

Oct. 27, 1970

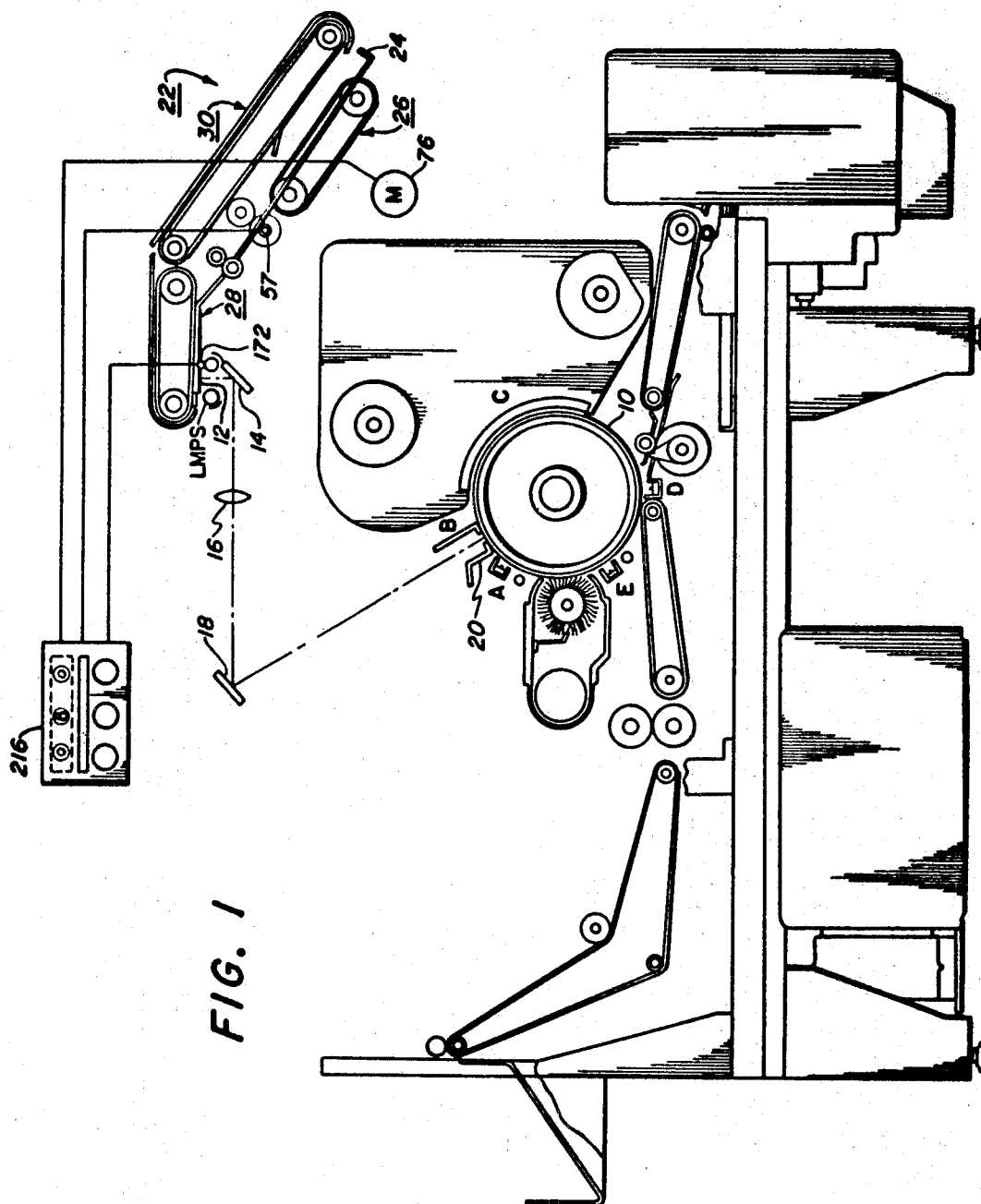
D. R. DERBY

3,536,320

SHEET REGISTRATION DEVICE

Filed Sept. 12, 1968

5 Sheets-Sheet 1



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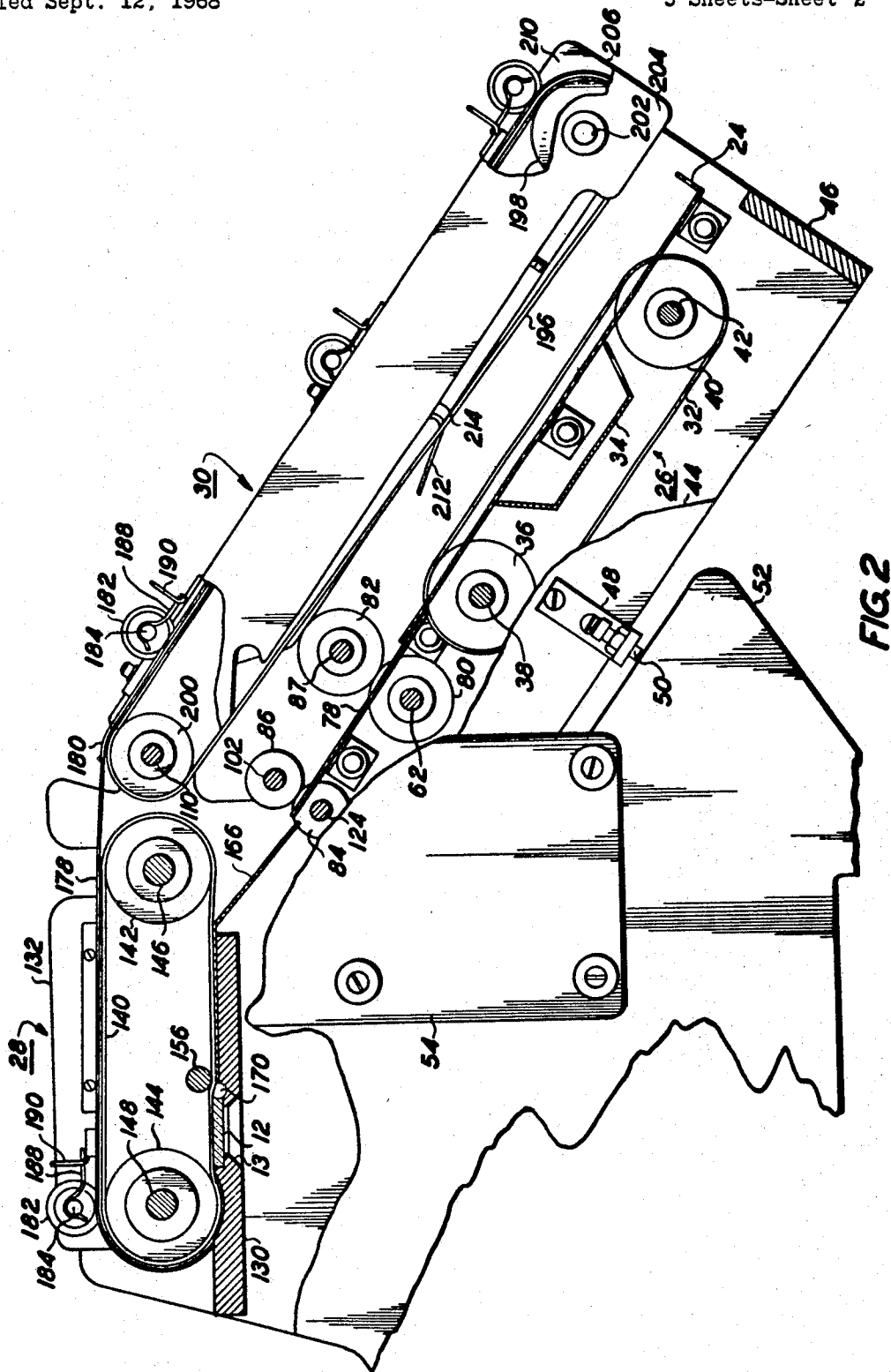
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SHEET REGISTRATION DEVICE

Filed Sept. 12, 1968

5 Sheets-Sheet 2



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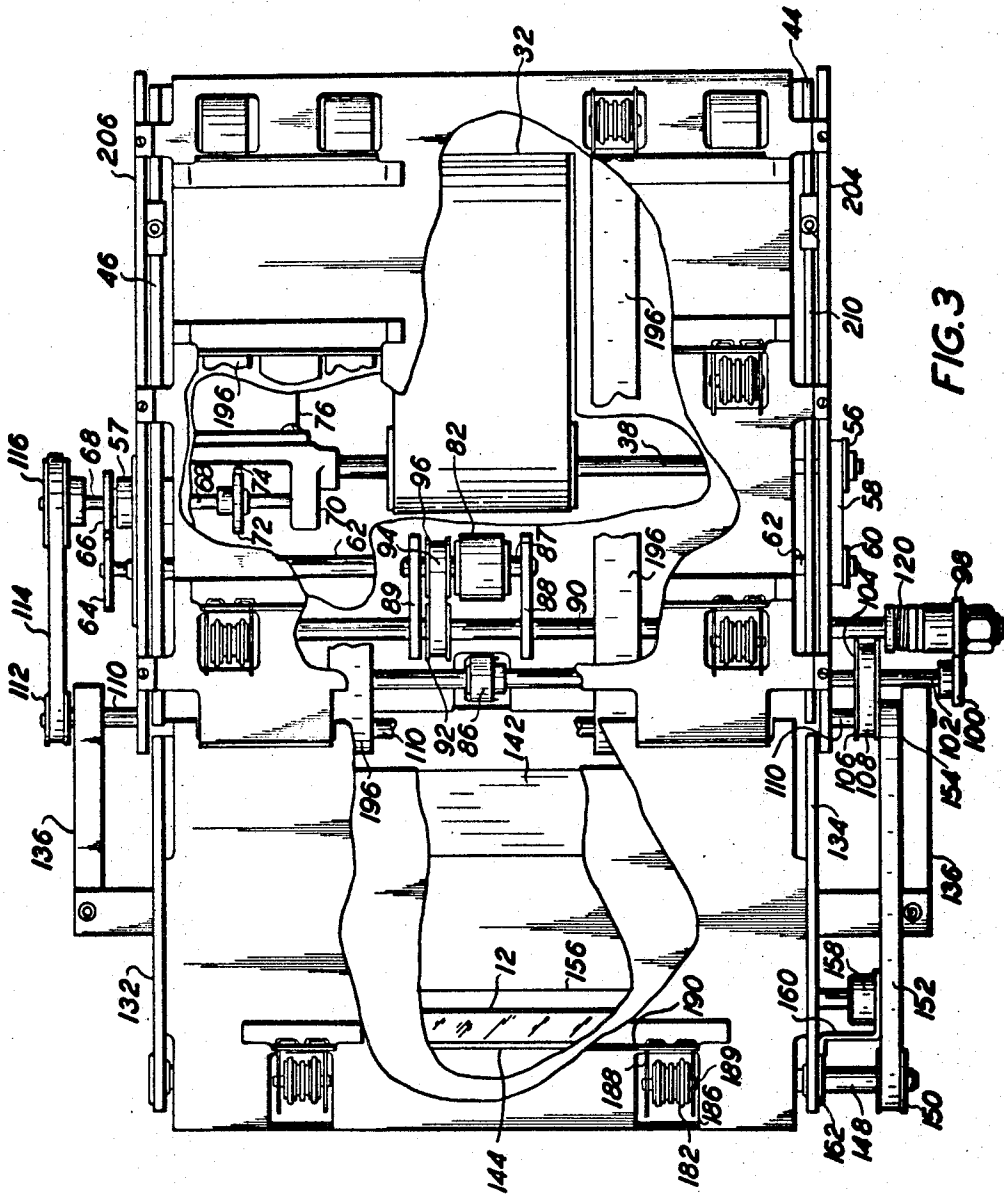
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SHEET REGISTRATION DEVICE

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5 Sheets-Sheet 3



Oct. 27, 1970

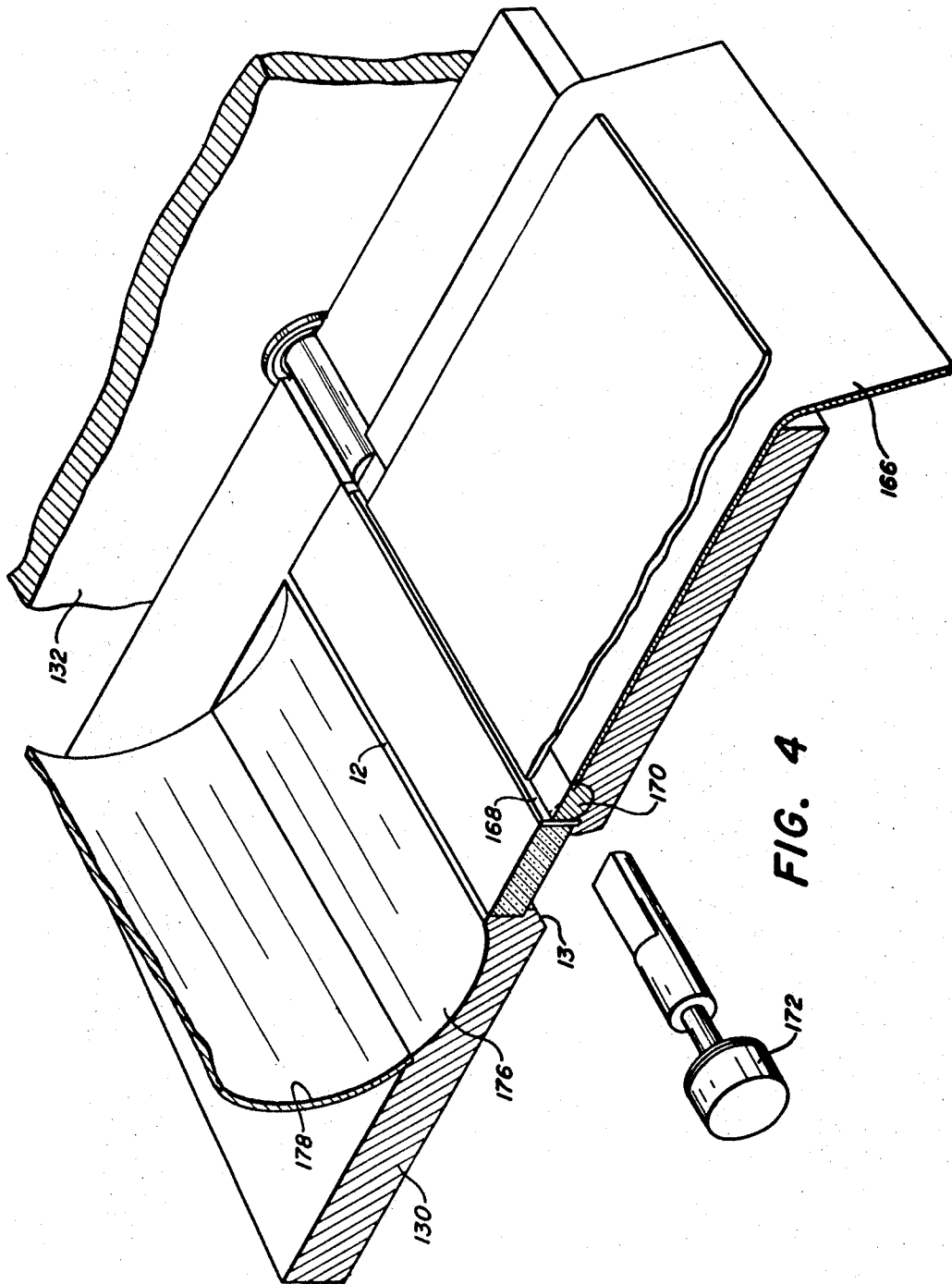
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SHEET REGISTRATION DEVICE

Filed Sept. 12, 1968

5 Sheets-Sheet 4



Oct. 27, 1970

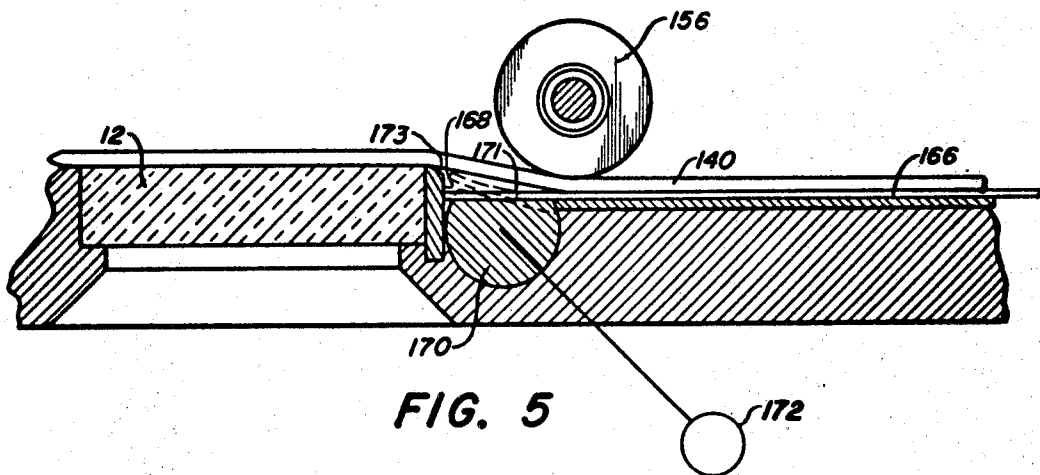
D. R. DERBY

3,536,320

SHEET REGISTRATION DEVICE

Filed Sept. 12, 1968

5 Sheets-Sheet 5



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3,536,320

SHEET REGISTRATION DEVICE

Dan R. Derby, Penfield, N.Y., assignor to Xerox Corporation, Rochester, N.Y., a corporation of New York
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Int. Cl. B65h 9/04

U.S. Cl. 271—50

7 Claims

ABSTRACT OF THE DISCLOSURE

Sheet handling apparatus for forwarding and registering a document which is to be optically exposed as it passes over a transparent optical exposure platen. The apparatus includes an endless belt positioned above an entrance guide plate, the exposure platen, and an exit guide plate with a sheet registration assembly between the entrance guide plate and the platen. The sheet registration assembly includes a vertical abutment surface for halting document movement prior to its travel above the platen for exposure. Positioned between the abutment surface and the entrance guide plate is a member for lifting the leading edge of the halted document to an elevated location at a given command signal so that it may move up a beveled portion of the abutment surface to the exposure platen. A backing roller is positioned above the belt to cause the belt to attain an angular orientation above the lifting member so that the document will not mechanically attach itself to the belt at this time and thus avoid being halted for its registration.

This invention relates to sheet handling apparatus and more particularly to apparatus for feeding a document to be optically exposed across a transparent exposure platen, the apparatus having included therewith an assembly to insure that the fed document stopped in a fixed orientation until the beginning of optical scan is to occur.

In the practice of xerography as described in U.S. Pat. No. 2,297,691 to Chester F. Carlson, a xerographic surface comprising a layer of photoconductive insulating material affixed to a conductive backing is used to support latent electrostatic images. In the usual manner of carrying out the process, the xerographic surface is electrostatically charged uniformly over its surface and then exposed to a light pattern of the image being reproduced to thereby discharge the charge to the areas where light strikes the layer. The undischarged areas of the layer thus form an electrostatic charge pattern in conformity with the configuration of the original light pattern.

The latent electrostatic image can then be developed by contacting it with a finely divided electrostatically attractable material, such as, a powder. The powder is held in image areas by the electrostatic charges on the layer. Where the charge field is greatest, the greatest amount of material is deposited. Where the charge field is least, little or no material is deposited. Thus a powder image is produced in conformity with a light image of copy being reproduced. The powder is subsequently transferred to a sheet of paper or other surface and suitably affixed thereto to form a permanent print.

One commercially used machine for carrying out this process is that described in U.S. Pat. No. 3,301,126 to Osborne et al. In the use of that device, it is necessary to manually change the document on the platen being reproduced after the desired number of copies have been made. Other documents may then be sequentially placed on the platen of the machine and the proper number of copies made. If the copies are to be used as multiple page reports, books or the like, it is necessary for an operator to appropriately sort or collate the copy from the copy catch of the machine.

2

One technique for expanding the utility of machines of the type described above is to employ a copy sorter of the type described in U.S. patent application Ser. No. 574,990 filed Aug. 25, 1966, now U.S. Pat. No. 3,467,371 in the names of James E. Britt et al. According to that disclosure, the xerographic copy output is directed to appropriate preselected bins. In other words, although the first page of a report is reproduced several times before each successive page is reproduced, each bin of the sorter will receive only one of each page being reproduced. In this manner, each bin will receive a set of copies correlated as the original set and the output copy is thus collated.

The present invention is directed to apparatus for creating collated output, not by collating the output, but rather by collating the input. More specifically, the present invention is directed to sheet handling apparatus including sheet feeding and registration mechanisms whereby sequentially fed documents may be halted and then refeed so that their optical scanning may be initiated in proper timed relationship with other correlated machine functions.

It is therefore an object of the instant invention to sequentially feed documents from a support tray, across a work station and then back to the support means in a timed sequence.

It is another object of the instant invention to sequentially feed sheet material across a work area upon a command signal.

It is a further object of the instant invention to sequentially feed a document to an exposure station, halt the document and then refeed it across the exposure station at a predetermined time.

It is a further object of the instant invention to prevent the movement of documents to be scanned until the occurrence of a predetermined signal.

It is a further object of the instant invention to assure alignment of documents moves past an optical exposure station.

It is a further object of the instant invention to feed sheet material toward a work station, halt the fed sheet material, align the front edge of the sheet material to render it normal to its path of movement and then refeed it to the work station in proper alignment.

These and other objects of the instant invention are attained by means of a sheet handling apparatus including an endless document feed belt. The belt is positioned above an entrance guide plate, a transparent optical exposure platen, and an exit guide plate. The apparatus also includes a sheet registration assembly between the entrance guide plate and the exposure platen. The sheet registration assembly includes a vertical abutment surface for halting document movement and aligning its front edge prior to its travel above the exposure platen for exposure. Positioned between the abutment surface and the entrance guide plate, in a plane with the guide plate, is a member lifting the leading edge of the halted document to an elevated location at a given command signal. In this manner, the halted document may move up a beveled portion of the abutment surface to the exposure platen. A backing roller is positioned above the document feed belt adjacent the lifting member to cause the belt to attain an increased angular orientation above the lifting member so that the document will not mechanically attach itself to the belt at this time and thus avoid being halted for its registration.

For a better understanding of the instant invention as well as further objects and features thereof, reference is had to the following detailed description of the invention wherein:

FIG. 1 illustrates schematically a continuous and automatic xerographic reproducing machine equipped with the

3

4

document feeder and sheet registration assembly of the instant invention;

FIG. 2 is an enlarged side view of the feeding and registration apparatus as shown in FIG. 1;

FIG. 3 is a top plan view of the apparatus of FIG. 2.

FIG. 4 is a perspective view of the exposure area of the document feeding apparatus and sheet registration assembly as shown in FIGS. 1-3; and

FIG. 5 is an enlarged side view of the sheet registration assembly as shown in FIGS. 1 through 4.

Referring now to the drawings, there is shown in FIG. 1 an embodiment of the subject invention in a suitable environment such as an automatic xerographic reproducing machine. The automatic xerographic reproducing machine includes a xerographic plate or surface 10 formed in the shape of a drum. The plate has a photoconductive layer or light receiving surface on a conductive backing, journaled in a frame to rotate in the direction indicated by the arrow. The rotation will cause the plate surface to sequentially pass a series of xerographic processing stations. For the purposes of the present disclosure, the several xerographic processing stations in the path of movement of the plate surface may be described functionally, as follows:

A charging station A, at which a uniform electrostatic charge is deposited on the photoconductive plate;

An exposure station B, at which light or radiation pattern of copy to be reproduced is projected onto the plate surface to dissipate the charge in the exposed areas thereof to thereby form a latent electrostatic image of the copy to be reproduced;

A developing station C at which xerographic developing material, including toner particles having an electrostatic charge opposite to that of the latent electrostatic image, is cascaded over the plate surface whereby the toner particles adhere to the latent electrostatic image to form a toner-powder image in a configuration of the copy being reproduced;

A transfer station D at which the toner-powder image is electrostatically transferred from the plate surface to a transfer material or a support surface; and,

A drum cleaning and discharge station E at which the plate surface is brushed to remove residual toner particles remaining thereon after image transfer and exposed to a relatively bright light source to effect substantially complete discharge of any residual electrostatic charge remaining thereon.

The sheet feeding and transport elements are shown in FIG. 1 in association with a xerographic machine with which they may be used. A transparent plate or glass 12 is mounted in exposure slot 13 over which the document to be reproduced is moved, is illuminated by lamps LMPS. Light images emanating from the glass 12 are projected toward the xerographic surface 10 through object mirror 14, lens 16, image mirror 18 and through a slot in light shield 20 for exposing the charged xerographic surface in conformity with the light pattern on the document being reproduced. The speed of movement of the document and xerographic surface is correlated to create undistorted copies of the document.

The document or sheet handling apparatus is indicated generally as numeral 22 and includes a sheet support tray 24, a sheet feeding station 26, a primary transport station 28, and a sheet return station 30 which functionally interact to effect the desired recirculation of documents being reproduced. Greater details of these stations may be seen in FIGS. 2, 3 and 4.

Documents to be fed by the instant apparatus are placed on apertured feed belt 32 with the image side of the documents facing downwardly. The first document to be reproduced is placed in contact with the face of the feed belt and documents to be successively reproduced, positioned thereabove. A vacuum chamber 34 in communication with a suitable source of negative pressure, not shown, is provided beneath the central portion of the feed belt to hold the lowermost document of the stack in association with the belt for being frictionally trans-

ported thereby. Feed belt 32 is supported at its first end by a driven feed roll 36 mounted on shaft 38 and, at its other end, by idler roll 40 supported on idler roll shaft 42. Shafts 38 and 42 are supported in the sheet feeding station by side frames 44 and 46. The inboard frame has secured thereto an adjustment bracket 48 with adjusting screw 50 riding against machine frame section 52 for varying the angle of repose of the sheet feeding station 26. Bracket plates 54 on opposite sides of the side frames secure the sheet feeding mechanism to the xerographic reproducing machine with which it may be employed.

Shaft 38, which imparts motion to the sheet feeding belt 32, is provided at one end with a pulley 56. Belt 58 connects pulley 56 with cooperating pulley 60 mounted for rotation on shaft 62. The end of the shaft 62, remote from pulley 60, is provided with gear 64 in meshing relationship with gear 66. Gear 66 is coaxially secured to clutch 57 and mounted for rotation on shaft 68 while the opposite end of shaft 66 is supported by a fixed support member 70. This support member 70, in addition to supporting the inboard end of shaft 68, supports the end of shaft 38 remote from pulley 56. Also mounted for rotation on shaft 68 is gear 72 which rides in meshing relationship with gear 74, the output member of main driver motor 76.

Gear 66 is not directly mounted for continuous concurrent rotation with shaft 68. Rather, it may be operably coupled to electric clutch 57. Both electric clutch 57 and gear 66 have an axis of rotation which is the axis of rotation of shaft 68. When electric clutch 57 is engaged, it couples to gear 66 to rotate with shaft 68 to drive belt 32. When disengaged, clutch 57 permits the inactivation of gear 66 and belt 32 while other machine parts may be driven through pulley 116 in a manner to be described.

Mounted upstream from the feed belt 32 in apertures formed in a guide plate 78 are sheet separating rolls 80, 82 and driven pinch rolls 84, 86. The lower of the sheet separating rolls 80 is mounted on the previously mentioned shaft 62 for rotation in the same direction and at the same speed as shaft 38 and drive belt 32. The upper separating roll 82 is mounted on shaft 87 the opposite ends of which are journaled in support plates 88 and 89. The support plates are journaled on shaft 90, the power imparting shaft for the upper separating roll 82. Rotation of shaft 90 rotates pulley 92, belt 94 and pulley 96 to thereby rotate upper separating roll 82 in a sheet rejecting direction. The opposite ends of shaft 90 are mounted for rotation in the side frames 44 and 46.

Power is imparted to shaft 90 through intermeshing gears 98 and 100. Gear 100 is mounted on shaft 102 which also supports pulley 104. Pulley 104 is connected to pulley 106 through belt 108. Pulley 106 is mounted on shaft 110, the opposite end of which supports pulley 112. Pulley 112 is connected through belt 114 to pulley 116 on the aforementioned driven shaft 68 for imparting motion to the upper sheet separating roll 82 through main drive motor 76.

The drive linkage between motor 76 and the upper separating roll 82 tends to rotate that roll against the sheet feeding direction, i.e., in a sheet rejecting direction. Operatively coupled within the linkage tending to drive the upper separator roll is a slip clutch 120. The slip clutch is of such magnitude that when a single sheet or no sheet is positioned between the upper and lower separating rolls 80 and 82, the frictional impetus of the driven roll 80 will rotate the upper roll 82 in a sheet feeding direction, against its driven direction, to advance a sheet. This is accomplished because the slip clutch 120 will begin to slip under these conditions. If, however, two or more sheets are fed into the nip between rollers 80 and 82, the frictional force between these two rollers will be effectively increased due to the decreased coefficient of friction effectively present therebetween. In this mode of operation, the upper reject roll 82 will be driven in its normal sheet rejecting direction through the driving of motor 76 as imparted to the shaft 90 and roller 82 through the non-

slipping effect of clutch 120. In this manner, the prevention of double sheet feeds is accomplished.

The last motion imparting elements mounted on the sheet feeding station side plates 44 and 46 are the pinch rolls 84 and 86. The upper pinch roll 86 is mounted on the aforementioned shaft 102 for driving this roll in a sheet feeding direction. The lower pinch roll 84 is mounted on shaft 124 which is journaled for free rotation in the frame portions 44 and 46. These rolls function to constantly urge the single sheet fed by feed belt 32 and separating rolls 80 and 82 into the primary transport station 28.

The primary transport station 28 is mounted on a machined base plate 130 in which the exposure slot 13 and transparent plate 12 are located. Upstanding from the sides of the base plate 130 are primary transport station side plates 132 and 134 which support the functioning elements of this station. Mounting bracket 136 on opposite sides of the base plate 130 retain several of the drive shafts as well as support this station in location on the reproducing machine.

The primary transport belt 140 is supported for rotation in the direction of document feed by idler support roll 142 and drive support roll 144. Idler support roll 142 is mounted on shaft 146 which is journaled for rotation in side plates 132 and 134. Drive roller 144 is mounted for rotation with shaft 148. This shaft is mounted in side plates 132, 134 and at its one end supports pulley 150. Pulley 150 is connected through belt 152 to pulley 143 on aforementioned driven shaft 110. Tensioner shaft 156 is mounted for rotation at one end in side plate 132 and at its other end by journal member 158 secured on extension plate 160 which in turn is mounted on bearing member 162 of side plate 134. In this manner, belt 140 functions to feed the document past the exposure slot and glass 12 and 13 for projecting light images to the xerographic surface 10.

The guiding of sheets moving from the sheet support station to the primary transport station is accomplished by a lead in baffle 166. Motion of the advancing sheet is stopped when the leading edge strikes a vertical bearing surface 168 at the exposure slot. At this time, the leading edge of the paper is resting on a flat section of rotary rod 170 which, when pivoted on its axis by rotary solenoid 172, lifts the leading edge into contact with the drive belt 140. This permits the feed belt 140 to further move the document to initiate the optical scanning thereof as it passes over the glass 12 and exposure slot 13.

While waiting for actuation of the rotary solenoid, the pinch rolls 84 and 86 may cause a slight buckle in the paper in the area above the lead in baffle 166 prior to the point of contact between the lead in baffle and the primary feed belt 140. At this time, the feeding of the second sheet is prohibited by the sheet separating action of rollers 80 and 82 as described hereinabove.

As shown in FIG. 5, the movement of the document to be reproduced over lead in baffle 166 will cause the leading edge of the document to strike the vertical bearing surface 168. Movement of belt 140 thereacross acts to align the document with surface 168 which is perpendicular to the line of travel of the document. In this position, the leading edge of the document is resting upon a flat portion 171 of rotary rod 170. The tensioner shaft 156 is positioned above the primary transport belt 140 to hold the belt 140 and the document in close contact with the lead in baffle 166. Due to the fact that the vertical bearing surface 168 has its uppermost surface above the level of the horizontal input plate 166, an angle is formed in the run of belt 140 at this location. When the angle is about 12° or more from the horizontal, most weights of paper to be fed through the document feeder will move forwardly against the vertical bearing surface and will not be mechanically attached to the belt for unstopped movement across the platen. In this manner, stoppage of the leading edge of the document will be caused to occur. Note the solid line position of the rotary bar 170 and document in FIG. 5.

Without the tensioner shaft 156 in this location, the transport belt 140 would form a negligible angle of rise between roller 142 and the top of the abutment surface 168. In such a case, a fed document would in some instances be mechanically retained on the belt as it moved onto exposure platen 12 and the stoppage required for registration would not occur.

When the rotary solenoid 172 is actuated by the programmer in synchronism with the reproducing machine to lift the leading edge of the document to its feed position, as shown in the dotted line position of FIG. 5, the leading edge of the document is moved by belt 140 onto a beveled portion 173 of the vertical bearing surface 168. This arrangement permits the smooth flow of the document over the platen 12 during its exposure.

Movement of the leading edge beyond the exposure slot and glass moves the sheet into contact with the arcuate recess 176 in the machine base plate 130. Further motion thereof moves the document into contact with a J-shaped baffle plate 178 which has a profile tracing the shape of the primary feed belt 140 over coincident portions of their extent. The action of the belt will thus move the exposed document in a curved path to effectively reverse its direction and move it back towards the sheet feeding station 26 and support tray 24. The last reached portion of the J-shaped baffle includes a flexible section 180 for permitting the communication of the primary transport station 28 with the sheet return station 30.

A plurality of idler rolls are positioned above the J-shaped baffle to assist in the movement of the document by primary transport belt 140. These idler rolls 182 are mounted for rotation on shafts 184 and extend through apertures 186 in the baffle. Spring wires 188 are mounted on upturned support members 190 of the baffle 178.

Motion of the sheet beyond the primary feed belt 140 and J-shaped baffle 178 will move the exposed document into the sheet return station 30. Motion of the sheet within the sheet return station is accomplished by main sheet return belts 196. Sheet return belts 196 are supported in position by an idler roll 198 and drive roll 200. Idler roll 198 is mounted on shaft 202 which is, in turn, mounted for rotation in the sheet return station frame sections 204 and 206. Drive roller 200 is mounted for rotation with driven shaft 110, previously discussed, for driving the belts 196 in the direction to bring the exposed document sheets back to the sheet support tray 24 for refeeding.

The sheet return station frame sections 204 and 206 are supported for rotation on the aforementioned driven shaft 110. In this manner, the sheet return station 30 may be pivoted out of the way of document support tray 24 for the loading thereof as well as for the clearing of paper jams. Also mounted on the side plates 204 and 206 is a secondary J-shaped baffle 210 for the guiding of documents in their movement by the sheet return belts 196. Idler rollers 182, constructed as those described with respect to the primary transport station, are located in communication with the belts 196 through apertures 184 in this secondary J-shaped baffle.

As the imaged documents move around the sheet return belts 196 adjacent the idler rolls 198, they once again have their image side down, the proper orientation having been reversed adjacent the feed roller 144 of the primary transport assembly. The leading edge of the document then moves beyond the space between the return belts 196 and the curved portion of the sheet return baffle 210. The lead edge of the sheet, with its image side down, is then slid forwardly toward the sheet separating rolls 80 and 82 by the driving force of the sheet return belts 196 driving the trailing portion of the document. This sliding motion of the leading edge of the sheet then continues until the entire document has passed beyond the curved portion of the secondary sheet return baffle 210 to thereby deposit the sheet, image

side down, on the topmost document in the stack on the tray. An extending finger 212 extends between two of the centermost sheet return belts 196 from an intermediate support bracket 214 to insure that the document is not retained on the belts 196 for supplemental recirculation thereby. Such tendency of a document to be retained on this belt may in some instances occur due to adhesive, mechanical or even electrostatic forces generated between the document and the belts 196.

The entire document feeding assembly is rendered operational off of drive motor 76. Drive motor 76 is operated from the main machine cam bank of the reproducing machine through the main programmer 216 as shown in block diagram in FIG. 1. The motor 76 is activated at the proper time from the programmer to initiate the movement from the first document in the stack, the one contacting the sheet feeding belt 32, in timed sequence with the rotation of the xerographic surface 10.

As has been described above, motor 76 acts to rotate gears 74 and 72. This rotation of gear 72 rotates gears 66 and consequently 64 which rotates shaft 62 upon which the lower sheet separating roll 80 is mounted. The rotation of shaft 62 through belt 58 also rotates shaft 38 and the sheet feeding belt 32. Rotation of gear 72, in like manner, rotates shaft 110 through belt 114. The rotation of shaft 110 rotates shaft 102, through belt 108, and shaft 148 through belt 152. Shaft 148 applies the motive power to the primary transport belt 140 while the rotation of shaft 102 rotates the upper pinch roll 86. The rotation of shaft 102 also rotates shaft 90 through gears 98 and 100 as well as through slip clutch assembly 120 to provide the sheet retarding motion to the upper sheet separating roll 82.

When the main machine programmer 216 acts to initiate the motion of the various functioning parts of a document feeder through motor 76 with electric clutch 57 engaged, the first sheet to be imaged is in contact, image side down, with sheet feeding belt 32. It is held in contact therewith by the vacuum source beneath the belts. Motion of the first sheet brings it past the sheet separating rolls 80, 82. The pinch rolls 84, 86 along guide baffle 166 and beneath primary transport belt 140. The upper sheet separating roll 82 is moving in the sheet feeding direction when a single sheet is therebeneath due to the frictional impetus provided by the sheet between the rolls 80 and 82. If, however, a second sheet should frictionally attach to the fed sheet therebeneath, the decreased frictional force as presented by the double sheet feed will permit the reverse rotation of reject roller 82 under the impetus of driving motion through slip clutch 120 to reject the second or improperly moved sheet.

The motion of the lead edge of the first fed sheet is impeded by register plate 168 until the machine programmer 216 trips the rotary solenoid 172 to raise the leading edge of the sheet into contact with the primary transport belt 140. At this time, the lead edge of the sheet is passed over the glass 12 for projecting the light image to the xerographic surface 10. The leading edge then continues its path of travel as defined by the primary transport belt 140 and J-shaped baffle 178 toward the sheet return station, returning to the tray 24 in its original position and orientation.

After the trailing edge of the first fed document has passed the sheet separating station, the next bottommost sheet begins its immediate path of travel following the previously advanced sheet. This second sheet will in like manner be stopped by the register plate 168 and fed across the transparent imaging slot 12 by the subsequent programmed tripping of the rotary solenoid 172 in the same manner as described with respect to the first sheet.

Each sheet then successively moves to the sheet return station 30 for being guided back to its original location on the top of the stack in support tray 24 for sequential imaging after the sheet therebeneath has been forwarded.

When, for example, it is desired to create three collated copies of a twenty page report, sixty is dialed onto the main machine programmer 216. This is because the total copy output of the twenty page report made three times equals sixty. In this manner, the xerographic reproducing machine will initiate the feeding of the first sheet to coincide with the first optical exposure and will inactivate the sheet feeding after the sixtieth exposure or, after each document has been fed through the assembly to create the collated xerographic output.

Inactivation of document feeding apparatus includes the inactivation of electric clutch 57 to stop the rotation of gear 66, shaft 38, shaft 62 along with sheet forwarding belt 32 along with rollers 80 and 82. This is then followed by the inactivation of drive motor 76 after the last document has been returned to the tray 24. This programmed inactivation of the document handling assembly, like the programmed activation thereof, is preferably controlled by the programmer 216 correlated with the reproducing machine with which the document handling apparatus is employed.

While the instant invention, as to its objects and advantages, has been described as carried out in a specific embodiment thereof, it is not desired to be limited thereby; but it is intended to cover the invention broadly within the scope of the appended claims.

What is claimed is:

1. Apparatus for registering fed sheet material comprising

a sheet material guide surface defining part of a sheet material feed path,

a work station, the upper surface of which is raised with respect to said guide surface,

a sheet material abutment surface adjacent said work station substantially normal to the sheet material feed path,

document feed means positioned adjacent said work station and said guide surface on the side of the sheet material feed path remote from said guide surface and said work station for feeding said sheet material along said guide surface to said sheet material abutment surface, and

lifting means to raise the leading edge of a sheet material stopped by said abutment surface to a level whereby further movement of the sheet material across said work station may be attained by the action of said feed means.

2. The apparatus as set forth in claim 1 wherein said sheet material feed means is an endless belt having a relatively flat extent adjacent said guide surface and said work station and further including means contacting said belt adjacent said lifting means to increase the slope of said belt above said lifting means.

3. The apparatus as set forth in claim 2 wherein said lifting means is a rotary member having a flat surface substantially in a plane with said sheet material guide surface and further including means to rotate said rotary member to lift fed sheet material so that they may be conveyed across said work station.

4. The apparatus as set forth in claim 3 wherein the upper portion of said abutment surface adjacent said lifting means is provided with a bevel to facilitate the reception of the leading edge of lifted sheet material between said endless belt and said work station.

5. The apparatus as set forth in claim 3 wherein said work station is a transparent optical exposure platen having a flat, substantially horizontal surface over which said sheet material is fed.

6. Sheet handling apparatus for forwarding and registering a document which is to be optically exposed including

a substantially horizontally disposed entrance guide plate,

an exit guide plate,

a substantially horizontally disposed transparent exposure platen positioned between said guide plates having its upper surface positioned above the surface of said entrance guide plate,
a substantially vertical abutment surface between said entrance guide plate and said exposure platen,
a document raising member located between said entrance guide plate and said abutment surface and having an upper surface normally in substantially horizontal registration with said entrance guide plate,
a document feed belt located above said entrance guide plate and said exposure platen in sliding contact therewith to move a fed document into contact with said abutment surface and then beyond upon the raising of said document raising member, and
a backing member positioned on the side of said belt remote from said entrance guide plate adjacent said lifting member to cause said belt to form an increased angle above said lifting member so that movement of the leading edge of the paper may be arrested by said abutment surface until the raising of said lifting member.

7. The apparatus as set forth in claim 6 and further including a beveled portion on said abutment surface to assist in the movement of a lifted document to between said belt and said exposure platen.

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U.S. Cl. X.R.

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