Jan. 23, 1962 L. J. STUCKENS 3,017,816

PHOTOCOPY APPARATUS

Filed Aug. 13, 1959 3 Sheets-Sheet 1

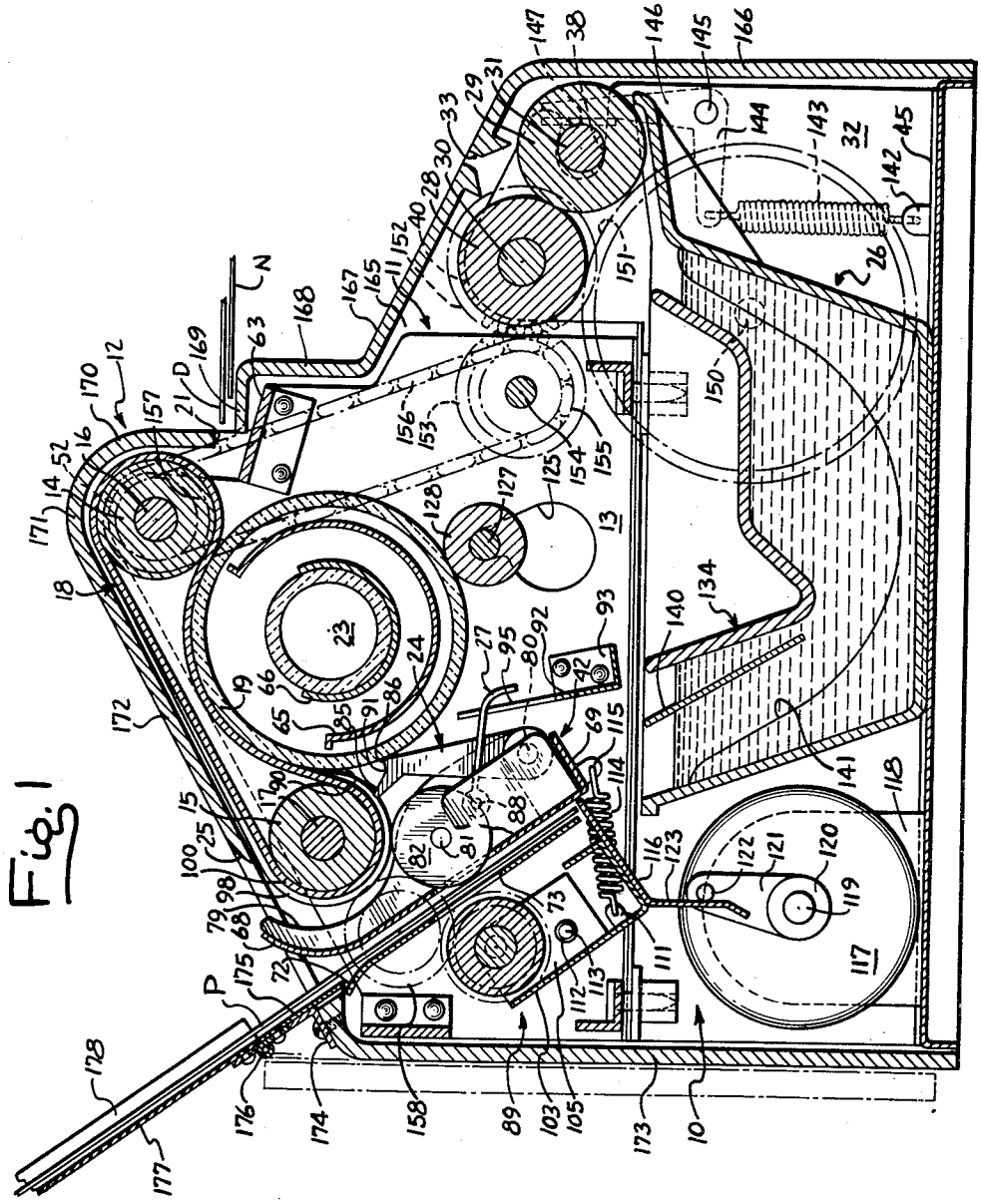


Fig. 1

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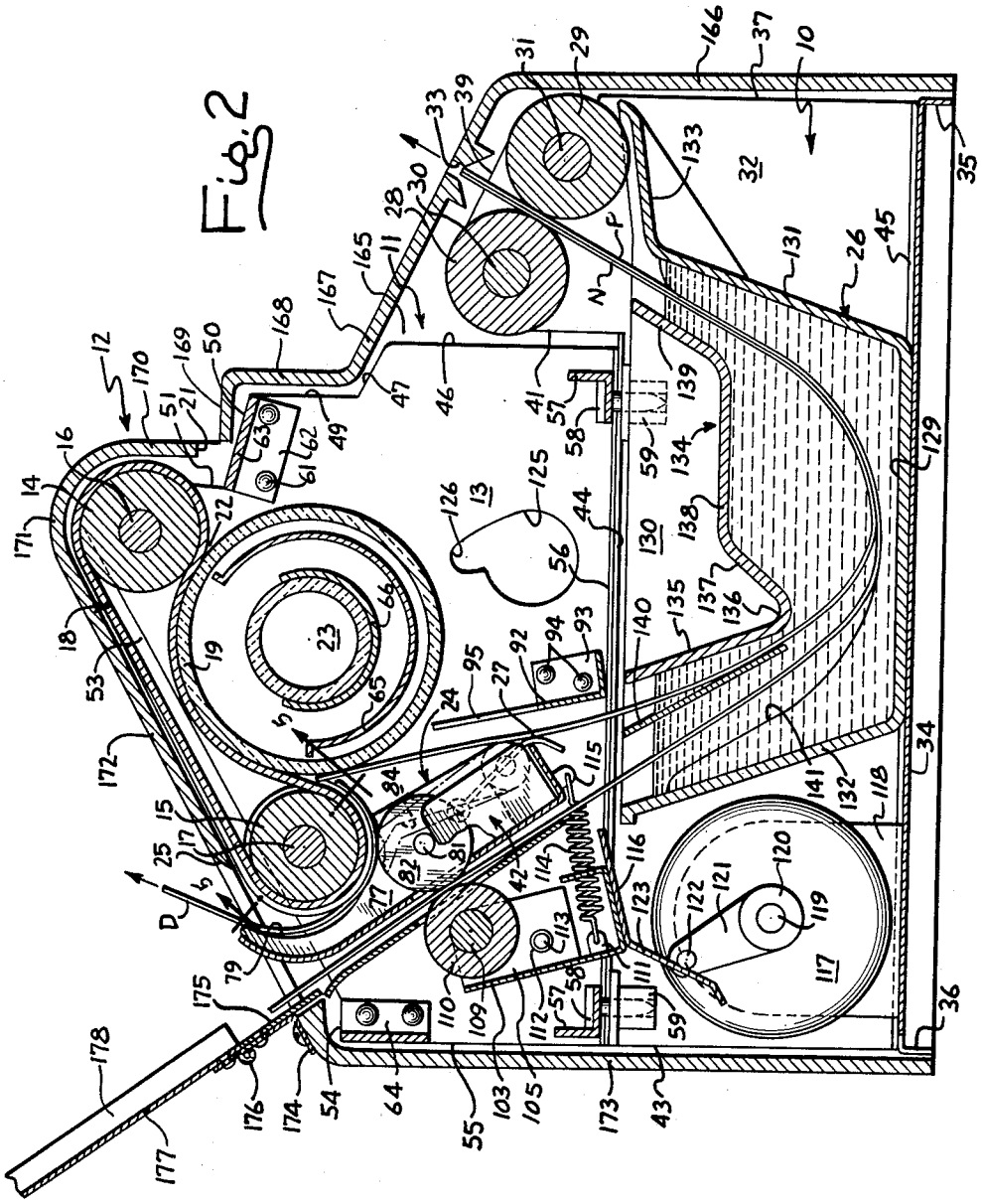
Jan. 23, 1962 L. J. STUCKENS 3,017,816

PHOTOCOPY APPARATUS

Filed Aug. 13, 1959

3 Sheets-Sheet 2

Fig. 2



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PHOTOCOPY APPARATUS

Filed Aug. 13, 1959 3 Sheets-Sheet 3

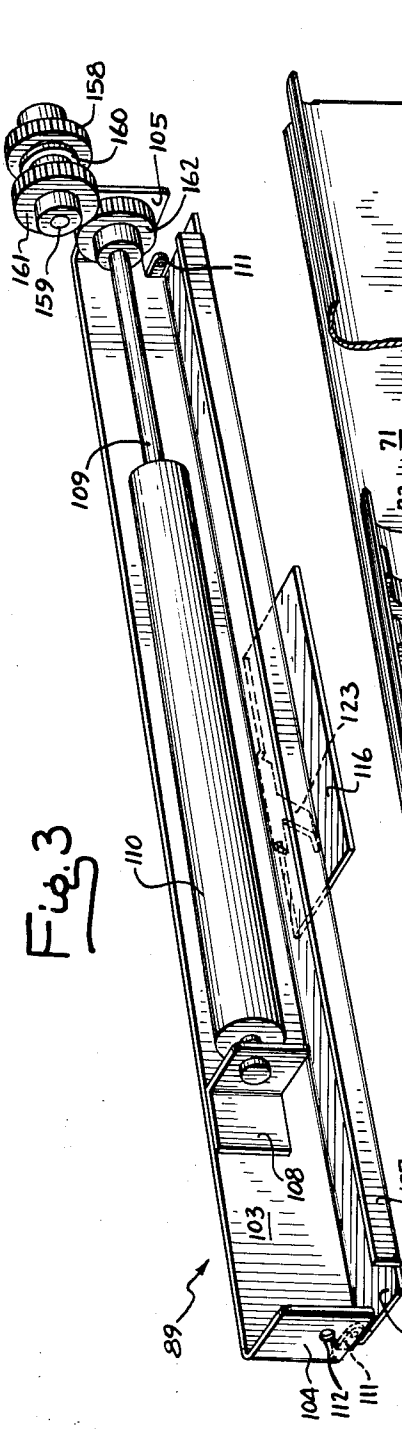


Fig. 3

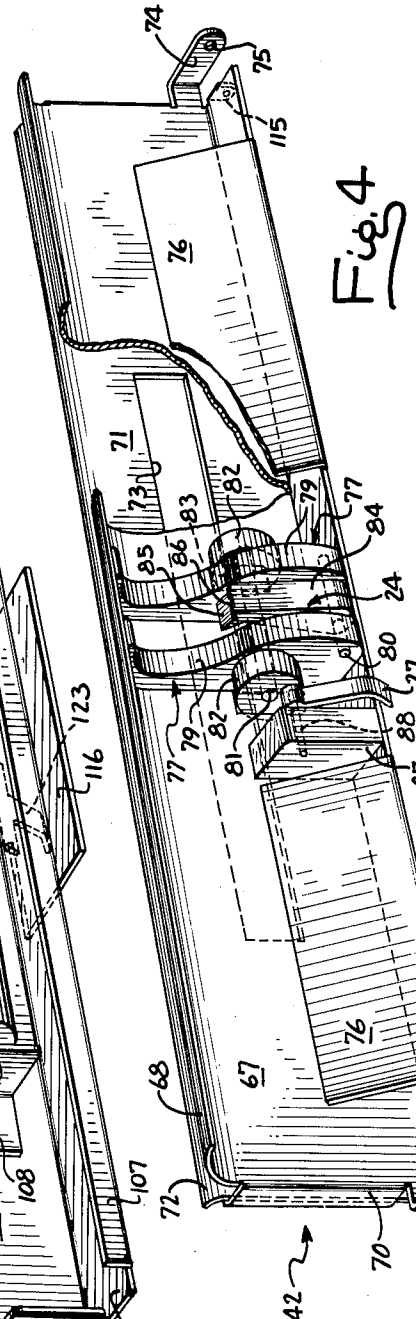


Fig. 4

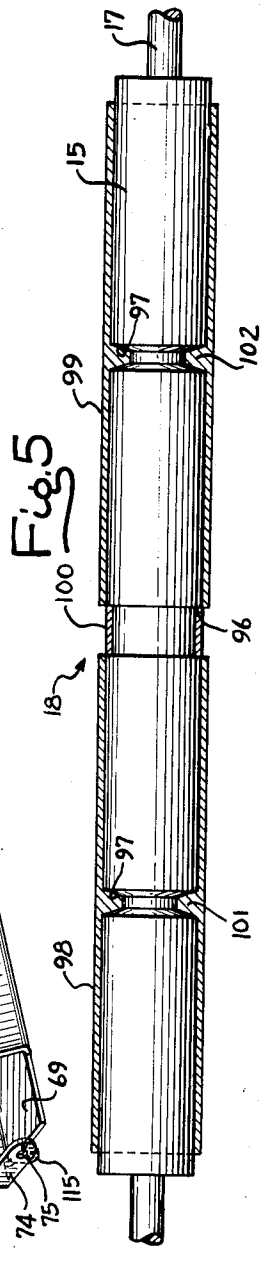


Fig. 5

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United States Patent Office 3,017,816 Patented Jan. 23, 1962

3,017,816
PHOTOCOPY APPARATUS

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Filed Aug. 13, 1959, Ser. No. 833,537
5 Claims. (Cl. 95—73)

The present invention relates generally to photocopy machines and more particularly to an apparatus for automatically producing photocopies by the transfer process.

This application is a continuation-in-part of my prior co-pending applications Serial No. 705,520 filed December 27, 1957, and Serial No. 741,372 filed June 11, 1958. The apparatuses of these prior applications as well as the apparatus of the present application comprise means for moving a pair of stacked superimposed negative and document sheets past exposure means to produce a latent photographic image in the negative sheet following which the two superimposed sheets are automatically separated with the document sheet being ejected from the apparatus and the negative sheet being guided along a path passing through a developer solution. These apparatuses also include means for automatically introducing a positive sheet into the developer solution in timed relation to the introduction of the negative sheet thereinto so that the two sheets pass through and out of the solution substantially simultaneously to be then passed through rollers which press the two sheets together and transfer the image to the positive sheet.

In the two prior apparatuses the positive sheet was stacked in superimposed relation with the negative and document sheets all of which were inserted together into the machine wherein the positive sheet was initially separated from the stack and conveyed along a separate path leading toward the developer solution. This path had a length substantially equal to that of the path traveled by the negative sheet as the latter moved toward the solution so that both sheets entered the solution substantially simultaneously.

In the apparatus constituting the present invention the positive sheet is inserted into the machine separately and is held in a ready position with its leading edge a predetermined distance from the developer solution. The positive sheet is introduced into the solution by driving means actuable in response to movement of the negative sheet toward the developer solution and at a time when the leading edge of the negative sheet has reached a position substantially the same distance from the developer solution as the leading edge of the positive sheet so that the two sheets are driven into the solution substantially simultaneously.

Other apparatuses having means for introducing the positive and negative paper into the developer solution substantially simultaneously have been heretofore devised, but each has particular shortcomings the elimination of which constitutes the object of the present invention. For example, one of the prior art apparatuses uses a complex electromechanical timing device for initiating the introduction of a segment of a stored roll of positive paper into the solution at a predetermined time in a photocopying cycle. As indicated, this device is relatively complex and, in addition, cannot compensate for factors which would delay the introduction of the negative paper into the solution. The positive paper will always enter the solution at a predetermined time in the cycle whether the negative is there or not.

Furthermore this device requires large rolls of positive paper to be stored within the machine, thereby substantially increasing the bulk of the machine and necessitating the provision of shears or other cutting elements and additional timing mechanism for actuating the shears at the proper time in the cycle. This device is neither intended to handle nor capable of handling positive and negative paper in the more desirable commercially available form of separate discrete sheets as distinguished from a continuous roll.

The present invention constitutes an automatic photocopy apparatus which avoids these drawbacks. Instead of a complex electro-mechanical timing system, the disclosed exemplification utilizes the leading edge of the moving negative sheet to trip a lever extending across the path of the negative sheet at a position the same distance from the developer solution as the leading edge of the positive sheet, when the latter is in the "ready" position. The tripped lever actuates driving means which moves the positive sheet from the "ready" position into and through the developer solution substantially simultaneously with the passage of the negative sheet therethrough.

With this type of device the positive sheet will not enter the developer solution unless and until the negative sheet enters. Furthermore, an extremely simple and foolproof actuating mechanism is provided.

The present invention is designed to handle positive paper in the commercially available sheet form and is consequently very much more compact than the bulky roll-carrying devices of the prior art. In addition, neither paper-cutting shears nor timing mechanism for the latter is required which further reduces the bulk. Moreover, fewer elements enable easier access thereto for purposes of maintenance and repair.

Another advantage of the present invention is the readiness with which it may be combined with a positive sheet container and automatic dispenser actuable to automatically feed individual positive sheets into the "ready" position at a desirable time in each photocopying cycle thereby eliminating virtually all introductory handling of the positive sheet by the operator.

An additional feature of this apparatus is the compact arrangement thereof whereby a minimum number of components are utilized to perform the functions of the apparatus.

Another important advantage of the present invention is the inclusion therein of the highly desirable thrust actuated separator which automatically separates the moving exposed negative and document sheets in response to the thrust exerted by these sheets, as described in the above mentioned prior applications.

Still another feature of the present invention is the arrangement whereby the thrust-actuated separator is disposed to receive the maximum thrust capable of being exerted by the moving sheets.

Other objects and advantages are inherent in the structure claimed and disclosed or will become apparent to those skilled in the art from the following detailed description in connection with the accompanying drawings wherein:

FIG. 1 is a vertical sectional view of a photocopy apparatus embodying the present invention and showing the apparatus at the start of a cycle of operation.

FIG. 2 is a vertical sectional view similar to FIG. 1 and showing the apparatus during its operating cycle.

FIG. 3 is a detail perspective view of a carrier assembly mounting a positive sheet driving roller and driving means for the latter.

FIG. 4 is a detail perspective view of a carrier assembly mounting a separator and sheet guiding and driving means with part of the front wall of the carrier cut away.

FIG. 5 is a sectional view taken on line 5—5 in FIG. 2.

Referring to FIGS. 1 and 2, the disclosed photocopy apparatus comprises a bottom section **10** supporting a detachable top section **11**, both of which are covered by a housing **12**. A pair of superimposed negative and docu-

ment sheets N, D (FIG. 1) are inserted through an upper opening 21 in the front of housing 12 (to the right in FIGS. 1 and 2) and pushed inwardly until the sheets are drivingly engaged between a moving belt arrangement generally indicated at 18 and a rotating translucent cylinder 19 at their "bite" or line of initial contact 22. Sheets N, D are then carried between the moving belt 18 and the rotating cylinder 19 past a rotatable tubular light source 23 extending longitudinally within translucent cylinder 19 whereby the sheets N, D are exposed to light and a latent photographic image is formed on negative sheet N.

Following exposure, sheets N, D are automatically separated by a deflector or kicker 24, in a manner to be subsequently described, so that document sheet D is directed upwardly and out of the machine through an opening 25 in the top of the housing and negative sheet N is directed downwardly toward lower section 10 where sheet N is introduced into a tank 26 containing solution which develops the latent image on sheet N.

Prior to insertion of sheets N, D into the apparatus, a positive sheet P is inserted through opening 25 in the top of housing 12 and into upper section 11 where it is held in a ready position as shown in FIG. 1. When the separated negative sheet N moves downwardly toward developer tank 26 it trips a pivotally mounted lever or element 27 extending across the path of sheet N, and the tripped lever 27 actuates mechanism, to be subsequently described, for introducing positive sheet P into the developer solution substantially simultaneously to the introduction of negative sheet N thereinto (FIG. 2).

Sheets N and P are driven through tank 26 and upwardly through a pair of rotating rollers 28, 29 which press developed sheet N and sheet P together thereby transferring a positive image to sheet P and then drivingly eject the sheets from the apparatus through lower opening 33 in the front of the housing.

In FIG. 2, lower section 10 comprises a bottom portion 34 having front and rear vertical support flanges 35, 36 respectively and a pair of parallel side portions or flanges 32, only one of which is shown. Extending between the upper foremost portions of flanges 32 are a pair of rotatable shafts 30, 31 mounting rollers 28, 29 respectively. Each side flange 32 has a front edge 37 extending upwardly to an indentation 38 in flange 32 (FIG. 1) for receiving shaft 31. Inclined upwardly from indentation 38 is an edge 39 extending to an arcuate edge 40 (FIG. 1) which connects with a vertical edge 41. Extending vertically at the rear of flange 32 is an edge 43. Extending from rear edge 43 to vertical edge 41 is a horizontal portion 44 and extending from rear edge 43 to front edge 37 is a horizontal portion 45, both portions 44, 45 being formed integral with side flange 32 and portion 45 being attached to bottom portion 34 by conventional means not shown.

Upper section 11 has a pair of parallel side flanges 13, only one of which is shown. Each side flange 13 has a front edge 46 connecting with an inclined edge 47 connecting with a vertical edge 49. An inclined edge 50 extends rearwardly from edge 49 to another vertical edge 51 which connects with an arcuate edge 52 (FIG. 1). A downwardly inclined edge 53 extends rearwardly to a short horizontal edge 54 connecting with a vertical rear edge 55. Extending between rear edge 55 and front edge 46 is a horizontal portion 56 formed integral with flange 13. Attached to opposite ends of horizontal portion 56 are L-shaped brackets 57 each provided with a pin 58 adapted to be received in bushings 59 attached to opposite ends of horizontal portion 44 of lower section side flange 32 whereby upper section 11 is detachably mounted atop lower section 10.

Adjacent inclined edge 50 of flange 13 is a brace member having a vertical portion 62 secured to each flange 13 by rivets 61 and a horizontal portion 63 for supporting sheets N, D upon insertion of the latter into the apparatus and for guiding the sheets toward the "bite" 22 between belt 18 and cylinder 19. Adjacent short horizontal edge 54 is another brace member 64 similarly attached to each flange 13.

Extending between side flanges 13 are a pair of rollers 14, 15 mounted on rotatable shafts 16, 17 respectively. Entrained around rollers 16, 17 is belt arrangement 18 which is driven by these rollers and which frictionally engages a peripheral portion of cylinder 19 to rotate the latter, cylinder 19 being rotatably mounted between side flanges 13.

In FIG. 1 each flange 13 has a large circular opening 125 upwardly from which extends a slot 126 (FIG. 2) for receiving opposite ends of a rotatable shaft 127 mounting a roller 128 slidably removable through openings 125. Roller 128 is pressure loaded by conventional means not shown so as to be urged upwardly against the periphery of cylinder 19 whereby cylinder 19 is maintained in driving engagement with belt arrangement 18.

Extending longitudinally within cylinder 19 is a first arcuate stationary light shield 65, and secured around a portion of the periphery of rotatable tubular light source 23 is a second longitudinal arcuate light shield 66. The width of the light beam initially emanating from light source 23 is determined by the space between the parallel longitudinal edges of arcuate shield 66. By rotating tube 23 to a position in which a portion of this light beam strikes the inner surface of stationary shield 65 the width of the beam passing through translucent cylinder 19 may be selectably decreased. Thus light source 23 may be rotated about its axis by any conventional means (not shown) to selectably vary the amount of light to which sheets N, D are exposed as they are carried on the periphery of cylinder 19 along an exposure path intersecting the aforementioned beam of light.

The kicker or deflector element 24, which separates the document and negative sheets following their exposure, is mounted on a carrier assembly 42, best illustrated in FIG. 4.

Carrier 42 comprises a front planar wall portion 67 integral with an upper arcuate portion 68 and a perpendicularly extending lower portion 69. Extending rearwardly at opposite ends of front wall portion 67 are connecting portions 70 which are L-shaped in cross-section and are attached to a rear wall portion 71 extending parallel to front portion 67 so that portions 67, 70, 71 form a rectangular vertical passageway. Rear wall portion 71 is integral with an upper arcuate portion 72 and has a centrally disposed longitudinal slot 73. At opposite ends of front wall portion 67 and near the bottom thereof are integral L-shaped brackets 74 each having a hole 75 for reeciving a pin (not shown) extending from the corresponding side flange 13 of upper section 11 so as to pivotally mount carrier 42 between flanges 13 (FIGS. 1 and 2).

Extending angularly from the forward edge of lower portion 69 to front wall portion 67 are a pair of planar guide members 76. Attached to front wall portion 67 and longitudinally disposed on each side of the center thereof are guide members 77 each having planar side, rear and bottom surfaces, a top arcuate surface engaging the lower surface of arcuate portion 68 and a substantially S-shaped front surface 79.

Extending between members 77 is a lower shaft 80 in axial alignment with the pins extending through holes 75 in brackets 74 and pivotally mounting kicker 24. A second shaft 81 projects outwardly from opposite sides of members 77 and rotatably mounts a roller 82 at each end. Each roller 82 extends rearwardly through a respective slot 83 in front wall portion 67 and into the rectangular passageway formed between portions 67, 70, 71.

Kicker 24 is shaped like an inverted boot having shank, toe and heel portions 84, 85, 86 respectively. A small spring (not shown) normally urges kicker 24 forwardly to the position shown in FIG. 1, in which heel portion 86

abuts cylinder 19. Kicker 24 separates the sheets N, D as follows:

In FIG. 1, sheets N, D have been inserted into the machine in staggered superimposed relation with the leading edge of document sheet D spaced ¼ inch or so ahead of the leading edge of negative sheet N, a condition necessary for effective operation of kicker 24 as will be seen below. After exposure, sheets N, D are conveyed along a path having a portion thereof substantially tangential to the line 90 at which belt 18 and the periphery of cylinder 19 diverge. The uppermost portion of kicker 24 is disposed across this path and the leading edge of moving sheet D is thrust against kicker 24. If the edge of sheet D initially strikes any part of the upper surface of toe portion 85 it will exert a thrust against kicker 24 with a line of force passing to the left of kicker pivot shaft 80 and consequently cause kicker 24 to pivot about the axis of shaft 80 in a counterclockwise direction to the displaced position shown in the solid lines in FIG. 2. If the edge of sheet D initially strikes the upper surface of heel portion 86 it will be directed to recess 91 where sheet D exerts a thrust against kicker 24 also causing pivotal movement of the kicker in a counterclockwise direction to the position of FIG. 2.

As kicker 24 pivots in a counterclockwise direction, the upper surface of heel portion 86 pushes against the adjacent surface of sheet D urging the latter in a rearwardly direction, and the upper surface of toe portion 85 guides the leading edge of sheet D towards the "bite" between belt 18 and rollers 82. Belt 18 and rollers 82 drivingly engage sheet D therebetween for movement of the latter along arcuate surfaces 79 of guide members 77 which direct sheet D out of the apparatus through the top opening 25 in housing 12 (FIG. 2).

By the time the leading edge of trailing sheet N has reached the position normally occupied by kicker 24, the latter has been pivoted toward the position shown in FIG. 2 so that sheet N clears heel portion 86 and moves along a path extending downwardly and determined by guide members 76, 77 of separator carrier 42 on the left (FIG. 4) and a right-hand guide member 92 extending upwardly from a brace member 93 attached to side flange 13 by rivets 94. A vertical slot 95 in member 92 receives lever 27 when the latter is in its normal position shown in FIG. 1. As previously indicated downwardly moving sheet N strikes lever 27, pivoting the latter to its actuating position (FIG. 2), and then continues on into developer tank 26.

The weight and spring action of sheet D maintains kicker 24 in the displaced position shown in FIG. 2 until the trailing edge of sheet D passes toe portion 85 thereby enabling kicker 24 to be spring-urged back to the normal position of FIG. 1. The dash-dot lines in FIG. 2 indicate the extreme position to which kicker 42 may be displaced, this position being determined by the abutment of shank portion 84 with shaft 81.

In FIG. 5, roller 15 has a recessed circumferential portion 96 as well as two track slots 97. Belt arrangement 18 comprises a pair of wide belts 98, 99, one on each side of a narrow belt 100. Belts 98, 99 each have respective track portions 101, 102 received in slots 97 of roller 15, and belt 100 is received in recessed portion 96. It will thus be seen that as belt arrangement 18 passes around roller 15 it has a centrally disposed longitudinal recessed portion parallel to its outer edges, and this recessed portion receives kicker 24 as it pivots back and forth. By virtue of this construction kicker 24 may be mounted so that its uppermost portions 85, 86 are disposed across the tangential portion of the path followed by the moving sheet D after exposure whereby kicker 24 will receive the maximum thrust capable of being exerted by sheet D. The path of kicker 24 crosses that of the outside path of belts 98, 99 which determine the path of sheet D. As a result the kicker 24, once it has been pushed by sheet D through the recessed portion 96 in which belt 100 is located, under no circumstances can return to its home position shown on FIG. 1 as long as sheet D is between kicker 24 and belt 100. As soon as the trailing edge of sheet D has passed the kicker 24, then said kicker 24 can swing freely back to its original position through the recessed portion above belt 100.

In FIG. 4, secured to the front wall portion 67 of carrier 42 atop lower portion 69 between guide members 76, 77 is a miniature snap-action switch 87 from which extends a horizontally disposed rotatable shaft 88 mounting the lever or actuating member 27. Shaft 88 is urged by spring means (not shown) in a counterclockwise direction as viewed in FIG. 1 so that member 27 is normally in the position shown in FIG. 1 extending across the path of sheet N as the latter moves toward the developing solution, and being located substantially the same distance from the developer solution as the leading edge of positive sheet P.

The leading edge of moving sheet N engages lever 27 and pivots the latter in a clockwise direction to the position shown in FIG. 2, in which position it is maintained until the trailing edge of sheet N moves past. The pivoting of lever 27 rotates shaft 88 in a clockwise direction thereby bringing into contact the terminals of switch 87 and closing a circuit for actuating mechanism to drive positive sheet P from the ready position shown in FIG. 1 into the developer solution.

The positive sheet driving mechanism is thus actuated when the leading edge of negative sheet N is at a position substantially the same distance from the developer solution as the leading edge of positive sheet P so that both sheets are introduced into the developer solution substantially simultaneously (FIGS. 1 and 2).

The mechanism for driving the positive sheet may be best understood by referring initially to FIG. 3 which illustrates a carrier assembly 89 mounting a positive sheet driving roller.

Carrier 89 comprises a planar rear portion 103 integral with perpendicularly extending side portions 104, 105 and a bottom portion 106 having an upstanding integral bracing portion 107. Attached to rear portion 103 is an L-shaped bracket 108, and extending between journaled openings in bracket 108 and side portion 105 is a shaft 109 mounting a roller 110. Each side portion 104, 105 has a hole 112 for receiving a pin 113 extending from the corresponding side flange 13 of upper section 11 so as to pivotally mount carrier 89 between flanges 13 as shown in FIGS. 1 and 2.

Extending perpendicularly from rear portion 103 at opposite ends thereof are brackets 111 each having a hole for attaching one end of a corresponding spring 114 (FIGS. 1 and 2) having its other end attached to a hole in a bracket 115 extending downwardly from lower portion 69 of separator carrier 42. Springs 114 urge pivotally mounted carriers 42, 89 to their normal positions shown in FIG. 1, wherein separator carrier 42 is being urged in a clockwise direction about the axis of shaft 80 but is limited in its pivoting by the engagement of rollers 82 with belt arrangement 18, and roller carrier 89 is being urged in a counterclockwise direction about the axis of shaft 113. With the carriers in their normal positions a positive sheet P inserted into opening 25 in housing 12 will be initially guided between upper arcuate portions 72, 68 of carrier 42 downwardly into the passageway formed by portions 67, 70, 71 of carrier 42 (FIG. 4) until the leading edge of sheet P comes to rest against a planar portion 116 attached to bottom portion 106 of roller carrier 89 (FIG. 1).

In FIGS. 1 and 2, when lever 27 is moved to its actuating position by downwardly moving sheet N (FIG. 2), a circuit is closed to energize a rotary solenoid 117 attached to a bracket 118 extending upwardly from bottom portion 34 of lower section 10. Energization of rotary solenoid 117 causes counterclockwise rotation of a shaft 119 attached to the armature (not shown) of solenoid 117. Shaft 119 mounts a collar 120 from which

extends an arm portion **121** which in turn has a pin **122** extending perpendicularly therefrom and engaging a leg portion **123** extending downwardly from member **116** of roller carrier **89**. As shaft **119** rotates, pin **122** pushes against leg **123** and pivots roller carrier **89** in a clockwise direction against the urging of spring **114** and about the axis of pins **113** to the position shown in FIG. 2. As a result, positive sheet supporting member **116** is withdrawn from beneath the lower edge of positive sheet P, and roller, **110** is moved through longitudinal slot **73** in separator carrier **42** toward rollers **82** so that positive sheet P is drivingly engaged between rollers **82, 110** for movement down into and through developer tank **26**. The clockwise rotation of roller carrier **89** reflects spring **114** which in turn urges separator carrier **42** in its normal clockwise direction about the axis of shaft **80**.

When lever **27** returns to its normal position solenoid **117** is de-energized causing shaft **119** and arm **121** to rotate in a clockwise direction back to the positions shown in FIG. 1, thereby easing the pressure exerted against leg **123** by pin **122** and enabling spring **114** to return roller carrier **89** to its normal position shown in FIG. 1.

In FIG. 2, developer tank **26** comprises a bottom portion **129** upwardly from which extend side portions **130** and front and rear portions **131, 132**. Integral with front portion **131** is a forwardly extending portion **133** for catching drippings resulting from the pressing together of wetted sheets N, P between rollers **28, 29**. Extending between side portions **130** is a cover member **134** for reducing evaporation and oxidation of developer solution within the tank **26**. Cover member **134** comprises a downwardly extending rear portion **135** integral with an arcuate portion **136** integral with an angularly extending portion **137** in turn integral with a horizontal portion **138** which connects with an upwardly extending portion **139**.

Also extending between side portions **130** and disposed between rear portion **132** and cover member **134** is a separating member **140** for maintaining sheets N, P apart until each has been thoroughly wetted on both sides by the developer solution. Attached to the inner surfaces of the front, bottom and rear portions **131, 129, 132** of tank **26** are a series of longitudinally spaced guide members **141** (only one of which is shown) each having arcuate upper edges which engage the lower surface of positive sheet P to guide the latter initially downwardly through the developer solution and then upwardly out of tank **26** towards the "bite" of rollers **28, 29** to be drivingly engaged between the latter.

In FIG. 1, extending upwardly from the front part of each lower horizontal portion **45** is a bracket **142** to which is attached one end of a spring **143** having its other end attached to an arm **144** of a lever pivotally mounted on a pin **145** extending from the corresponding side flange **32** of lower section **10**. A second arm **146** extends angularly from arm **144** and a flange **147** is formed integral with arm **146** and engages an end portion of shaft **31**. Spring **143** urges the lever arm **144** in a counterclockwise direction about the axis of pin **145** thereby urging flange **147** against shaft **31** so as to maintain the latter's roller **29** in driving engagement with roller **28**.

All of the driving elements in the apparatus are driven by one motor in the following manner: In FIG. 1, a motor (not shown) drives a shaft **150** located adjacent lower section **10** and mounting a gear **151** which engages and drives a gear **152** mounted at one end of shaft **30** thereby rotating roller **28**, which in turn drivingly engages roller **29**. Roller **29** is rotated by a gear identical to gear **152**, mounted on shaft **30**, and drivingly engaging a gear (not shown) on shaft **31**. Gear **152** drivingly engages a gear **153** mounted on a rotatable shaft **154** extending between side flanges **13**. Also mounted on shaft **154** is a sprocket **155** around which is entrained an endless-non-slip drive belt **156** also entrained around a sprocket **157** mounted on shaft **16** for rotating the latter and thereby driving roller **14** and belt arrangement **18**.

Belt arrangement **18** in turn rotates roller **15** and cylinder **19**.

Mounted on shaft **17**, rotatable in response to the rotation of roller **15**, is a gear (not shown) which engages and drives a gear **158** mounted on a rotatable shaft **159** (FIG. 3) having opposite ends extending from a journaled mounting **160** in flange **13**. Mounted on shaft **159** inwardly of gear **158** is a gear **161** which engages and drives a gear **162** mounted on shaft **109** of roller carrier **89** thereby rotating shaft **109** and roller **110** mounted thereon. As previously indicated, when roller carrier **89** is pivoted to the position shown in FIG. 2, roller **110** drivingly engages and rotates rollers **82** on separator carrier **42**.

In FIGS. 1 and 2 housing **12** comprises a pair of side portions **165** between which extend a front portion **166** integral with an inclined portion **167** having a longitudinally extending opening **33**. Portion **167** is integral with a vertical portion **168** in turn connecting with a rearwardly extending horizontal portion **169** leading into the opening **21** which extends between side portions **165**. Extending upwardly from opening **21** is a portion **170** integral with an arcuate portion **171** integral with an inclined top portion **172** having an opening **25** extending between side portions **165** near the rearmost extremity of top portion **172** (to the left in FIGS. 1 and 2). Extending downwardly from top portion **172** is a rear portion **173**.

Attached to top portion **172** rearwardly of opening **25** is a bracket **174** to which is attached a positive sheet guide member **175** extending angularly into opening **25** for directing sheet P into the apparatus. Also attached to bracket **174** is a hinge **176** mounting a positive sheet guide member **177** having a side flange **178** for aligning the edge of the positive sheet P so that it corresponds with the edge of a negative sheet N inserted into opening **21** in alignment with a mark on housing portion **169**. When the apparatus is not in use, hingedly mounted member **177** may be swung to a more compact vertical position adjacent housing rear portion **173**, as shown in the dash dot lines in FIG. 1. If desired, a positive sheet holder and dispenser actuable to automatically dispense a positive sheet at the start of each cycle may be employed in place of guide member **177**.

It is to be understood that the specific embodiment of the invention shown in the drawings and described above is merely illustrative of one of the many forms which the invention may take in practice without departing from the scope of the invention as defined in the appended claims which are to be interpreted as broadly as possible in view of the prior art.

I claim:

1. An apparatus for automatically producing photocopies, said apparatus comprising exposure means, a first means for moving a pair of stacked superimposed negative and document sheets along a joint path running past said exposure means to produce a latent photographic image in said negative sheet, means for containing a developer solution, means for separating said moving superimposed sheets following said exposure thereof and for directing said moving document sheet along a second path leading out of said apparatus and for directing said moving negative sheet along a third path leading into said developer solution to develop said latent image, means for holding a positive sheet, means responsive to said movement of one of said sheets along one of said paths for moving said positive sheet into said developer solution substantially simultaneously to the movement of said negative sheet thereinto, and means for transferring said developed image from said negative sheet to said positive sheet following said movement of said sheets into said developer solution and for ejecting said sheets from the apparatus, said positive sheet moving means comprising means actuable in response to said movement of the negative sheet along said third path, said positive sheet moving means com-

prising a pair of oppositely driven rollers each disposed on a respective opposite side of said positive sheet held in said holding means, a first of said rollers being mounted for movement between first and second positions thereof, said rollers drivingly engaging said positive sheet therebetween when said first roller is in said first position, said rollers being disengaged from said positive sheet when said first roller is in said second position, means normally urging said first roller towards its second position, and means for moving said first roller to its first position in response to said movement of said negative sheet along said third path.

2. An apparatus as recited in claim 1 wherein the second roller and said first moving means are normally disposed to drivingly engage said directed document sheet therebetween following said separation of the document sheet from said negative sheet and to eject the directed document sheet from said apparatus.

3. An apparatus as recited in claim 2 wherein said second roller is mounted for movement between a first position in which said roller is disposed to drivingly engage said document sheet and a second position in which said roller is disposed to be disengaged therefrom, said means normally urging said first roller towards its second position also normally urging said second roller towards its first position.

4. An apparatus for automatically producing photocopies, said apparatus comprising means for receiving a pair of stacked negative and document sheets arranged in staggered superimposed relation with one of said sheets leading the other, first means for imparting movement to said stacked sheets, means for exposing said moving superimposed sheets to produce a latent photographic image in said negative sheet, means for containing a developer solution, means responsive to the thrust of said leading moving sheet for separating said stacked sheets following said exposure thereof and for directing said moving document sheet out of said apparatus and for directing said moving negative sheet along a path leading into said developer solution to develop said latent image, means for holding a positive sheet, means responsive to said movement of said negative sheet along said second path for moving said positive sheet into said developer solution in

timed relation to said movement of said negative sheet thereinto so that said positive and negative sheets move into said solution substantially simultaneously, and means for transferring said developed image from said negative sheet to said positive sheet following said movement of said sheets into said developer solution, said first moving means comprising endless belt means and a rotatable cylinder, said belt means frictionally engaging a portion of said cylinder, said sheets being drivingly engaged between said belt means and said portion of said cylinder for movement along a joint path, said joint path having a portion thereof substantially tangential to the line on said cylinder at which said belt means become disengaged from said cylinder, said separating means comprising a sheet deflector element, means mounting said deflector element for movement between first and second positions thereof, said belt means having a longitudinal recessed portion for receiving said deflector element in said first position thereof in which said deflector element is disposed in said joint path for engagement by said leading moving sheet, said sheet separating means comprising means normally urging said deflector element towards its first position, said deflector element being moved to said second position out of said joint path in response to said engagement by the leading moving sheet, said deflector element comprising means for directing said document sheet out of said apparatus and means for directing said negative sheet along said path leading into the developer solution following said movement of said deflector element towards its second position.

5. An apparatus as recited in claim 4 wherein said endless belt means comprises a plurality of rollers and a plurality of belts, each of said belts being trained in side-by-side relation around said rollers, one of said rollers being disposed adjacent said sheet separating means and having a circumferential recessed portion for receiving one of said belts to produce said longitudinal recessed portion in said belt means.

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