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Mihalik et al.

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[54] **ELECTROSTATIC COPIER**

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[51] **Int. Cl.** **G03g 15/22**

[58] **Field of Search** 355/3, 14

[56] **References Cited**

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[57] **ABSTRACT**

An electrostatic copier wherein powder images are heat set in a fuser unit and which includes a control circuit having an override device adapted to ensure completion of a fusing operation even if a main on/off switch is turned to off during such an operation. The override device can also ensure completion of a fusing operation in the event that safety devices are actuated during such an operation. This ensures completion of a fusing operation so that paper is not left in the fuser unit where it might ignite next time the copier was used. The copier additionally includes a rapid heating fuser unit and a timer motor to control copying operations.

18 Claims, 4 Drawing Figures

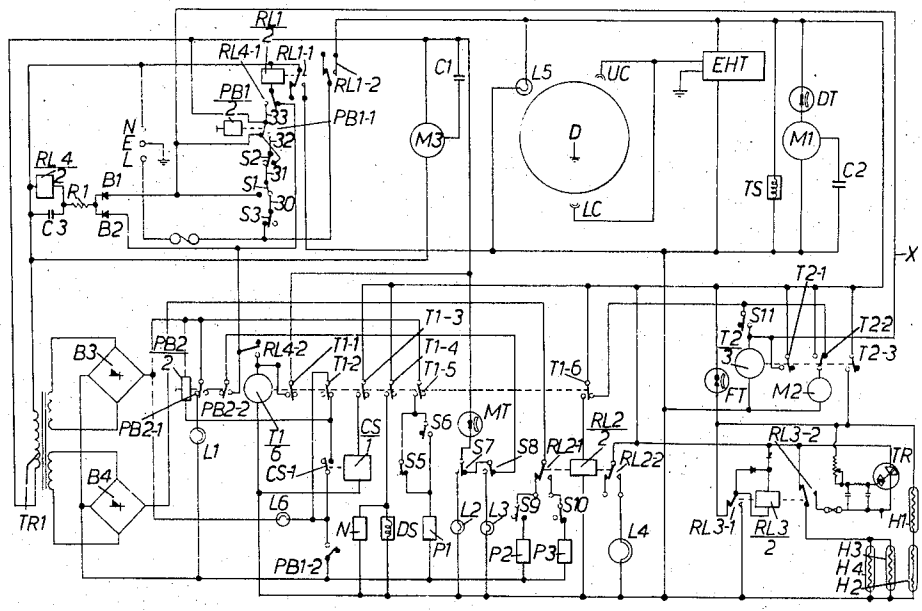


FIG 1

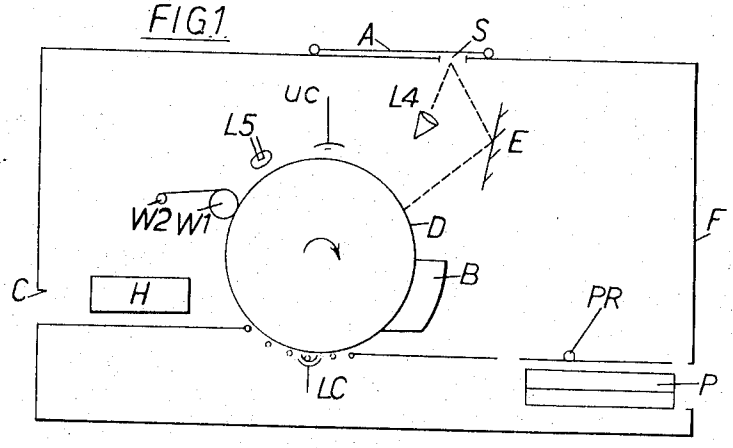


FIG 3

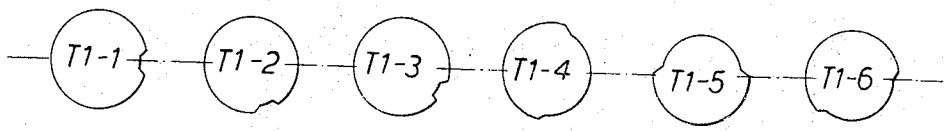
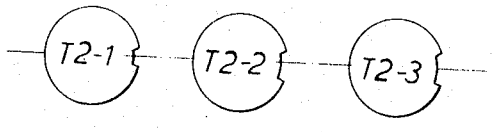


FIG 4



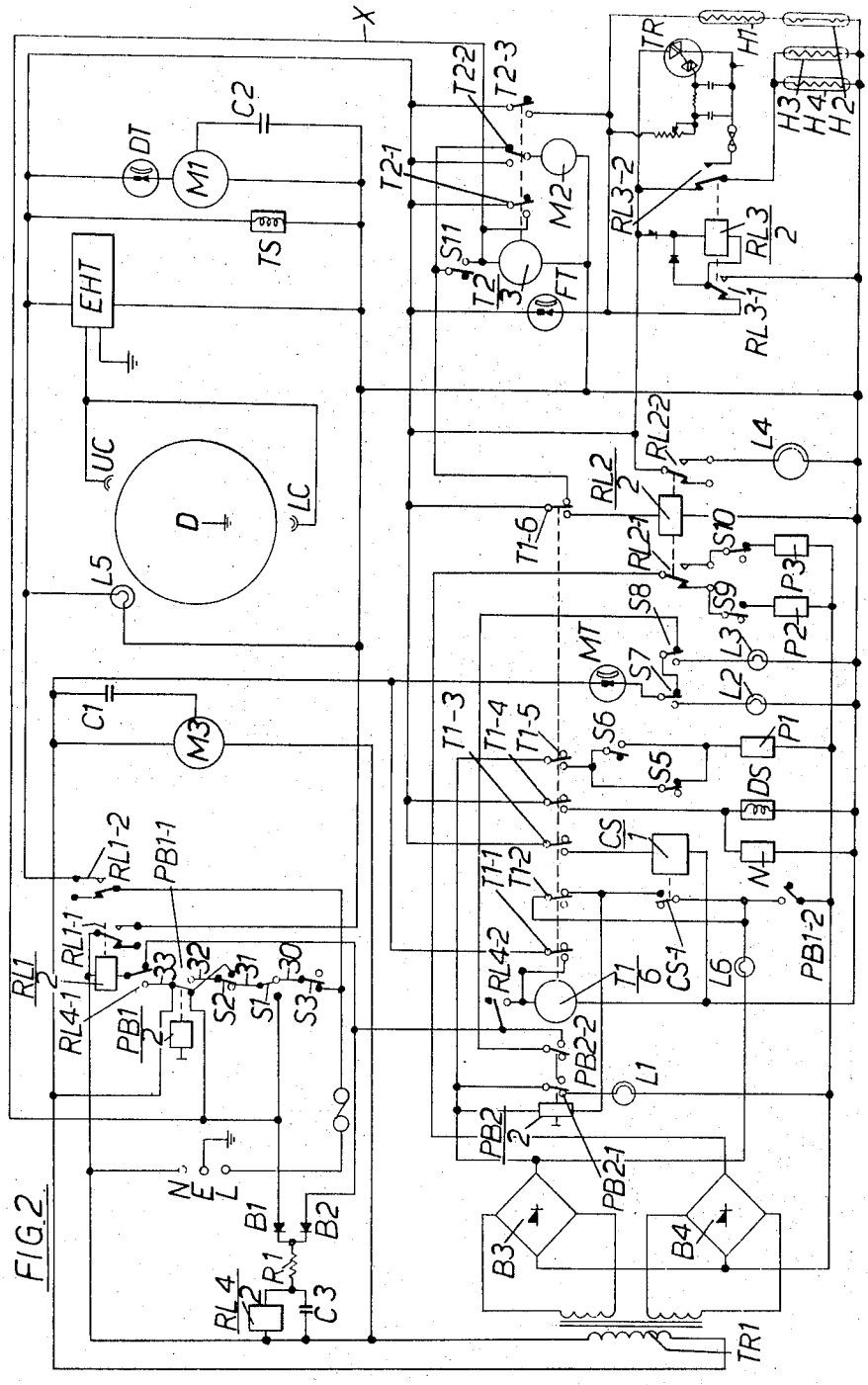

X
DT
M1
C2
TS
EHT
UC
D
LC
L5
C1
M3
RL1-2
PB1-1
RL1
RL1-1
RL4-1
PB1
33
32
31
30
S2
S1
S3
N
E
L
B1
B2
R1
C3
RL4
T2-2
T2-3
T2-1
M2
S11
T2
FT
TR
H1
H3
H4
H2
RL3-2
RL3
RL3-1
RL22
L4
RL2
RL21
T1-6
S10
S8
S9
P3
P2
M1
S7
L3
L2
T1-3
T1-4
T1-5
S6
S5
P1
DS
CS
T1-1
T1-2
N
RL4-2
T1
6
CS-1
L6
PB1-2
PB2-2
L1
PB2
PB2-1
B3
B4
TR1

FIG.2

ELECTROSTATIC COPIER

This invention relates to electrostatic copiers. Such copiers employ a photoconductive surface of a material, such as selenium or a selenium/sulphur alloy, this surface being provided with a conductive backing and being initially charged substantially uniformly. An original to be copied is then illuminated and its image is directed onto the said surface. The illuminated part of the surface becomes conductive and discharges. A charge pattern remains corresponding to the original, and a so called "electrostatic" latent image is thus formed. This "electrostatic latent image" is usually developed by the application of the toner in the form of particles which are electrostatically attracted to the image areas, and the developed image is transferred to a copy sheet by contact pressure, sometimes assisted by a corona charging device. The copy sheet bearing the image is then forwarded to a fusing zone, wherein the toner may be fused by application of heat or by subjection to a solvent vapour. The drum is cleaned and discharged and is then ready for another exposure.

It is an object of this invention to provide an electrostatic copier having a novel and improved control circuit for controlling the operating cycle or a plurality of operating cycles of the copier.

According to one aspect of the present invention, there is provided an electrostatic copier including components for fusing an image on a copy sheet in a fusing operation and a control circuit to control operation of the copier, said circuit including a main on/off switch and an override device adapted to ensure completion of any fusing operation independent of the switching of the main switch to its off position during a fusing operation.

This feature of the invention may be achieved by including in the copier control circuit a mains isolation relay which controls the supply of current to at least the fuser unit and a copy sheet forwarding device. The relay is kept activated when the fuser unit is in operation. The operation of the fuser unit can be controlled by a cam switch on a timer motor which closes a circuit to the fuser supply. Another cam switch on the same timer motor can close a circuit to the mains isolation relay. This ensures that a copy sheet is never left in the fuser, where it might ignite when the machine was next used.

According to a preferred feature of the invention the copier and control circuit therefor are such that the copier does not require a lengthy "warm-up" period before it can be operated, but can operate immediately on being supplied with electrical power.

Preferably, copying operations of the copier are controlled by a copy switch or push button and although no parts of the copier need operate on switching on the electrical supply, advantageously machine cooling fans and warning lights are then activated.

Closure of the copy switch then activates for instance heaters, developer, drive motor, corona HT. supply etc.

This feature may be provided by a control relay controlling the supply to all components of the copier which are only to be supplied during actual copying. The control relay is activated on closure of the copy switch. Preferably a further relay is activated, after a short delay, on closure of the copy switch, this relay controlling the starting of a timer motor for controlling operation of the copier, and transferring the mains isolation relay to a latching circuit including the mains on/off switch but not the copy switch.

The control relay is preferably the same mains isolation relay as is used in ensuring that a fusing step is completed.

Another aspect of the invention is a copier having a novel arrangement of fuser heaters, which allow rapid initial heating of the fuser unit, and subsequent maintenance of a desired temperature. This feature is in fact necessary if the heaters are only operated when the copy switch is actually closed. This feature is provided by at least one heater initially operable at high power, and thereafter intermittently, and optionally at lower power, when the fuser reaches a desired temperature. This intermittent operation can be by means of an electronic control. In a preferred arrangement, there are four infrared heater elements of which two are in series and are controlled by a fuser thermostat and two are in parallel and are controlled by the electronic control in conjunction with a fuser thermostat. This arrangement of heaters allows instantaneous operation, eliminating lengthy pre-heating periods prior to use of the copier.

The advantage of maintaining such devices as the drum drive, H.T. corona supply, and fuser unconnected except when copying takes place is that the accumulation of unwanted developing powder on the drum surface is prevented.

The copier may include various safety devices which are preferably arranged so that they will prevent the start of a copying cycle but will not halt a cycle. These devices may include a switch activated by lack of copy paper, a switch activated by lack of cleaning tissue for the drum, and a machine thermostat. These particular devices can be overridden by a hold on a current supply to a copy cycle control motor once a cycle has started; i.e., they do not stop a cycle, but only prevent one starting.

In addition, the copier may have a switch opened on the occurrence of a jam in the paper feed or on removal of a paper tray. Preferably these switches do not stop operation of the copier once a fusing step has commenced.

A switch opened when the copier cover is removed may be provided to stop the copier in all circumstances.

In order that the invention may be more clearly understood the following description is given, merely by way of example, with reference to the accompanying drawings, in which:

FIG. 1 is a schematic view of an electrostatic copier according to the invention;

FIG. 2 is a circuit diagram of one form of control circuit for the copier of FIG. 1;

FIG. 3 is an illustration of the profiles of six cams to operate switches in the circuit of FIG. 2; and

FIG. 4 is an illustration of the profiles of three cams to operate further switches of the circuit of FIG. 2.

A copier according to the invention is schematically illustrated in FIG. 1. It includes within a housing F a rotatable earthed drum D which has a photoconductive surface. The drum is adapted to rotate clockwise as shown. An original carrying carriage A is movable to and fro over a slit S in the top of the housing, which slit is adapted to be illuminated during copying by a light source L4. An image of the original is then reflected from a mirror E onto the drum. The carriage A is suitable for conveying both sheet originals and books.

The copier also includes upper and lower drum surface charging devices UC and LC in the form of corona charging devices and a toner applicator B located adjacent the drum at a position just after the point at which images from the slit S contact the drum in the drum rotation sense. A supply of copy paper is held at P and copy sheets are fed when required by a copy sheet supply roller PR. A drum cleaning means in the form of a roll of tissue paper web is also provided, this roll passing between two spools W1 and W2. Between the drum cleaning means and the upper charging device UC is located a "clearing" lamp L5 which can illuminate the entire surface of the drum so that it is completely discharged. The lower drum surface charging devices LC is located below the bottom of the drum, and is used to assist the transfer of developed images from the drum to copy sheets. The sheets are fed against the drum by rollers for the purpose of image transfer and contact the drum and travel with it for a short distance. The sheets then leave the drum to be forwarded beneath a heater H to copy outlet C. Basically, in operation, the drum rotates and a copying cycle commences with the drum being charged to a uniform potential by charging device UC. The drum is then selectively discharged where light falls upon it from the mirror E so that it bears an electrostatic image corresponding to the original. The original is on the carriage A which is moved at substantially the same speed as the surface speed of the drum. The drum is discharged in those areas where light falls upon it, which correspond to light or white areas on the original, and remains charged in areas corresponding to the dark areas of the original. The drum then passes to the toner applicator B, where toner is applied and is attracted to the charged areas of the drum surface. Meanwhile a copy sheet is forwarded from the supply P and this, having been forwarded to a dwell position adjacent the drum, is then forwarded in synchronism therewith so that the developed image on the drum is transferred to the copy sheet as it is urged against the drum. This transfer is encouraged by the lower charging device LC. After transfer, the copy sheet is forwarded to the heater H where the toner image is fused and thus fixed, before passing out through outlet C. The drum next contacts the tissue web on the spool W1. This web is normally rotated, both to provide clean tissue and to encourage the cleaning action, the tissue and drum surface being arranged to move in opposite rotational directions to assist this cleansing action. The drum then passes under the "clearing" lamp L5 which exposes the entire surface to light, thus completely discharging it, so that it is in a uniform uncharged condition prior to recommencing the copying cycle.

The drum is driven by a drum drive motor (not shown), while the carriage is moved to and fro by means of forward and reverse clutches engaging it with a motor drive system at appropriate times. The web tissue spool W1 is urgable into engagement with the drum B by a solenoid device at the appropriate time, and is rotated by a further motor. Operation of the developer is also activated by a solenoid. The copy sheet supply is supported on a removable tray, for easy filling of the supply with sheets.

Various switches to control operations of the copier and to act as safety switches are also provided. Thus, if a copy sheet is jammed on forwarding from the drum to the heater and possibly also from the supply P to the drum a paper jam switch is opened; a paper tray switch is provided to open when the tray is removed; the machine has an access cover and a switch associated with this cover is opened whenever the cover is opened; two switches control the forward movement of the paper both to a dwell position near the drum and to forward the paper from the dwell position in synchronism with the drum; in addition two switches are respectively activated when the supply of cleaning tissue is running out or when the supply of copy paper is depleted to a predetermined low value.

Front and back stop switches are provided to disengage the forward and reverse clutches controlling the carriage movement and in addition a further switch, activated by the carriage, controls the start of a timer motor which controls a cleaning tissue web drive motor.

The above description is an outline of the main parts of the copier. FIG. 2 shows a control circuit for the copier, including the various switches and control devices already referred to, and additional control devices and relays.

With regard to FIG. 2, the various switches and relays of the circuit will be in the positions shown when the machine is switched off, and when there are no faults or malfunctions.

The components of the circuit are as follows:

The mains input is shown at N-E-L at the top left of the circuit. Switches S3 S1 and S2 are respectively the machine cover switch, the paper jam switch and the paper tray switch.

The machine cover switch is normally closed as shown but will be opened whever the cover of the machine is opened; the paper jam switch will normally be closed unless activated by paper jammed in the paper forwarding means, and the paper tray switch will similarly be closed so long as the tray bearing the supply of paper is in its correct position.

A mains on/off push button is provided at PB1/2 and this controls the first and second switches PB1-1 and PB1-2. The line from switch PB1-1 leads firstly to a first switch RL4-1 which is associated with a relay RL4/2 and also to a line connected to a LT transformer TR1 and to fans M3 of the machine. A fan capacitor C1 is provided.

RL1/2 is a mains isolating relay which is held activated when switch RL4-1 is closed, and this relay controls switches RL1-1 and RL1-2. Switch RL1-2 is adapted, when closed, to connect the live mains connection to various further features of the machine. These features include the discharge cleaning lamp L5, a high tension voltage supply EHT which supplies the upper corona UC and lower corona LC. Switch RL1-2 is also connected to a solenoid TS, which urges the cleaning tissue against the drum, and to a drive motor M1 for the drum, via a motor thermostat DT. A capacitor C2 is provided for the drive motor M1. The return line from these components includes switch RL1-1 which is also closed by relay RL1/2.

Two low voltage circuits are energised by the transformer TR1, the circuits having respective rectifiers B3 and B4. For convenience these circuits will be respectively and accordingly referred to as circuit 3 and circuit 4. Circuit 3 supplies a light L6, which is in line with switch PB1-2, associated with the mains push button.

A copy button PB2/2 is provided in circuit 3, and closure of this button closes switches PB2-1 and PB2-2. A

line to a light L1 is opened by the opening of switch PB2-1 when the copy button is pressed, and switch PB2-2, when closed allows current at mains voltage to flow from switch PB1-1 via a machine thermostat MT, and switches S7 and S8, if they are in the positions shown, through a delay network comprising a rectifier B2, resistor R1, and a relay RL4/2 and a capacitor C3 which are in parallel. The capacitor C3, of course, provides a delay in actuation of relay RL4/2, actuation of which closes both the switch RL4-1 and switch RL4-2.

Switches S7 and S8 are both normally closed, and are only opened when lack of cleaning tissue or lack of copy paper is sensed respectively. When these switches are opened respectively warning light L2 and L3 are illuminated, and the copy cycle cannot commence as there is no supply to switch PB2-2.

Switch RL4-2 is connected to a motor T1/6 which drives a shaft carrying six programming cams T1-1 to T1-6. These cams are illustrated in FIG. 3, and are intended to rotate clockwise as shown. They have portions of larger radius which correspond to closure of the various switches illustrated in FIG. 2, except in the case of T1-5.

Switch T1-1 is a timer hold switch. When motor I1/6 is started, it is bound to provide one complete revolution of the cams as a supply to it from the mains is provided via switch T1-1. Opening of machine thermostat MT or either of switches S7 and S8 is not effective to stop motor T1/6 once it has started. Switch T1-1 opens at the completion of one cam revolution.

Switch T1-2 is a release switch for the copy push button PB2/2. A solenoid is associated with that button, and this is supplied by circuit 3 so long as switch T1-2 remains closed, which is for about 300° of the cam revolution.

Switch T1-2 can be overridden by a control switch CS-1 with which it is in parallel. If this switch is closed, the copy push button solenoid will remain energised if T1-2 is opened. Control switch CS-1 can be closed by a multiple copy selector relay CS/1. This is a "notching" relay. If a number of copies are required, this relay is "notched" to n-1, so that, normally on n-1 occasions after the first revolution of the cam shaft it causes switch CS-1 to override switch T1-2 and keep the copy push button in a position to command a further copy. Each rotation of the cam T1-3, which has not notch, pulses selector CS/1 which thus "counts down".

Switch T1-4 controls the developer solenoid DS and is connected to the live mains supply via switch RL1-2. Closure of this switch causes the developer material to come into contact with the drum so that it adheres to the charged areas. In parallel with this solenoid is a totalising counter N, which records the number of copies made by the copier.

Switch T1-5 is in the low voltage circuit 3, and is in a line with a paper feed clutch P1. Two switches S5 and S6 control the paper feed clutch in addition to cam T1-5. The clutch will operate when either of these switches and switch T1-5 is closed, and the switches are respectively S5, a paper dwell switch and S6 a paper synchronising switch. Paper is in fact forwarded in two stages. When T1-5 is first closed during a cycle, paper is forwarded to a dwell position adjacent the drum. When it has reached this position dwell switch S5 is opened. Switch S6 is closed to continue movement of paper feed in synchronism with the drum. Switch S6 is closed by the carriage A for the original at a particular stage in its cycle of movement.

Switch T1-6 when closed activates relay RL2/2 which controls switches RL2-1 and RL2-2. Switch RL2-2 closes a circuit to a lamp L4 which is the exposure lamp for the illumination of originals to be copied. This lamp is lit whenever switch T1-6 is closed. P2 and P3 are respectively clutches for driving a carriage A backwards and forward. Limit switches for stopping the travel of the carriage in respective directions are S9 and S10, and these are tripped by the carriage itself. Activation of relay RL2/2 on closure of switch T1-6 causes the carriage to move forward until it reaches the end of the travel when switch S10 is opened, and the subsequent opening of switch T1-6 reverses switch RL2-1 so that the carriage is driven back again until it reaches the limit of its travel, whereupon switch S9 is opened. The carriage drive clutches are supplied by circuit 4.

With regard to cams T1-1 to T1-6, it has already been explained that the cam switch T1-1 opens at the end of a cam cycle to break one mains supply to motor T1/6. The other supply to this motor, via MT, S7 and S8 will be maintained provided that switches PB2-2 and RL4-2 are closed. Cam switch T1-2 opens near the end of the cycle to release the copy button unless overridden by control switch CS-1. Cam switch T1-3 activates the notching relay CS/1 as explained, again near the end of a cam cycle. Cam switch T1-4 is closed for about half a cycle, commencing after about 80°. The developer is applied to the drum during this period. Cam switch T1-5 is closed during the first half of a cam cycle during which paper feed occurs. Cam switch T1-6 activates relay RL2/2 for rather more than half the cam cycle. This cam switch at other times provides a live mains connection to switch S11, to be explained below.

A second cam driving motor T2/3 is provided, and this is activated by closure of switch S11, provided that cam switch T1-6 is in the position shown. Switch S11 is closed by carriage A at a point in its travel cycle. Cam switches I2-1, T2-2, T2-2 and T2-3 are controlled by motor T2/3. The shapes of these cams is shown in FIG. 4, and as shown they are considered to rotate clockwise. Cam switch T2-1 functions in the same manner as T1-1, that is, once motor T2/3 has started, a mains supply is maintained to it through T2-1 whatever happens to S11 and T1-6. Cam switch T2-2 controls a motor M2 which drives the tissue web W1 (FIG. 1) for most of the cycle of this cam. Cam switch T2-3 is concerned with the heater control to be explained.

In addition to ensuring activation of motor T2/3, cam switch T2-1 has an important function, as a line X is live at mains voltage after this switch is closed. This line is connected to the left lower terminal of main on/off switch PB1-1. This is normally the "off" terminal, but so long as switch T2-1 is closed current is supplied to the mains isolation relay RL1/2, which controls switches supplying most parts of the copier, whether or not the mains switch is on. The consequence is that the copier will complete a copy if the mains is switched off during that part of a copying cycle when motor T2/3 operates. In fact this motor operates during the time when copy sheets are being heated by the fuser unit, with the result that sheets cannot be left in that unit.

The fuser unit comprises four heaters H1 to H4. Of these, H1 and H2 are in series with each other and with a fuser thermostat FT, and H3 and H4 are in parallel

with each other, and are as shown supplied from the mains via a switch RL3-2. Reversal of the switch RL3-2 causes heaters H3 and H4 to be supplied through a Triac device TR switched by thermostat FT.

The fuser thermostat FT governs the circuits to the heaters. If this thermostat is closed, then the relay RL3/2, which controls switches RL3-1 and RL3-2, will be as shown. Then, when the mains supply is connected, all four heaters operate, and H3 and H4 are said to be at high power. Once a given temperature is reached, thermostat FT opens. Prior to this opening of FT, the voltage drop across relay RL3/2 is zero, switch RL3-1 being connected to live mains. When FT opens, a circuit from the live supply through RL3/2 and RL3-1 and heaters H1 and H2 is made, the relay RL3/2 then switches over from its shown position. After such switching, heaters H3 and H4 are connected to mains, but their supply is controlled by the triac TR via a fuse. In the event of a failure, these heaters are switched off. The triac is gated via a variable resistance and thermostat FT, so that H3 and H4 come on again if FT closes. The triac is also gated by a connection, including a variable resistance, to switch T2-3. Accordingly, when switch T2-3 is closed, which occurs as a copy sheet is about to enter the fuser unit H, then whatever the condition of fuser thermostat FT, the triac is gated to supply current to H3 and H4. It will be seen that H1 and H2 are also supplied at this time. The heaters are turned off when T2-3 opens.

If, at the commencement of a copying cycle FT is already open, the fuser unit having been heated during earlier cycles, then the heaters operate intermittently at low power. If, however FT is closed at the start of a cycle, then full power heating takes place until the required temperature is reached. This does not take long and the fuser unit is ready to fuse a copy sheet when delivered. For the actual fusing, the heaters H1 to H4 are all used at high power by reason of the closure of switch T2-3. A single heater could be used in place of each of the pairs H1, H2 and H3, H4.

The operation of the copier is as follows:

When the mains button PB1/2 is switched on, switch PB1-1 is closed and the fans M3 start to work. At the same time the LT transformer TR1 is activated, and if either of switches S7 and S8 is activated due to lack of tissue or paper respectively warning lights L2 or L3 will come on. The closure of switch PB1-2 means that the mains "on" light L6 is lit up, and switch PB2-1, which is closed at this time, means that the copy light L1 is also lit. No other parts of the machine function at this stage.

If the copy button PB2/2 is now pressed the copy light L1 goes off, but the switch PB2-2 is closed and the delay circuit including relay RL4/2 is activated. The closure of switch PB2-2 energises mains isolation relay RL1/2 closing its two associated switches with the result that the discharge lamp L5, the motor M1, the tissue solenoid TS, the high tension supply EHT, and the heaters H1 to H4 are immediately activated. When the charge has built up in capacitor C3, relay RL4/2 is energised thereby closing switches RL4-1 and RL4-2. The closure of the former switch transfers the mains isoltating relay coil RL1/2 onto a latching circuit including S3, S1, S2 and PB1-1. Closure of switch RL4-2 ensures that the motor T1/6 for the control cams commences. These cams control the exposure lamp, carriage movement, paper feed, developer solenoid, copy button release, multiple selector and continued operation of the motor. In due course, the release of switch T1-6 and the closure of switch S-11 energises the motor T2/3. The three cams driven by this motor control the tissue motor (M2) and the heaters as described, and also ensure activation of the mains isolation relay until the fusing step, which commenced substantially at the same time as energisation of motor T2/3, is complete.

The heaters operate independently of any control cam during the early part of the cycle, bringing the fuser unit as a whole to the correct temperature.

If multiple copies are required, then the cam motor T1/6 repeats its cycle, as the push button is not released.

Certain features of this circuit will be particularly noted.

Any fusing step, once commenced, will be completed, due to the live supply to the alternative terminals of switch PB1-1 when fusing takes place, even if the mains is switched off, and if the paper tray is removed or the paper becomes jammed. After fusing, this live supply is cut and relay RL1/2 isolates the mains. Machine overheat and shortage of copy paper and cleaning tissue do not halt the machine during fusing step.

When the mains is initially switched on only the fans (M3) and warning lights are activated. However, this will not occur if any of the machine cover switch (S3), paper tray switch (S2) or paper jam switch (S1) is open.

If the copy switch is initially depressed, or maintained depressed during multiple copying, a copy cycle will only commence if the machine thermostat MT is closed, and if there is enough copy paper (S8) and cleaning tissue (S7).

The fuser heaters will not come on full power if the fuser is already hot enough due to thermostat FT. The performance of the heaters when not on full power can be adjusted.

Heaters H3 and H4 are fused.

After a copy cycle, or a plurality of copy cycles, all equipment except the fans and warning lights are automatically isolated.

Two heaters (H3 and H4) are controlled by a switching system and thermostat, the other two (H2, H1) by the thermostat. All four heaters operate during an actual fusing step.

Typical values for the various elements of the circuit are:

C3	100 μF
R1	3.9 KΩ
C1	1.0 μF
C2	2.5 μF

In addition, circuit 3 suitably operates at 30 volts, circuit 4 at 90 volts.

We claim:

1. An electrostatic copier comprising in combination a fuser unit having heaters for heat fusing an image on a copy sheet in a fusing operation, electrical conductors for connecting said copier to a supply of electricity, a copier control circuit to govern operations of the copier including fusing operations and comprising a main on/off switch movable between on and off positions to connect and disconnect said circuit with said conductors, an override device connected with said main on/off switch, means to activate said override de-

vice throughout each fusing operation and means to provide a current path through said main on/off switch when in said off position on activation of said override device, whereby movement of said main on/off switch to said off position during a fusing operation does not disconnect the copier from said conductors and stop the copier.

2. A copier as claimed in claim 1 and further comprising in said copier control circuit at least one safety switch in series with said main on/off switch to connect and disconnect said circuit with said conductors, said at least one safety switch being movable from a closed, normal, position to an open position on the occurrence of a copier malfunction, said override device being additionally connected with said at least one safety switch, and including means to provide a current path through said at least one safety switch when in said open position on activation of said override device, whereby movement of said at least one safety switch to its open position during a fusing operation does not disconnect the copier from said conductors and stop the copier.

3. A copier as claimed in claim 2 wherein a said at least one safety switch comprises a paper jam switch, openable on jamming of copy paper in the copier.

4. A copier as claimed in claim 2 and further comprising a tray for supporting copy paper, wherein a said at least one safety switch comprises a paper tray switch connected in series with said main switch and openable on removal of said tray.

5. A copier as claimed in claim 1 and having first and second contacts to said main switch, said first contact being connected to a said conductor, and said means to provide a current path comprising means to maintain said second contact at mains voltage on activation of said override device.

6. A copier as claimed in claim 1 and further comprising copy sheet forwarding means, an isolation relay and switches closed on actuation of said isolation relay, said switches being in series with said heaters and said forwarding means and said override device comprising means to actuate said isolation relay during a fusing operation.

7. A copier as claimed in claim 1 and further comprising a fuser timer motor, switches closable on operation of said motor to supply current to said heaters during a fusing operation, and means to activate said override device on operation of said motor.

8. A copier as claimed in claim 1 and further comprising a cover and a cover switch openable responsive to opening of said cover and which is in series with said main on/off switch to connect and disconnect said circuit with said conductors.

9. A copier as claimed in claim 1 and further comprising a copy switch, a control relay, means to activate said control relay after closure of said copy switch, further components of said copier, said further components comprising a drive motor, illumination means and a high tension supply and switches closed on activation of said relay to supply current to said further components.

10. A copier as claimed in claim 9 and further comprising a delay circuit, a delayed relay and a timer motor, actuation of said copy switch energising said delayed relay after a delay to activate said timer motor.

11. A copier as claimed in claim 10 and further comprising copy sheet forwarding means, an isolation relay and switches closed on actuation of said isolation relay, said switches being in series with said heaters and said forwarding means, and said override device comprising means to actuate said isolation relay during a fusing operation, andd said delayed relay being connected to switch said isolation relay into a latching circuit with said main switch.

12. A copier as claimed in claim 10 and further comprising at least one copy circuit safety switch device movable from a closed, normal position to an open position on the occurrence of a copier malfunction and means to prevent operation of said control relay on actuation of said copy switch when a said copy circuit safety switch is open, and further comprising current supply means to said timer motor which is in parallel with said at least one copy circuit safety switch.

13. A copier as claimed in claim 9 and further comprising at least one copy circuit safety switch movable from a closed, normal position to an open position on the occurrence of a copier malfunction, and means to prevent operation of said control relay on actuation of said copy switch, when a said copy circuit safety switch is open.

14. A copier as claimed in claim 13 wherein said at least one copy circuit safety switch is opened in response to at least one of a cleaning tissue shortage, a copy paper shortage and machine overheat.

15. A copier as claimed in claim 1 and further comprising a fuser unit, a fuser thermostat and heaters to said fuser unit, means to operate said heater continuously when a copying operation commences with said thermostat closed, a relay operable on opening of said thermostat, an electronic gating device connected to said heaters when said relay operates, and means connecting said thermostat to control said gating device.

16. A copier as claimed in claim 15 and further comprising a fuser timer motor, said motor, in use, activating said override device, and a further switch closable by said timer motor to close said gating device while a copy sheet is passed through said fuser unit.

17. A copier as claimed in claim 16 and further comprising further heaters connected to said further switch.

18. A copier as claimed in claim 15 and further comprising further heaters connected to said fuser thermostat.

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