

Jan. 12, 1954

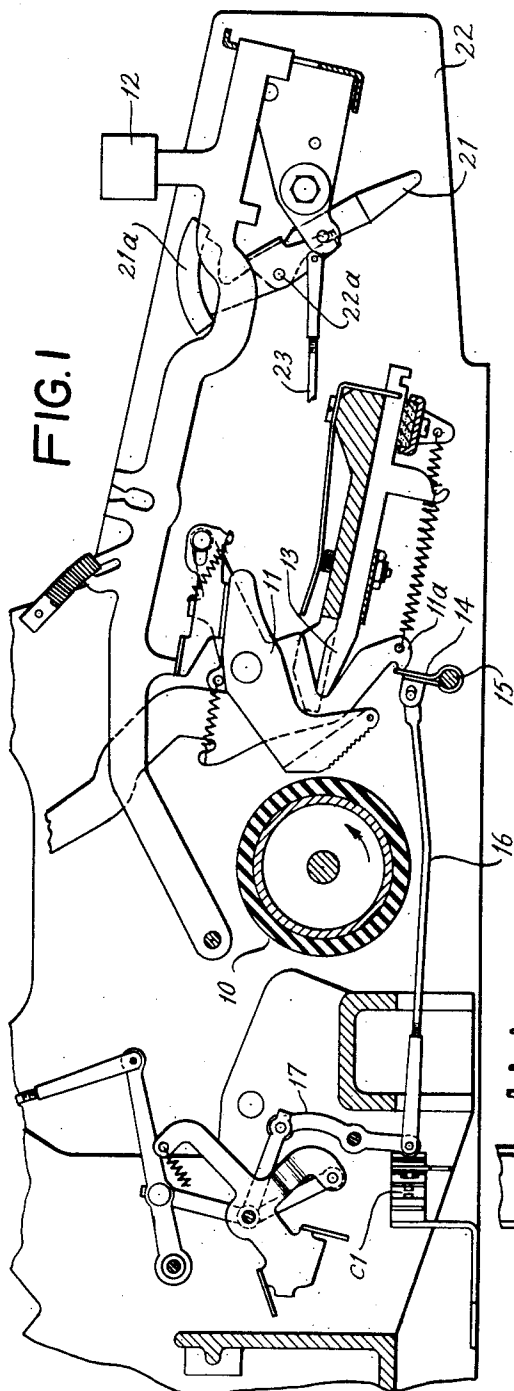
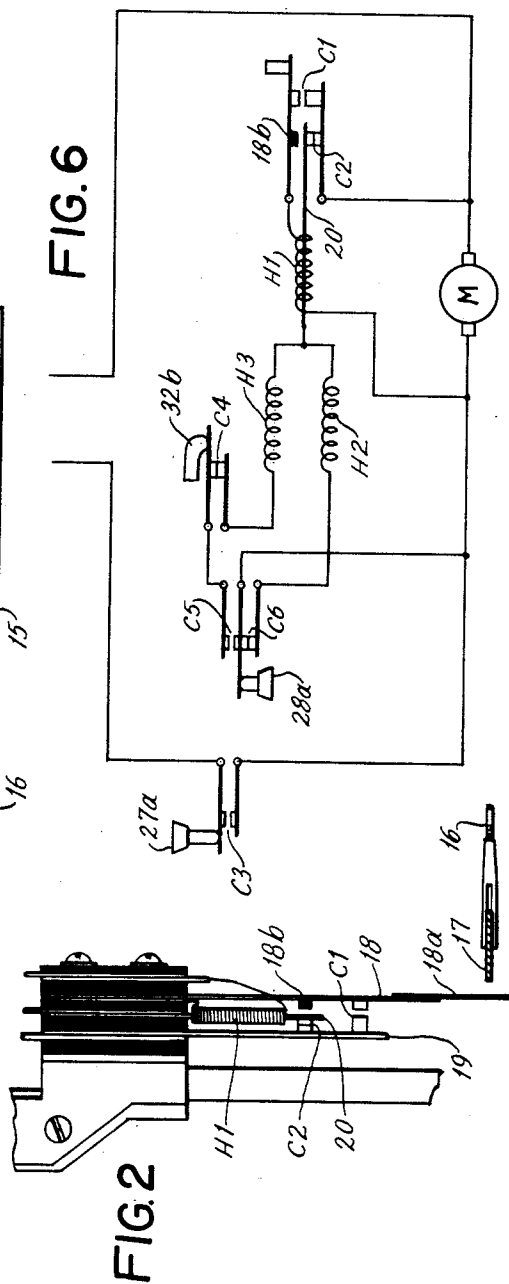
K. R. STAUSS

2,665,792

TYPEWRITING MACHINE HAVING AUTOMATIC CUTOFF SWITCH

Filed Oct. 27, 1950

2 Sheets-Sheet 1



INVENTOR
K. R. STAUSS
BY *Brewer*
ATTORNEY

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2 Sheets-Sheet 2

FIG. 4

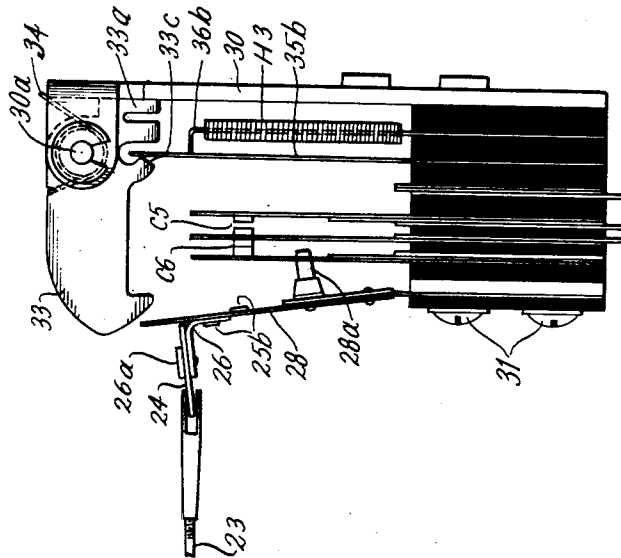


FIG. 5

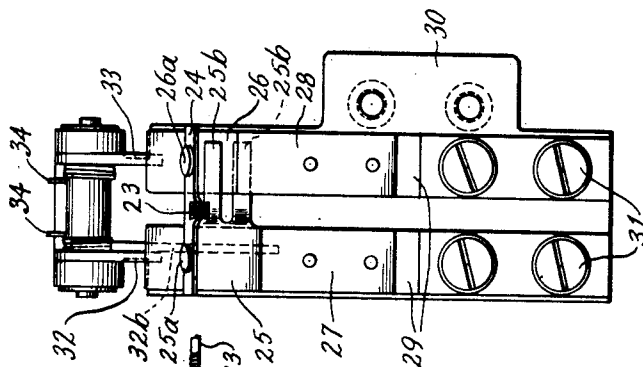
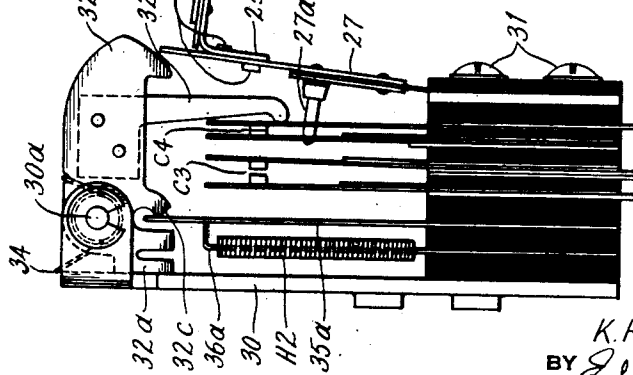


FIG. 3



INVENTOR
K. R. STAUSS
BY *[Signature]*
ATTORNEY

UNITED STATES PATENT OFFICE

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TYPEWRITING MACHINE HAVING AUTOMATIC CUTOFF SWITCH

Karl R. Stauss, Poughkeepsie, N. Y., assignor to
International Business Machines Corporation,
New York, N. Y., a corporation of New York

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11 Claims. (Cl. 197—17)

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This invention relates to typewriting machines. The broad object of the present invention is to improve power operated typewriters.

An object is to provide a means of automatically stopping the driving motor of a power operated typewriter if the machine remains unattended for longer than a predetermined period.

An object is to provide a simple and reliable thermal cut-out switch for controlling the driving motor of a power operated typewriter.

An object is to provide a thermal cut-out switch in which the automatic switch opening function is combined with the manual control of the switch to enable the machine to be started and stopped by hand independently of the thermal control.

The invention mainly consists in the provision of a combination of thermo-responsive elements which become automatically effective to interrupt the circuit to the driving motor when the machine is left idle with the main switch closed for longer than a predetermined time.

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 through a portion of a power operated typewriter embodying the present invention.

Fig. 2 is a plan view of the contact mechanism which is responsive to activity of the typewriter.

Fig. 3 is a front elevation of the cut-out switch.

Fig. 4 is a rear elevation of the cut-out switch.

Fig. 5 is a right side elevation of the cut-out switch.

Fig. 6 is a wiring diagram of the invention.

The invention is shown as applied to a power operated typewriting machine of the type disclosed in application Serial No. 752,723, filed June 5, 1947, by Ronald D. Dodge and issued as U. S. Patent No. 2,506,444, May 2, 1950. It will be understood, however, that it is not limited to the machine chosen for purposes of illustration of the invention, but may be applied to other power operated typewriters equally as well.

In machines of the type disclosed in the aforementioned application, there is provided a power roller 10 which is driven continually in the direction of the arrow (Fig. 1) by a suitable driving motor which in the present case is shown diagrammatically in Fig. 6 and designated M. Co-operating with this power roller are power units like the one designated 11 in Fig. 1 which are con-

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trolled by keys like 12. These keys, when depressed, render the power units 11 operative by the power roller 10 and each power unit 11 is actuated in a clockwise direction about the left-hand end of the fulcrum member 13 as a pivot. The power units 11 have extensions 11a for actuating a universal bar 14 on the cross rod 15 through a link connection 16. The universal bar 14 actuates a lever 17 which is part of the mechanism for operating the ribbon vibrator. This mechanism is disclosed in application Serial No. 756,174, filed June 21, 1947, by Ronald D. Dodge and issued as U. S. Patent No. 2,616,547, November 4, 1952.

In the present case, the ribbon vibrator mechanism is of interest only to the extent that the link 16 and lever 17 are utilized as a means of disabling the automatic cut-out switch when there is activity on the typewriter; that is, when it is in use to write on work sheets. The universal bar 14 is operated every time characters are printed by the typewriter; consequently, the link 16 becomes stationary when activity at the machine ceases.

Associated with the lever 17 is a contact mechanism best shown in Fig. 2, which involves the movable spring contact blade 18 having a strip of insulating material 18a projecting into the plane of the lever 17 whereby the blade 18 is vibrated by the operation of the lever 17 through the link 16, mentioned above. Coacting with the contact blade 18 is a fixed contact blade 19 which, along with blade 18, is insulatably mounted in the base of the machine and extends parallel with the blade 18 in Fig. 2. The blades 18 and 19 have cooperating contacts designated C1 which are closed momentarily whenever the blade 18 is vibrated. Insulatably mounted between the two blades 18 and 19 is a bimetallic contact blade 20 which bears one of two contacts designated C2, the blade 18 carrying the other contact C2. Surrounding the bimetallic contact blade 20 is a heater H1 comprising a coil of resistance wire which is designed to heat the bimetallic member 20 and cause it to bow in a counterclockwise direction to open contacts C2.

The machine is provided with a switch lever 21 (Fig. 1) which is pivoted at 22a in the base 22 of the machine and, in the position in Fig. 1, the switch lever is in the "Off" position.

The switch lever is provided with an arcuate indicator 21a which has the words "Off" and "On" engraved or suitably marked thereon and the cabinet of the machine has a suitable aperture to display these words when the switch lever 21 is set in the corresponding positions. Pivotaly

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connected to the switch lever 21 is a link 23 which is connected to the cut-off switch shown in Figs. 3, 4, and 5. In these views, the cut-off switch is shown in the motor "Off" position. The link 23 is pivotally connected to the mid-point of a plate 24 of insulating material which is pivotally connected by means of studs 25a, 26a to brackets 25, 26 carried by the fingers 27, 28, respectively. These fingers are mounted on flexible strips 29 which in turn are insulatably mounted on a frame 31 by means of the screws 31.

It is clear that when the switch lever 21 is rocked clockwise (Fig. 1) to the motor "On" position, the link 23 will be thrust to the left and the plates 27 and 28 will be rocked counterclockwise (Fig. 3) or clockwise (Fig. 4) into a latching relation with the latches 32, 33.

The latches 32, 33 are pivotally mounted on a pin 30a carried by lugs formed in the frame 30 and are urged in a clockwise direction (Fig. 3) by the torsion springs 34 so as to snap over the ends of the fingers 27, 28 in the position to which they are moved by the switch lever 21. The latches 32, 33 are formed with lugs 32a, 33a which limit rotation of the latches under the influence of the springs 34, and position the latches as in Figs. 3 and 4 when the switch is either "On" or "Off."

Cooperating with the finger 27 are four spring contact members bearing the contacts C3, C4, 30 and three other contact members bearing the contacts C6, C7 cooperate with the finger 28. The finger 27 has an insulating button 27a which is adapted to engage the right-hand member (Fig. 3) for the contacts C3 to close said contacts when the switch lever 21 moves to the "On" position. The finger 28 has a button 28a (Fig. 4) arranged to operate the middle contact member for the contacts C5, C6, so as to close the contacts C5 and open contacts C6 when the switch lever 21 is 40 placed in "On" position.

The latch 32 (Fig. 3) has secured to it a contact operating finger 32b which projects downwardly and holds the contacts C4 closed by pressing the right-hand contact member therefor to the left. Under normal conditions, with the switch lever in the "off" position, contacts C4 will be closed but will be momentarily opened and reclosed when the latch 32 is operative to latch the fingers 27. The bracket 25 also has a pair of fingers 25b which are formed so as to loosely project on each side of the finger 28 and the main part of bracket 26.

Each latch 32, 33 has a finger 32c, 33c (Figs. 3 and 4) engaged by a bimetallic spring member 35a, 35b and coacting with each such spring member is a bimetallic member 36a, 36b each having a heater H2, in the case of the latch 32, and H3, in the case of the latch 33. The bimetallic members 36a, 36b are bent at their upper ends to bear against the sides of the spring members 35a, 35b in each case.

When current flows through the heaters H2, H3, bimetallic members 35a, 35b, 36a, 36b bow clockwise in Fig. 3 and counterclockwise in Fig. 4 and to disengage the latches 32, 33 from the fingers 27, 28, this action taking place in opposition to the springs 34.

When the switch lever 21 is moved to the "On" position and the fingers 27, 28 are latched by the latches 32, 33, the insulating button 27a closes contacts C3 thereby starting the driving motor M in Fig. 6. Also, the contacts C5 close and contacts C6 are opened by finger 28. The closure of contacts C5 connects the heater H3 and contacts 75

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C2 in a series circuit across the line wires and, if nothing else happens, the heater H3 will start the bimetallic members 35b, 36b to bowing in a counterclockwise direction (Fig. 4) thereby tending to gradually disconnect the latch 33 from the end of finger 28. After a period of time determined by the physical constants of the heater H3 and the bimetallic members 35b, 36b, the latch 33 will release the finger 28 which will spring part way to the position shown in Fig. 4 and will move the pivoted point of the link 23 half way to the normal position. Fingers 25b limit this movement of finger 28. However, the finger 27 will remain latched by the latch 32 and contacts 15 C3, C4 will remain closed.

The release of the finger 28 allows the contacts C6 to reclose and C5 to reopen thereby connecting the heater H2 in series with the contacts C2 and the heater H2 commences to heat. If the machine still remains inactive, the latch 32 will be gradually disengaged and release finger 27 after a definite period of time dependent upon the physical constants of the heater H2 and the bimetallic elements 35a, 36a. This allows the contacts C3, C4 to open to stop the motor.

If the operator, after setting the switch 21 to "On" position, commences to operate the machine to type on a work sheet, the operation of the typewriter power units will cause the link 16 to be reciprocated horizontally so as to periodically open and close the contacts C1. This will cause the heater H1 to be periodically impulsed with the current with the result that it causes the bimetallic member 20 to bow in a counterclockwise direction (Figs. 2 and 6) and open the contacts C2. The opening of the contacts C2 disconnects the heaters H2, H3 and allows them to cool. Thus, as long as the operator is using the machine, the heater H1 will be kept hot enough to prevent the heaters H2, H3 from functioning and the motor M will remain in circuit. If the operator now goes away and leaves the machine unattended, the heater H1 will cool very rapidly and allow the contacts C2 to reclose thereby reconnecting the heaters H2, H3 in circuit. Since the motor M is running and the machine is active, the contacts C4, C5 are normally closed, the heater H3 will then again function to first open the contacts C5 and close contacts C6 and then finally heater H2 will open contacts C3 to stop the motor as described above.

There is a possibility that due to faulty operation of the machine, the contacts C1 may be left in a closed condition with the power on the machine. This often happens when several keys are operated simultaneously and the type bars jam in the type basket thereby stalling the motor and the power roller 10. In order to get a long time interval, it is desirable that the heaters H2, H3 be relatively sluggish and of high resistance so as to accumulate heat relatively slowly. It is desirable that the time interval before power is cut off from the motor be long enough to allow the stenographer to perform small duties connected with typing, such as arranging books, turning pages, or answering the telephone.

On the other hand, it is desirable that the action of the heaters H2, H3 be fairly quickly suspended as soon as the machine is put into operation. For that reason it is desirable that the heater H1 and the element 20 be relatively quick acting which requires that the heater H1 be of low resistance so as to permit the relatively heavy current necessary to quickly heat the bi-metallic member 20. If the heater H1 has these charac-

teristics, it will be damaged if it is kept connected across the line wires for any great length of time which, of course, would be the case if the contacts C1 were held in closed condition as by a jam of the type bars in the basket.

It will be noted in Fig. 2 that the blade 18 is considerably longer than the blade 19 and the plate 18a also increases its effective length relative to the lever 17 so that the blade 18 will be capable of flexing to permit the bowing thereof to the right (Fig. 2) to open the contacts C1. The member 18 is provided with an insulating button 18b which is engaged by the bi-metallic member 20 when the latter is excessively heated and causes the member 18 to flex sufficiently to open the contacts C1 thus disconnecting the heater H1 from the line. Of course, as soon as the heater H1 is disconnected, it will start to cool and the bi-metallic member 20 will permit the contacts C1 to reclose, whereupon the heater H1 and member will again become effective to flex the member 18. Thus, the heater H1 will be impulsed at intervals which will be very short owing to the fact that the heater H1 and bi-metallic member are essentially quick acting, but the intervals when the circuit is open will be long enough to prevent overheating the heater H1.

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 combination with a power operated office machine having a driving motor and a control circuit for such motor, a main switch for controlling said motor circuit, a second switch, manual means to close said switches, means to hold said switches in closed condition, thermal means tending when heated to release the holding means, heating means for said thermal means, a cut-off control circuit including said heating means and second switch and a thermally released switch, and means responsive to use of said machine for periodically energizing said thermally released switch to maintain said cut-off control circuit open.

2. In combination with a power operated office machine having a main driving motor, a control circuit for said motor, a main switch for starting and stopping said motor, and manual means to close said switch; means for maintaining said switch in closed condition, a thermal release device for said maintaining means including a heater, a second switch in circuit with said heater and opened by the manual means when closing the main switch, means for holding said second switch in open position, a second thermal release device for said holding means including a second heater, a control circuit for said heaters arranged to include said second heater when the main switch is closed and the first heater when the second switch is closed and including a thermally actuated heater control switch for opening said circuit, a control heater for operating said heater control switch, and contact means actuated by activity of said office machine for closing a circuit to the control heater.

3. In combination with a power operated office machine having a main power circuit, a main switch for closing said circuit and manual means for operating the main switch, releasable means to hold the main switch closed, a first thermal device for releasing the holding means, a first heater for the first thermal device, a second switch actuated by said manual means to an operated position and comprising transfer contacts arranged to close a circuit to said first heater when released, a second holding means for holding the second switch in operated position and having a second heater to which a circuit is closed by the second switch in its operated position, a third switch, a control circuit including said heaters and said third switch in a series parallel arrangement, and means controlled by activity of said office machine for maintaining the third switch in open position to prevent heating either of said heaters while said machine is in use.

4. In combination with a power operated office machine having a main power circuit, a main switch for closing said circuit and manual means for operating the main switch, releasable means to hold the main switch closed, a first thermal device for releasing the holding means, a first heater for the first thermal device, a second switch actuated by said manual means to an operated position and comprising transfer contacts arranged to close a circuit to said first heater when released, a second holding means for holding the second switch in its operated position and having a second heater to which a circuit is closed by the second switch in its operated position, a third switch, a control circuit including said heaters and said third switch in a series parallel arrangement, and a thermal device for opening the third switch including a third heater and means responsive to activity of said machine for periodically closing a circuit to the third heater to maintain the third switch in open position and prevent heating either of said first and second heaters while said machine is in use.

5. In combination with an office machine having a main power circuit and a part which operates at closely spaced intervals when the machine is in use, a main heater control circuit, a series of three thermally released switches each having a heater for releasing the associated switch, the first of said switches being disposed in said main power circuit and constituting a main power switch, the second of said switches being closed when the main power switch is closed and operative to connect the heater for said second switch in said circuit and disconnect the heater for said main power switch from said circuit to render the second heater effective to release the second switch, said second switch being effective when released to connect the heater for the main power switch in said circuit to effect release of said main power switch, said main power switch being operative when released to open said main power circuit, the third switch being operative to open said heater control circuit, and means for closing a circuit to the heater for the third switch under control of said active element when the machine is in use.

6. In an office machine having a main power circuit and a part which is active at closely spaced intervals while the machine is in use, a heater control circuit, a pair of thermally released switches each having a heater for releasing the associated switch, one of said switches when set connecting its heater in said control circuit and when released connecting the other heater in said

control circuit, the second switch when set closing said power circuit and when released opening said power circuit; means to simultaneously set said switches, a thermally actuated switch in said heater control circuit and having a heater for operating the switch to open position, and a circuit for the last named heater including a switch actuated by said active part.

7. In an office machine having a main power circuit and a part active at closely spaced intervals when the machine is in use, a heater control circuit, a pair of switches each having a latch for holding the switch in a set condition, each latch having thermal release means and a heater for the thermal release means, one of said switches when set connecting its heater in said control circuit and when released connecting the other heater in said control circuit, the second switch when set closing said power circuit and when released opening said power circuit; means to simultaneously set said switches, a thermally actuated switch in said heater control circuit and having a heater for operating such switch to open position, and a circuit for the last-named heater including a switch actuated by said active part.

8. In combination with a power operated office machine having a motor circuit, a main power switch for controlling said motor circuit, a second switch, manual means to close said switches, latch means to hold said switches in closed condition, thermal means tending when heated to release the latch means, heating means for said thermal means, a cut-off control circuit including said heating means and second switch and a thermally released switch, and means responsive to use of said machine for periodically energizing said thermally released switch to maintain said cut-off control circuit open.

9. In combination with a power operated office machine having a main driving motor, a control circuit for said motor, a main switch for starting and stopping said motor, and manual means to close said switch; a first latch for maintaining said switch in closed condition, a thermal release device for said first latch including a heater for releasing the latch, a second switch in circuit with said heater and opened by the manual means when closing the main switch, a second latch for holding said second switch in open position, a second thermal release device for said second latch including a second heater, a control circuit for said heaters arranged to include said second heater when the main switch is closed and the first heater when the second switch is closed and including a thermally actuated heater control switch for opening said circuit, a control heater for operating said heater control switch, and contact means actuated by

activity of said office machine for repeatedly closing a circuit to the control heater.

10. In combination with a power operated office machine having a main power circuit, a first switch for closing said circuit and manual means for closing said switch, releasable means to hold the first switch closed, a first thermal device for releasing the holding means, a first heater for the first thermal device, a second switch comprising transfer contacts arranged to close a circuit to said first heater when released and actuated by said manual means to an operated position, a second holding means for retaining the second switch in operated position, a second thermal device for releasing the second holding means, a second heater to which a circuit is closed by the second switch in its operated position for heating the second thermal device, a control circuit including said heaters and said second switch in a series parallel arrangement and a thermally actuated switch having a third heater, and means controlled by activity of said office machine for repeatedly closing a circuit to the third heater to maintain the thermally actuated switch in open position to prevent heating either of the first two heaters while said machine is in use.

11. In combination with an office machine having a main power circuit and a part which operates at closely spaced intervals when the machine is in use, a main heater control circuit, a series of three thermally released switches each having a heater for releasing the associated switch, the first of said switches being disposed in said main power circuit and constituting a main power switch, the second of said switches being closed when the main power switch is closed and operative to connect the heater for said second switch in said circuit and disconnect the heater for said main power switch from said circuit to render the second heater effective to release the second switch, said second switch being effective when released to connect the heater for the main power switch in said circuit to effect release of said main power switch, said main power switch being operative when released to open said main power circuit, the third switch being operative to open said heater control circuit, and contact means for repeatedly closing a circuit to the heater for the third switch under control of said active element when the machine is in use.

KARL R. STAUSS.

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