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AUTOMATIC CUTOFF SWITCH FOR TYPEWRITERS

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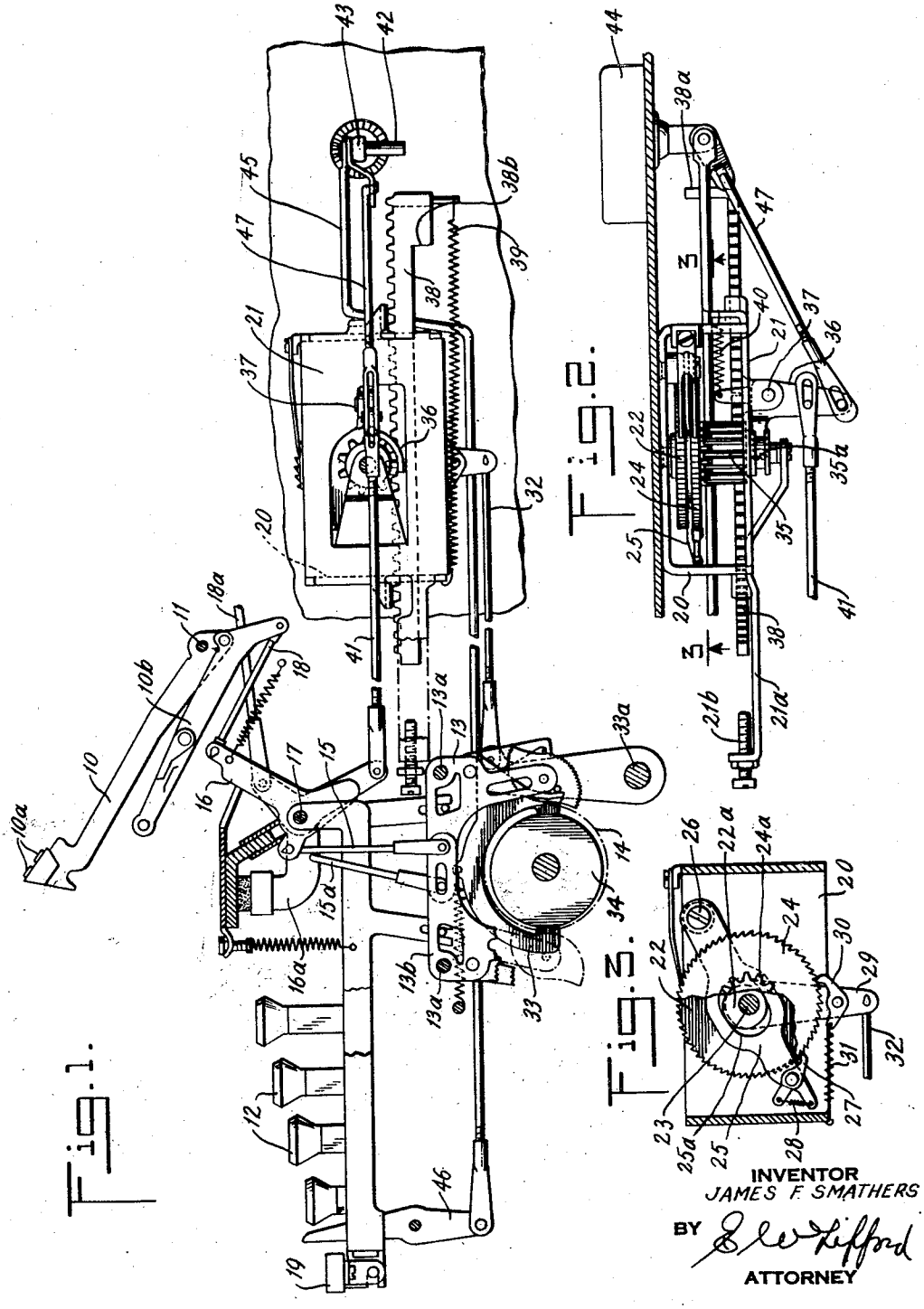


Fig. 1.

Fig. 2.

Fig. 3.

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AUTOMATIC CUTOFF SWITCH FOR TYPEWRITERS

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4 Claims. (Cl. 197—17)

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This invention relates to typewriting machines.

The invention is primarily concerned with improving power operated typewriting machines to the extent of providing means for reducing to a minimum the power loss arising from leaving the machine unattended for appreciable lengths of time without placing the main switch in the "off" position.

An object is to provide a timing device which will automatically stop the driving motor of the typewriter if the typist goes away and leaves the machine unattended for longer than predetermined lengths of time.

An object is to provide an automatic cut-out device for power operated typewriting machines which is simple and reliable in its operation, and which does not interfere with the normal use of the machine.

An object is to provide an automatic cut-out device which is automatically disabled as soon as the operator resumes use of the machine after leaving the machine unattended or failing to operate it for a period less than the cut-off period.

Other objects of the invention will be pointed out in the following description and claims and illustrated in the accompanying drawings, which disclose, by way of example, the principle of the invention and the best mode, which has been contemplated, of applying that principle.

In the drawings:

Fig. 1 is a vertical section of a typewriting machine incorporating the present invention.

Fig. 2 is a plan view of the cut-off mechanism.

Fig. 3 is a vertical section on the line 3—3 of Fig. 2.

Fig. 1 illustrates the keyboard and power operating mechanism of a well-known form of power operated typewriter. It will be understood, however, that the invention is not limited to this particular form of typewriter, but may be used in any power operated typewriter with suitable modifications not affecting the principle of the invention.

The power operated typewriter includes a typical type bar 10 pivotally mounted on the fulcrum wire 11 which is usually carried by some form of segment mounted for case shifting operation to select either of the two types 10a on the type bar 10. The type bars are operated by power mechanism controlled by the character keys 12 which control cam units 13 in a well-known way to render the cam units operative by the power roller 14, shown in outline form by dot-dash lines. Each cam unit is pivotally mounted on one of two pivot wires 13a and is connected by

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a link 15 to a sub-lever 16 pivoted on a fulcrum wire 17 suitably mounted in the framework of the machine. The type bars 10 are connected to the sub-levers 16 by means of links 18 and toggles 10b.

The depression of a character key 12 renders the cam units 13 operative in a well-known way by the power roller 14, resulting in the links 15 being drawn downwardly and rocking the sub-lever 16 counterclockwise thereby drawing the link 18 to the left and actuating the type bar 10 to printing position.

The space bar or key 19 controls a cam unit 13b similar to the cam units 13 and this cam unit 13b is connected by a link 15a to a lever 16a also pivoted on the wire 17. Through a link connection 18a between the lever 16a and the usual carriage escapement mechanism (not shown), the cam unit 13a operates the escapement mechanism to space the platen carriage (not shown) each time the space bar 19 is depressed. The use of the space bar in the normal operation of the machine is utilized in the present instance as a means of disabling the automatic cut-off mechanism.

The cut-off mechanism consists of a unit suitably mounted in the main framework of the machine and includes the U-shaped frame 20 to which is secured the plate 21 to form a box-shaped housing for the timing mechanism. The timing mechanism includes a first ratchet 22 which is loose on a short stud 23 carried by the U-shaped frame 20 and the plate 21. Mounted alongside the ratchet 22 is a second ratchet 24 also loose on the stud 23. Fixed to the side of the ratchet 22 confronting the ratchet 24 is an eccentric cam 22a rotatable within an oval opening 25a in a lever 25 pivoted on the stud 26 carried by the frame 20. As a result of this construction, the lever 25 is oscillated on the stud 26 once for each revolution of the ratchet 22.

Pivotally mounted on the free end of the lever 25 is the pawl 27 which is urged into engagement with the teeth of the ratchet 24 by a spring 28. The throw of the eccentric 22a is such that the ratchet 24 will be advanced one tooth space for each full revolution of the ratchet 22 and thus constitutes a reduction gearing causing the ratchet 24 to travel at a relatively slow rate compared to the ratchet 22. The latter is actuated by an arm 29 pivoted on the stud 23 and carrying a pawl 30 engaged with the ratchet 22 by a spring 31 anchored to the tail of the pawl 30 and to the frame 20. This spring also helps to restore the arm 29. The arm 29 is connected

by a link 32 to a yoke-shaped cam follower lever 33 pivoted at 33a in the framework. The two arms of the cam follower lever 33 engage diametrically opposite sides of an eccentric cam 34 fixed to the shaft of the power roller 14.

It is apparent that the arm 29 will be oscillated continually while the power roller 14 is in operation and the cam 34 is proportioned so that the racket 22 will be advanced one tooth-space for each revolution of the power roller 14.

Fixed to the side of the ratchet 24 is a pinion 24a which acts as one member of a clutch, the other member consisting of a pinion 35 loose on the stud 23 and cut so that its teeth extend beyond the body of the pinion 35 into the tooth spaces of the pinion 24a. The pinion 35 has a circumferential groove 35a engaged by one arm of a shift lever 36 pivoted at 37 on a lug formed in the plate 21. When the lever 36 is actuated in a counterclockwise direction (Fig. 1) the projecting ends of the teeth of pinion 35 become disengaged from the pinion 24a and permit the pinion 35 to run free of the ratchet 24.

The pinion 35 constantly meshes with a rack 38 which is suitably guided in the frame 20 and normally urged to the left by a spring 39 anchored to a pin carried by the right-hand end of the rack 38. The plate 21 is provided with an extension having an adjusting screw 21b which may be used to regulate the length of the cut-off cycle. When the lever 36 is actuated as aforesaid, the pinion 35 is freed from the ratchet 24a permitting the spring 39 to draw the rack to the left until it engages the screw 21b. Normally the spring 40 holds the lever 36 in the position of Fig. 2, maintaining clutch engagement between the pinion 24a and the pinion 35, whereby the rack 38 will be progressively advanced to the right (Figs. 1 and 2) as long as the machine is in operation.

The lever 36 has a link connection 41 to the lever 16a which rocks counterclockwise in Fig. 1 each time the space bar or key 19 is operated. This causes the link 41 to be thrust to the right thereby disengaging the pinion 35 from the pinion 24a. Thus, during the course of normal operation of the machine, the rack 38 will never be advanced more than a few tooth-spaces to the right before it will be withdrawn by the spring 39 to starting position in contact with the stop screw 21b.

If the machine is left unattended for longer than a predetermined length of time, however, the rack 38 will continue to advance to the right to the limit of its travel and at that point will actuate the motor switch to stop the driving motor for the machine. This is effected by a lug or pin 38a projecting from the side of the rack 38 in a position to engage a pin 42 carried by the arm 43 of a toggle switch 44. The pin 43 is connected by a link 45 with the manual switch lever 46 and also is connected by a link 47 with the lever 36. The drawings show the switch in the "on" position with the motor running and under these conditions the engagement of the pin 38a with the pin 42 will result in actuating the switch lever 43 to the right or counterclockwise in Fig. 2, to the "off" position, thereby interrupting current to the driving motor of the typewriter. When this happens, the link 47 actuates the shifter lever 36 to disengage the pinion 35 from the pinion 24a and holds it in this position to prevent the cut-off device starting from a partly operated position or one in which it would prevent the turning of the switch

44 to the "on" position. This link also releases the rack when the switch is turned "off" manually.

It is apparent from the foregoing description that if the machine is left unattended, the rack 38 will be progressively advanced to the right and after a time delay dependent upon the reduction effected through the ratchets 22, 24 and the pinion 35, switch 44 will be actuated to the "off" position automatically and stop the machine. However, if the operator resumes operation of the machine while the cut-off cycle is in progress, the pinion 35 will be disengaged from the pinion 24a and restart the timing cycle each time the space bar is operated. This, on the average, will take place approximately every five character key operations in normal typing.

The reduction is designed so that the timing cycle is long enough to permit a short interruption by the typist, such as a telephone conversation of short duration, without shutting off the motor, but is short enough so that if the stenographer is called away on an errand and forgets to turn off the switch, the machine will be stopped within a minute or two, the length of the cut-off cycle depending upon the number of teeth in the ratchets 22, 24, the pitch diameter of pinion 35, and the adjustment of the screw 21b. This cycle may be adjusted to suit the conditions under which the machine is used. If desired, the adjusting screw 21b may be omitted and the rack 38 may be stopped in a fixed position as, for example, by the part 38b thereof engaging the side of the frame 20.

While there have been shown and described and pointed out the fundamental novel features of the invention, as applied to a preferred embodiment, it will be understood that various omissions and substitutions and changes in the form and details of the device illustrated and in its operation may be made by those skilled in the art without departing from the spirit of the invention. It is the intention, therefore, to be limited only as indicated by the scope of the following claims.

What is claimed is:

1. In a typewriting machine, a power actuator, a power unit, a manual device for coupling the power unit to said power actuator, a main switch for stopping said actuator, a member movable from a starting position to a position for operating said switch; a reduction gear enabling said actuator to drive said member at a reduced speed from said starting position to said switch operating position, including a first ratchet and pawl device actuated by said actuator and a second ratchet and pawl device actuated by the first ratchet and pawl device and actuating said member; a clutch connecting said second ratchet and pawl device to said member and released by an operation of said power unit, and means to restore said member to starting position when said clutch is released.

2. In combination with a power operated typewriter having a main power actuator, a switch for controlling the actuator, and a manually controlled power device actuated by the main actuator; a switch operating member having a stroke from a closed switch position to a position in which said switch is actuated to open position, means operated by said actuator for driving said member to open switch position at a definite time rate, means controlled by the power device for disabling the driving means and restoring said member to closed switch position, and a manual

device for opening said switch and operating the disabling means.

3. In a typewriting machine, a device to be operated, a main power operator, a manual device for connecting said first device to the power operator for operation by the latter, a main switch for controlling the main operator, a timing device actuated by said main operator and having means to operate said switch after a predetermined period of time to stop said main operator, means controlled by said manual device for disabling said timing device each time said manual device is operated, and a connection from said switch to said disabling means to temporarily disable the timing device when the switch is opened.

4. In a typewriting machine, a power actuator, a power unit, a manual device for coupling the power unit to said power actuator, a main switch for stopping said actuator, a timing device including an element actuated by said actuator toward a position in which said switch is opened to stop operation of said power actuator and including a clutch released by the power unit for disabling said element to prevent operating said switch, and a clutch releasing connection between the switch and the clutch to restart the timing cycle each time the switch is opened.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,549,101	Wales	Aug. 11, 1925
1,557,457	Hawley	Oct. 13, 1925
1,667,773	Degener	May 1, 1928