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Post et al.

[11] **3,809,475**

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[54] **COPIER FUSER PROTECTOR**

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[73] Assignee: **Xerox Corporation**, Stamford, Conn.

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[52] **U.S. Cl.** ..... **355/3 R**, 219/216, 219/388, 271/57, 355/3 R

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

[58] **Field of Search** 355/3, 8, 11, 14; 219/216, 219/388; 271/57

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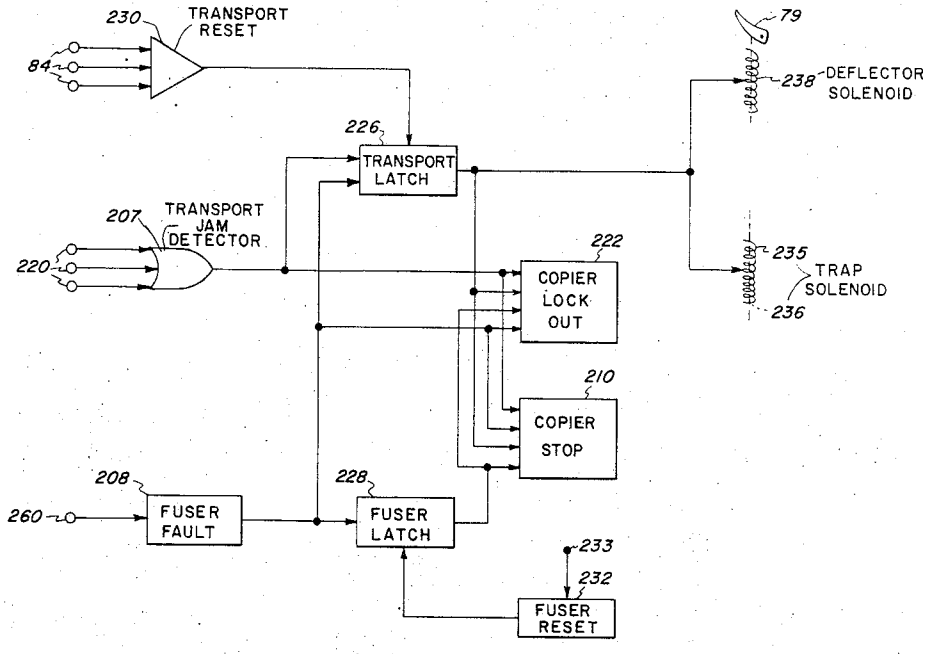
Assistant Examiner—Kenneth C. Hutchison

[57] **ABSTRACT**

A copying system incorporating means to stop the system in the event of a malfunction, such as excessive temperature in the processor fuser. For this purpose, suitable detection means are provided for monitoring the system fuser and also the system paper transports. These detection means respond to a fault in the associated component to shut down the copying system. At the same time, latching devices are set which prevent restarting of the copying system until the fault has been corrected. A malfunction in the system fuser sets both the fuser latch and the paper transport latch so that, in this circumstance, both fuser and paper transports must be cleared before restarting of the copying system can be effected.

2 Claims, 5 Drawing Figures



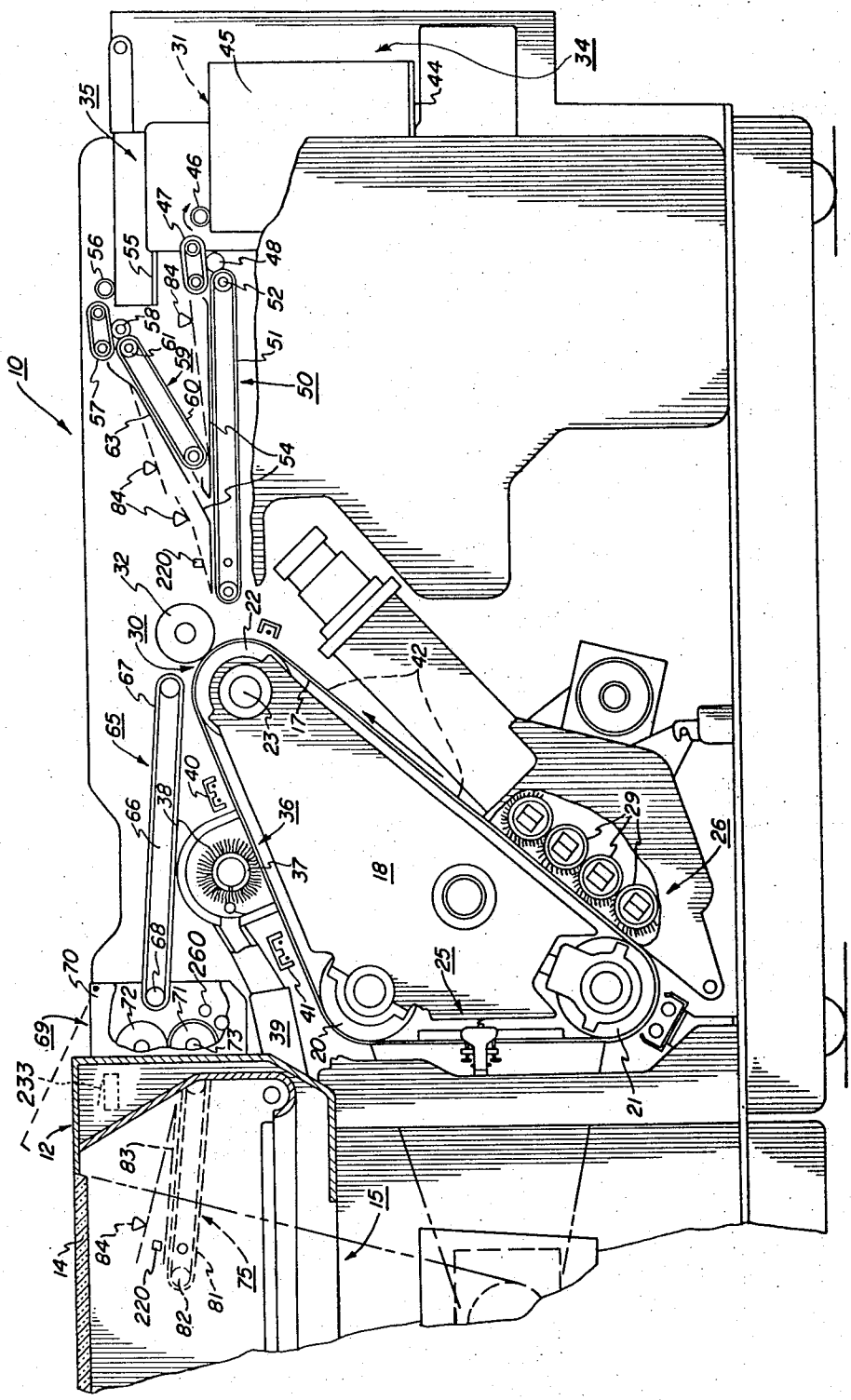


FIG. 1a

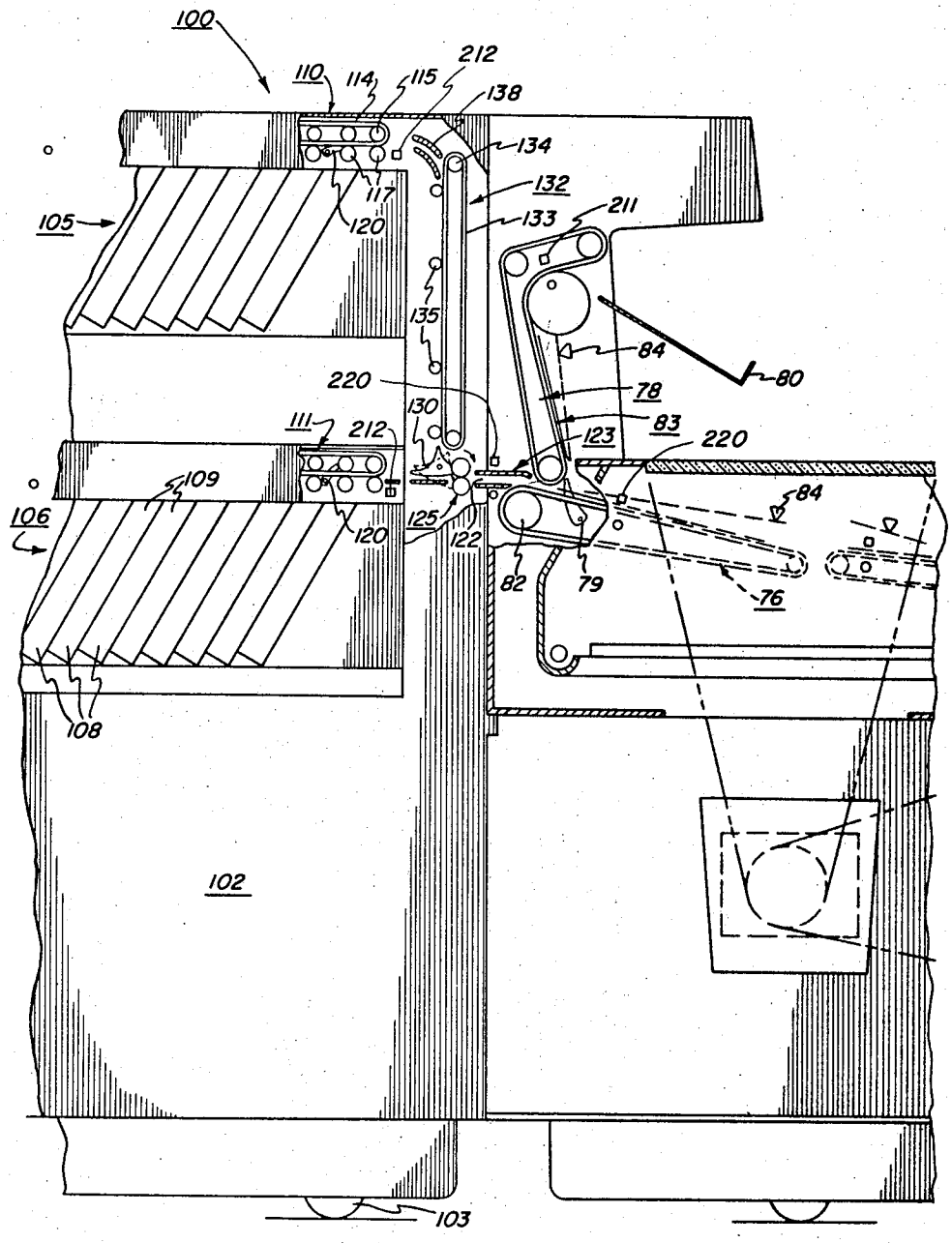

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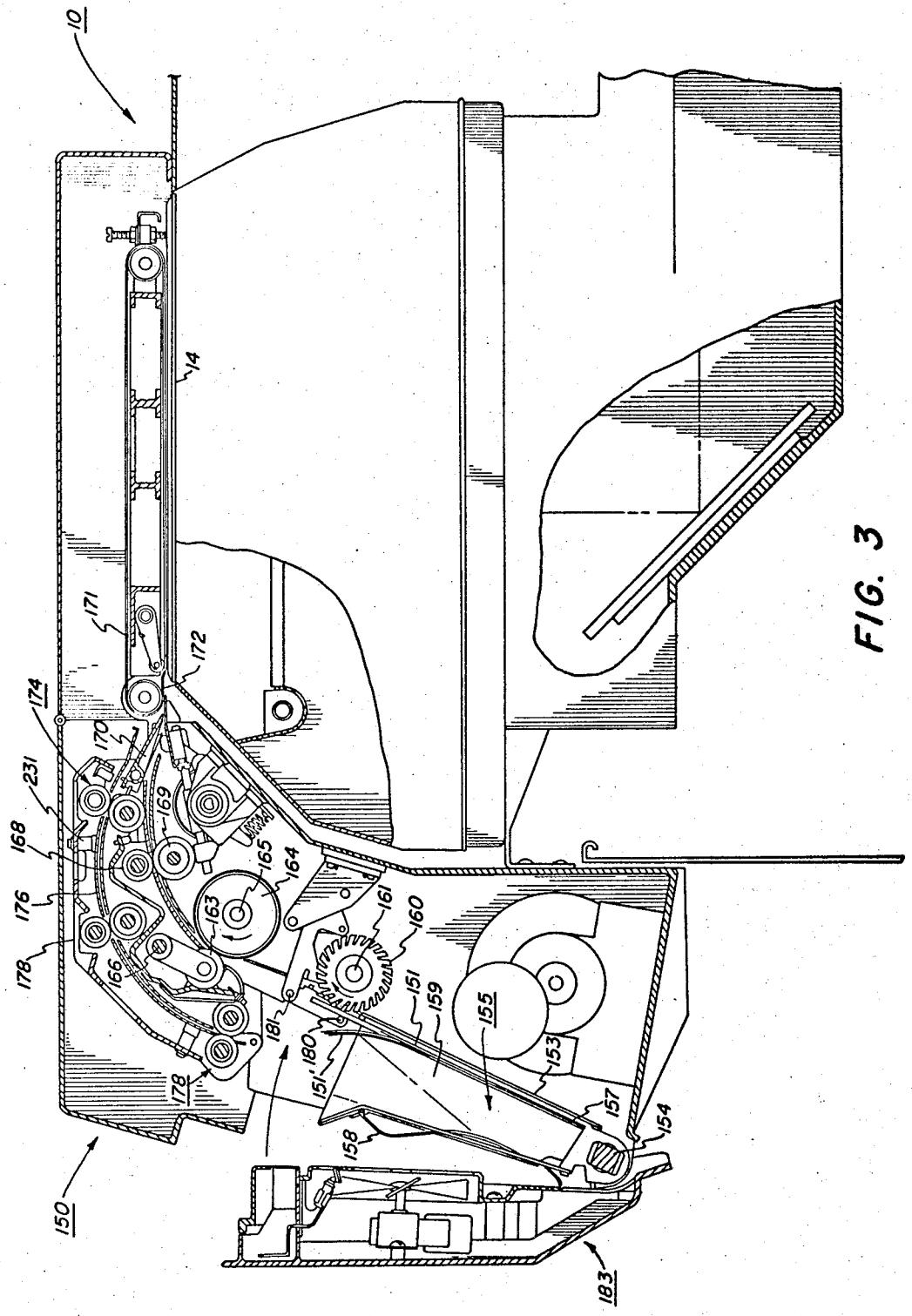
FIG. 1b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14
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180
181
178
150
183

FIG. 3

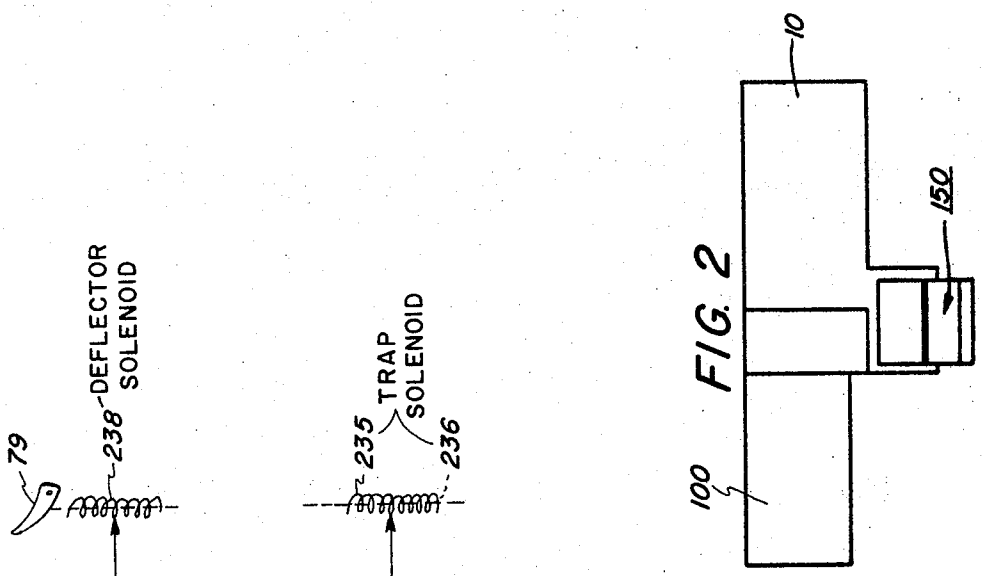
10
150
100

FIG. 2

DEFLECTOR SOLENOID
238
TRAP SOLENOID
235
236
79
COPIER LOCK OUT
222
COPIER STOP
210
233
232
FUSER RESET
TRANSPORT LATCH
226
FUSER LATCH
228
TRANSPORT RESET
230
TRANSPORT JAM DETECTOR
207
FUSER FAULT
208
84
220
260

FIG. 4

COPIER FUSER PROTECTOR

This invention relates to a document copying system, and more particularly to a document copying system having improved fault protection.

Because of possible malfunctions, such as paper jams in reproduction or copier machines, particularly high speed machines, means are usually incorporated to automatically stop the system in the event of a malfunction. For example, jam detectors may be provided to respond to the presence or absence of copy paper in a specific place at a particular time. Failure in this respect results in a jam being declared and the reproduction machine shut down. However, there is no assurance that the malfunction, for example, a jam, will be cleared before restarting of the machine is attempted. This is a possibility that cannot be ruled out particularly in a large office where a great many people have access to the reproduction machine.

In addition, machines of this type usually have a fuser for permanently fixing the copy images. Normally, this comprises a heater or oven. Problems such as jams or overtemperatures may occur within the fuser which must be protected against. However, it is desirable to limit operator servicing of the fuser, which is often quite hot, to a minimum and for this purpose it would be helpful to segregate fuser malfunctions from others.

It is a principal object of the present invention to provide a new and improved reproduction system control.

It is a further object of the present invention to provide a control for copiers adapted on a fault in the copier fuser to preclude restarting of the copier until the fault is corrected.

It is an object of the present invention to provide a control for reproduction systems effective to distinguish between transport jams and fuser faults.

It is an object of the present invention to provide a copier incorporating means designed to avoid unnecessary opening of the copier fuser in the event of a malfunction related shut down of the copier.

This invention relates to a document reproduction system comprising in combination: a processor; means to bring copy sheets from a supply into operative relationship with the processor; fusing means to fix the image on the copy sheets following imaging thereof; means responsive to a fault in said fusing means to shut down the processor; locking means triggered by the fault responsive means to inhibit restarting of the processor; and restart controlling means responsive to correction of the fault in the fusing means to release the locking means and allow restarting of the processor.

Other objects and advantages will be apparent from the following description and drawings in which:

FIG. 1 is a schematic sectional view of an electrostatic type reproduction machine embodying the improved control means of the present invention;

FIG. 2 is a top view of the reproduction machine shown in FIG. 1;

FIG. 3 is an enlarged sectional view of the automatic document handler for the reproduction machine shown in FIG. 1; and

FIG. 4 is a schematic circuit representation of the improved control means of the present invention.

Referring particularly to FIGS. 1 and 2 of the drawings, an exemplary copier/reproduction machine, designated generally by the numeral **10**, and incorporating the automatic program or job recovery arrangement of the present invention, is shown. As in all electrostatic systems such as the xerographic type machine illustrated, a light-image of a document to be reproduced is projected onto the sensitized surface of a xerographic plate to form an electrostatic latent image thereon. Thereafter, the latent image is developed with an oppositely charged developing material to form a xerographic powder or toner image, corresponding to the latent image on the plate surface. The toner image is then electrostatically transferred to a support surface where it is fused by a fusing device so that the toner image is permanently adhered to the support surface.

In the coper **10**, an original document **12** to be copied is placed upon a transparent platen **14** fixedly arranged in an illumination assembly, generally indicated by the reference numeral **15**, and disposed at one end of the copier **10**. While upon the platen, the document **12** is illuminated, thereby producing image rays corresponding to the informational areas on the original. The image rays are projected by means of an optical system onto the photosensitive surface of a xerographic plate. In the exemplary copier/reproduction machine **10**, the xerographic plate is in the form of a flexible photoconductive belt **17** supported in a belt assembly **18**.

The support assembly **18** for photoconductive belt **17** includes three rollers **20, 21** and **22** located with parallel axes at approximately the apices of a triangle. The upper roller **22** is rotatably supported on shaft **23** which in turn is rotatably driven by a suitable motor and drive means (not shown) to drive belt **17** in the direction shown by the arrow in FIG. **1**. During this movement of the belt, the reflected light image of the original document **12** on platen **14** is flashed upon the photoreceptor surface of belt **17** at an exposure station **25** to produce an electrostatic latent image thereon.

The electrostatic image is carried on belt **17** from exposure station **25** through developing station **26** where the latent electrostatic image is developed by means of toner through the use of a multiple magnetic brush system **29**. From developer station **26**, the now developed image on belt **17** moves to transfer station **30** where the developed image is transferred to a support surface, normally a sheet of copy paper **31**, brought from main or auxiliary paper trays **34** or **35**, respectively, as will appear. The copy sheet **31** passes between transfer roller **32** and belt **17** at transfer station **30** at a speed substantially equal to the speed of belt **17**, transfer taking place by means of electrical bias on transfer roller **32** in a manner understood by those skilled in the art.

Following transfer, the belt **17** is cleaned in preparation for the next image at cleaning station **36**. There, a suitable cleaning brush **37** housed in vacuum chamber **38** removes residual toner, the toner being drawn from chamber **38** by vacuum through line **39** for deposit in a suitable collecting place (not shown). To assist cleaning, a cleaning corotron **40** is provided upstream of vacuum chamber **38**.

Following cleaning of belt **17**, the belt **17** is once again charged as by charging corotron **41** in preparation for the next image.

It will be understood that whenever copier **10** is operated to make multiple copies, a number of images **42**

may be on belt 17 simultaneously in various process stages as described above.

Photoconductive belt 17 comprises a photoconductive layer of selenium, which is the light receiving surface and image medium for the apparatus, on a conductive backing. Further details regarding the structure of the belt assembly and its relationship with the machine and support therefor may be found in the copending application Ser. No. 102,312 filed Dec. 29, 1970.

Copy sheets 31 are supplied from either main paper tray 34 or auxiliary paper tray 35. Main paper tray 34 includes a suitable elevator type base 44 on which a supply 45 of sheets 31 rest, base 44 being supported for automatic up and down movement by suitable means (not shown) designed to maintain paper feed roll 46 in operative contact with the topmost one of the sheets 31 on elevator 44. Feed roll 46, which is operated intermittently in the direction shown by the solid line arrow in timed relationship to the spacing of images 42 on belt 17, serves to advance the topmost sheet from supply stack 45 into the nip of belt and feed roll pair 47, 48, respectively, which in turn carry the sheet onto main paper supply transport 50.

Transport 50 includes one or more endless feed belts 51 stretched about support rollers 52, one or both of which are suitably driven. Sheet guides 54 are disposed in operative position above transport belts 51, guides 54 serving to maintain the sheets 31 in operative contact with belt 51 of paper supply transport 50 during movement therealong. Transport 50 carries the sheets 31 forward to transfer roll 32.

Auxiliary tray 35, in the exemplary arrangement shown, is arranged above main tray 34, auxiliary tray 35 including a suitable elevator type base 55 on which a supply of sheets 31 may be provided. As with main supply tray 34 suitable means (not shown) are provided to raise base 55 of auxiliary tray 35 as the supply of sheets thereon are used up so as to maintain the paper feed roll 56 for auxiliary tray 35 in operative contact with the topmost sheet. Paper feed roll 56, which is intermittently driven in the same manner as main tray feed roll 46, advances one sheet at a time into the nip of belt and roller feed pair 57, 58 which in turn carry the sheets forward to auxiliary paper supply transport 59. Transport 59 which comprises one or more endless belts 60 stretched about support rollers 61, one or both of which are suitably driven, is disposed to discharge sheets 31 drawn from auxiliary tray 35 onto the operating run of main supply transport 50. The sheets 31 from auxiliary tray 35 are thereafter fed to transfer roll 32. Guides 63 serve to maintain the sheets in driving contact with the auxiliary paper supply transport 59 during movement therealong.

Transfer roll 32 is provided with a suitable bias designed to electrostatically attract and attach sheets 31 thereto. In this way, the sheets 31 discharged from main supply transport 50 are carried by transfer roller 32 past belt 17 and in spaced but operative relationship therewith to vacuum transport 65. It is understood that transfer of the image from belt 17 to copy sheet 31 takes place as the sheet 31 passes between transfer roller 32 and belt 17.

Following transfer, the copy sheet 31 is stripped from belt 17 by suitable means (not shown), the image bearing sheets being carried by vacuum transport 65 to a fuser 69. Transport 65 includes a vacuum plenum 66 to which vacuum is supplied from a suitable source (not shown). Transport 65 includes an endless conveyor belt 67 arranged about rollers 68, belt 67 having suitable perforations therethrough which enable vacuum from plenum 66 to tack the sheets 31 being fed thereto.

Fuser 69 includes a suitable housing 70 within which is disposed a lower heated fuser roll 71 and an upper pressure roll 72, rolls 71, 72 cooperating to form a nip through which the copy sheets 31 pass. Rolls 71, 72 are suitably supported for rotation and driven in unison by a suitable drive means (not shown). Pressure roll 72 is comprised of a relatively soft rubber like material with the result that pressure contact between the rolls 71, 72 deforms the surface of pressure roll 72. In this way, an increased contact arc between the copy sheet and the heated fuser roll 71 is obtained.

In the exemplary arrangement illustrated, fuser roll 71 is hollow, roll 71 being formed from a suitable heat conductive material. A source of heat such as lamp 73 is disposed therewithin. A suitable temperature variable resistor, i.e. thermistor 74 is supported on the fuser housing 70 in heat exchange relation therewith to sense temperature conditions within fuser 69. Suitable control circuitry (not shown) for controlling fuser lamp 73 in response to fuser temperature conditions as sensed by thermistor 74 is provided.

Copy sheets 31 leaving fuser 69 are carried by intermediate copy output transport 75 to copy output transport 76 and from transport 76 to either copy discharge transport 78 or to the inlet of a copy sheet handling device such as the sorter 100. Where sorter 100 is not in use or where no sheet handling device is provided a blocking gate 79 serves to route all copies onto discharge transport 78. Discharge transport 78 carries the copies to output tray 80.

Copy output transports 75, 76 and copy discharge transport 78 each have one or more endless conveyor belts 81 operatively disposed about support rollers 82 therefor, one or both of which may be driven. Guides 83 are disposed in operative relationship with each of the transports 75, 76, 78, guides 83 serving to maintain the copy sheets in operative contact with the conveyor belts associated therewith.

Guides 54, 63, 83 are releasably supported to enable their respective transports to be cleared in the event of a jam. Sensors 84, disposed in operative relationship with the guides 54, 63, 83 for transports 50, 59, 75, 76, 78, serve to prove release of the guides by the user following a jam, restarting of the copying machine 10 being precluded until sensors 84 are activated by opening of the guides 54, 63, 83 as will appear.

In the exemplary arrangement shown in FIG. 1, a sorter 100 is operatively coupled to copier 10. Sorter 100 serves to sort copies 31 as they agress from copier 10. Sorter 100 includes a suitable frame 102 which is preferably mounted on castors 103 to facilitate moving sorter 100 about. Sorter 100 includes upper and lower copy bin rows 105, 106 respectively. Each row 105, 106 contains a plurality of spaced downwardly inclined bins or trays 108 for receiving and holding copies being sorted, each bin 108 being open at the top to provide an inlet 109 through which the copies pass into the bin.

A generally horizontal copy sheet transport 110, 111 is spacedly disposed above each row 105, 106 of bins 108 opposite inlets 109 thereto, the operating length of transports 110, 111 being sufficient to enable trans-

ports 110, 111 to carry the copies to the endmost one of the bins. Transports 110, 111 each comprise one or more endless conveyor belts 114 supported on rollers 115, one or both of which may be driven by a suitable means (not shown). A series of idler rolls 117 are arranged below and in operative contact with the lower operating run of transports 110, 111, an idler roll 117 being provided adjacent the inlet 109 to each bin 108. Idler rollers 117 serve both to hold the copies in operative contact with the transport conveyor belts 114 and as a base about which copies are born by the adjoining deflector 120 into the inlet 109 bin therebelow. An individually actuable deflector 120 is arranged slightly downstream of each roller 117. When actuated to a raised position, the deflectors 120 cooperate with the surface of the roller 117 to turn a copy from the sheet transport 110 or 111 associated therewith into bin 108 therebelow.

Sorter 100 includes a copy sheet inlet 122 formed by sheet guide pair 123, the height of sorter inlet 122 being approximately the same as the operating height of copier discharge transport 76. In this way copies from discharge transport 76 pass into sorter 100 and are sorted thereby, it being understood that in this mode of operation gate 79 of copier 10 is in the down position.

A sorter feed roll pair 125 are provided adjacent the discharge side of inlet guide 123. Roll pair 125, which are driven in the direction shown by the solid line arrow of the drawings, serve to carry the copy forward into the sorter 100. A movable sorter inlet deflector 130 is provided just downstream of roll pair 120, deflector 130 serving when in the solid line position shown in the drawings to direct the copies to transport 111 and lower bin row 106.

To enable the copy sheets 31 to be fed to transport 111, and upper bin row 105, an elevator transport 132 is provided. Transport 132 comprises one or more endless belts 133 supported by roll pair 134, one or both of which are driven by suitable means (not shown). A series of idler rollers 135 are disposed in contact with the operating run of transport belt 134, rolls 135 serving to hold the copy sheets on transport 132. Vertical transport 132 is disposed just downstream of roller pair 125 and in operative relationship with deflector 130 such that deflector 130 when moved to the dotted line position shown in the drawings, serve to route the copy sheet 31 emerging from roll pair 125 onto transport 132.

A curved paper guide pair 138 is operatively disposed between the upper discharge end of transport 132 and the inlet to upper transport 111. Guide pair 138 serves to turn the copy sheets leaving transport 132 through an arc of approximately 90° to upper bin transport 111.

During use, copy sheets 31 leaving copier 110 enter inlet 122 of sorter 100 and are forwarded by roll pair 125 to either lower bin transport 111 or to elevator transport 132 depending on the position of deflector 130. Copy sheets routed onto transport 132 are carried upwardly thereby to upper bin transport 110. Copy sheets 31 from either transport 110 or 111 are routed into selected bins 108 of either upper or lower bins rows 105, 106, respectively, through selective actuation of deflector 120.

In the exemplary arrangement shown, an automatic document handler designated generally by the numeral 150 and seen best in FIG. 3 is provided. As will appear, document handler 150 serves to feed one document at a time from a supply of documents 151 into copying position on platen 14 of copier 10 where a copy or series of copies may be made. Following copying, each document is automatically returned to the document supply 151 and the next document, if any, is brought into copying position on platen 14. As will appear documents returned to supply 151 may be recycled by handler 150 or simply removed by the user when the copying program is completed.

Document handler 150 includes an inclined base section 153, the lower end of which swingably supports by means of shaft 154, matching left and right hand tray members 155. The trays 155 are substantially U-shaped when seen in cross section, each having a base 157, a top 158 spaced thereabove, and sides 159. A portion of the base 157 of each tray member is cut away at the upper end thereof to accommodate primary document feeder roll 160. The trays 155 are adjustable along shaft 154 to accommodate various size documents.

Document feeder roll 160 is rotatably supported under base section 153 on drive shaft 161 such that a portion of the periphery of roll 160 projects into the document tray area, base 153 being suitably apertured to accommodate the roll 160. Feeder roll shaft 161 is suitably supported for rotation and driven by suitable means (not shown) in the direction shown by the solid line arrow of FIG. 3.

A pair of document limiting rolls 163, 164 are disposed on the downstream side of feeder roll 160, rolls 163, 164 functioning to prevent passage of more than one document at a time. Shaft 165 of lower limiting roll 164 is turned in the direction shown by the solid line arrow of FIG. 3. Upper limiting roll 163, which is supported from shaft 166, is arranged to be driven by lower limiting rolls 164 so long as friction developed between rolls 163, 164 remains above a predetermined setting. In the event of a decrease in roll friction, as occasioned by an attempt of two superimposed documents to pass therethrough, the upper roll 163 is turned in a document rejecting direction as shown by the dotted line arrow in FIG. 3 by a suitable drive means (not shown).

Documents emerging from limiting rolls 163, 164 are carried forward by intermediate transports rolls 168, 169 underneath curved document guide fingers 170 to platen transport 171. Transport 171, which may comprise a belt-type conveyor, carried the document onto the platent 14 of copier 10.

A register edge 172 is provided across the inlet side to platen 14, edge 172, serving to register or locate the documents in pre-set position on platen 14 for copying thereof. Platen transport 171 is reversed for this purpose after the document has been carried past register 172, reversal of transport 171 serving to move the document backwards to bring the document trailing edge into abutment with register edge 172. When copying is completed, platen transport 171, is again operated in reverse to carry the document backwards off platen 14, register edge 172 being retracted for this purpose by a suitable means (not shown). The document guide fingers 170 deflect or guide the returning document upwardly into the nip of a first returned transport roll pair 174, roll pair 174 carry the returning document between suitable return guides 176 and into the nip of a

second return transport roll pair **178** which carry the document back into tray members **155, 156.**

To maintain the return documents, which have been designated for convenience by the numeral **151,** segregated from documents **151** awaiting feeding and prevent inadvertent refeeding of returning documents **151** by the primary feeder roll **160** following feed of the last one of the original documents **151,** a displaceable bail or separator bar **180** is provided substantially opposite to and above feeder roll **160.** Bail **180** is supported from a rockable cross shaft **181.** Shaft **181** is suitably journaled in the supporting framework of document handler **150,** base section **153** thereof being suitably apertured to permit disposition of the bail support arms **182** therethrough. Suitable means (not shown) are provided to selectively turn cross shaft **181** and raise bail **180** out from under documents **151** resting thereupon and thereafter return bail **180** back onto the topmost one of the documents.

To help guide the returning documents into the document tray, as well as prevent documents from falling out of the tray, particularly when bail **180** is raised a tray cover **183** is provided. Cover **183** is supported on the shaft **154** to enable the cover **183** to be opened for access to the document tray members **155, 156** as with loading or unloading documents.

Referring to the control schematic of FIG. **4,** sheet jam detectors **220** are provided at strategic locations along the copy path in copier **10** and at the inlet to sorter **100,** detectors **220** serving in association with suitable enabling circuitry to respond to a jam or blockage of the copy sheet path. To sense a fault in fuser **69,** fuser overtemperature detector **260** is provided to protect against excessive temperatures within fuser **69.** The signal output of detectors **220** is fed to transport jam detection circuit **207** while the signal outputs from user detector **260** is fed to fuser fault detection circuit **208.** Circuits **207, 208,** when triggered in response to a fault as detected by one of the detectors **220, 260,** respectively, actuate stop circuit **210** to terminate the copying operation. At the same time the signal from circuits **207, 208** trigger print lock-out circuit **222** which inhibits restarting of copier **10.**

Where transport fault detection circuit **207** is triggered, the signal therefrom sets transport latch circuit **226.** In cases where the fault is in fuser **69,** triggering of fuser circuit **208** sets both fuser latch circuit **228** and transport latch circuit **226.**

The signal output of latch circuits **226, 228** on triggering thereof provides holding signals to stop circuit **210** and print lock-out circuit **222** to prevent resetting thereof to a non-fault condition until such time as the fault has been cleared. Transport reset circuit **230** is provided for resetting transport latch circuit **226,** reset circuit **230** being triggered by input signals from transport detectors **84.** On a transport jam, restarting of copier **10** is precluded until such time as the paper transports **50, 59, 75, 76** and **78** have been at least opened and closed as sensed by transport detector **84.** This presumes that in the process of opening and closing the several paper transports, the operator will remove the jammed material.

Fuser reset circuit **232** is provided for resetting fuser latch circuit **228** to enable copier **10** to be restarted following a fuser fault. A detector **233** is provided on the fuser housing **70,** opening and closing of the fuser housing serving to trigger detector **233.** The resulting signal from detector **233** to reset circuit **232** triggers circuit **232** and the signal therefrom resets fuser latch circuit **228** to enable copier **10** to be restarted.

To prevent copies upstream of fuser **69** from entering the fuser on a fault and perhaps becoming trapped therewithin when copier **10** is shut down, a trap solenoid **235** is provided for fuser inlet transport **65.** Solenoid **235,** which is supported in operative position opposite the lower operating run of transport **65,** has armature **236** thereof arranged upon energization of solenoid **235** to move into physical abutment with a portion of transport frame **66** between the moving transport belts **67** to thereby stop any copy sheets on transport **65** at that point. As will be understood, subsequent copy sheets upstream of transport **65** will be intercepted by trap solenoid **235.**

Discharge deflector **79** includes a suitable solenoid operator **238** therefor adapted when actuated to turn deflector **79** to the dotted line position shown in FIG. **1.** In this position, copies are directed into the inlet of sorter **100.** Suitable bias means (not shown) turn deflector **79** to the solid line position shown in FIG. **1** upon the deenergization of solenoid **238** so that copies are routed upwardly onto output transport **83** for transfer to tray **80.**

The signal from transport latch circuit **226** upon actuation thereof actuates the operating circuit for solenoid **235** and **238** to prevent sheets upstream of fuser **69** from entering fuser **69** while the deenergizing solenoid **238** to route the copies then in process into paper tray **80.**

On the occasion of a jam in any one of the paper transports, the signal from the detector **220** affected thereby triggers circuit **207** which, in turn, sets transport latch circuit **226** while actuating copier stop and lock-out circuits **210, 222,** respectively. The ensuing signal from transport latch circuit **226** in turn actuates trap solenoid **235** to prevent copies in process from entering the fuser **69** while rendering deflector solenoid **238** inoperative to route the copies then in process into tray **80.** In order to restart the copier **10,** each of the paper transports **50, 59, 75, 76** and **78** must be opened and reclosed to actuate the detectors **84** associated therewith. Following this, combined signal inputs of detectors **84** trigger transport reset circuit **230** which, in turn, resets latch circuit **226** to release trap solenoid **235** and set deflector **79** in the operating position desired. In addition, the signal from circuit **226** resets copier stop and lock out circuits **210** and **222** respectively to enable copier **10** to be restarted.

On a fault in fuser **69** detector **260** triggers fuser fault circuit **208** which, in turn, actuates copier stop circuit **210** to stop copier **10** and lock-out circuit **222** to prevent restarting of copier **10.** At the same time, the signal from circuit **208** energizes both fuser latch circuit **228** and transport latch circuit **226.** As described before, circuit **226** when actuated sets deflector **79** into the tray position while actuating trap solenoid **235.**

To restart following actuation of fuser fault detection circuit **208,** fuser **69** must be opened and the fault corrected. In the case of a paper jam, this requires removal of the paper trapped therewithin. The fuser housing **70** is then reclosed. Closure of fuser housing **70** actuates detector **233** to trigger fuser reset circuit **232** to reset fuser latch circuit **228** and place an enabling signal on print copy stop circuit **222.** Since transport latch circuit **226** was also triggered, the several paper transports

must be opened and reclosed to trigger transport reset circuit **230** which in turn triggers transport latch circuit **226** to restart copier **10.**

As will be understood, where the fault consists of a fuser overtemperature condition, detector **260** reacts to stop copier **10.** In this case the fuser **69** must be opened and the fault corrected to enable copier **10** to be restarted. Where fuser **69** includes a pressure release mechanism of the type described in copending application Ser. No. 214,304, filed Dec. 30, 1971, in the name of Oskar Braun, the signal from fuser fault circuit **208** may also actuate the aforedescribed mechanism to release the pressure between fuser rolls **71, 72** and render fuser **69** inoperative. Resetting of fuser **69** in this case is precluded until the fault is corrected and fuser latch circuit **228** is reset.

Other conditions and/or malfunctions may be envisioned to trigger fuser fault circuit **208** and in this way set both fuser and transport latch circuits **228, 226,** respectively. For example, the opening of a processor interlock or failure of the copy sheet to release from the photoconductive belt **17** following transfer of the image thereto may be considered fuser jams and may be used to trigger fuser fault circuit **208** as described.

While the invention has been described with reference to the structure disclosed, it is not confined to the details set forth, but is intended to cover such modifications or changes as may come within the scope of the following claims.

What is claimed is:

1. In a document reproduction system including a processor, with transport means to bring copy sheets from a supply into operative relationship with the processor and fusing means to fix the image on the copy sheets following transfer of the image thereto, said transport means and said fusing means being openable to permit copy sheets to be removed therefrom in the event of a fault, the combination of:

means responsive to a fault in said fusing means to shut down said processor;

locking means triggered by said fault responsive means to inhibit restarting of said processor; and

restart controlling means responsive to opening and reclosing of both said transport means and said fusing means to release said locking means and allow restarting of said processor.

2. In a reproduction apparatus having a processor for producing copies, means for transporting copy sheets for receipt of images thereon, and a fuser to fix the images on said copy sheets, said transporting means including at least one paper transport, the combination of:

transport fault detecting means actuable in response to a fault in said paper transport;

fuser fault detecting means actuable in response to a fault in said fixing means;

control means to stop said apparatus in response to actuation of either of said transport or fuser fault detecting means;

first lock means adapted when set to prevent restarting of said processor until said transport means is checked; and

second lock means adapted when set to prevent restarting of said processor until said fuser is checked;

said transport fault detecting means serving on actuation to set said first lock means whereby restarting of said apparatus is prevented until said transport means is checked;

said fuser fault detecting means serving on actuation to set both said first and second lock means whereby restarting of said apparatus is prevented until both said transport and said fuser are checked.

* * * * *