engageable with said trip element when the latter is in tripping position for rocking said bail, a second arm on said bail responsive to rocking thereof for opening said switch, and a latch for holding said second arm in its switch-opening position.

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