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FOREIGN PATENTS

1,128,295 10/1962 Germany..... 355/106

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[54] **DOCUMENT FEED APPARATUS**
4 Claims, 9 Drawing Figs.

[52] U.S. Cl..... **271/4,**
 271/41, 271/69

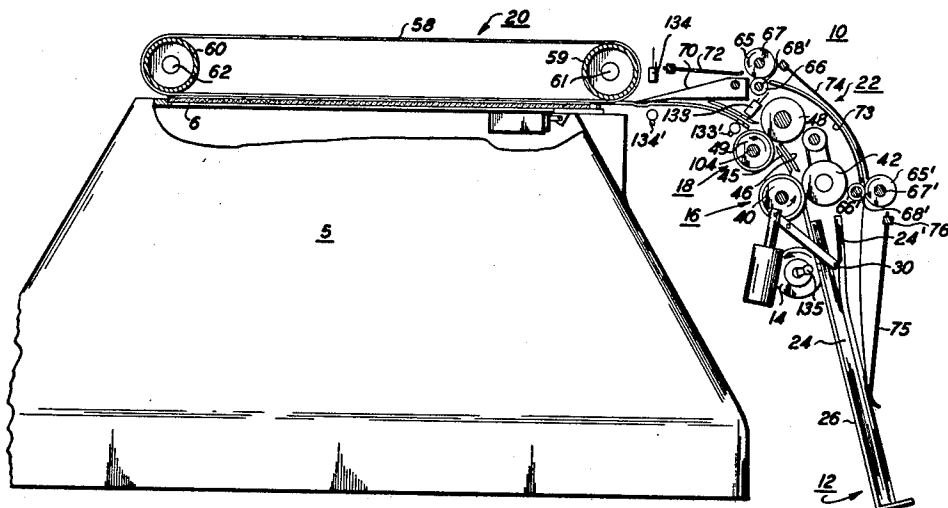
[51] Int. Cl..... **B65h 5/06**

[50] Field of Search..... 271/3, 6, 5,
 4, 7, 35, 41, 61

[56] **References Cited**
UNITED STATES PATENTS

3,083,960	4/1963	Coronado et al.	271/44X
3,499,710	3/1970	Sahley	355/64
3,304,080	2/1967	Greenblott et al.	271/3

ABSTRACT: Document feed apparatus for transporting one document at a time from a supply tray to a work station and back to the supply tray on completion of the work cycle, the apparatus having relatively high speed first document transport means for feeding each document to the work station and returning the document to the supply tray, relatively low speed second transport means for bringing the next document forward to a point adjacent the work station inlet, and means to maintain documents returned to the supply tray segregated from documents awaiting feeding to the work station, the last mentioned means being adapted, where the cycle is repeated, to automatically move onto the topmost one of the returned documents following return of the last document to the supply tray.



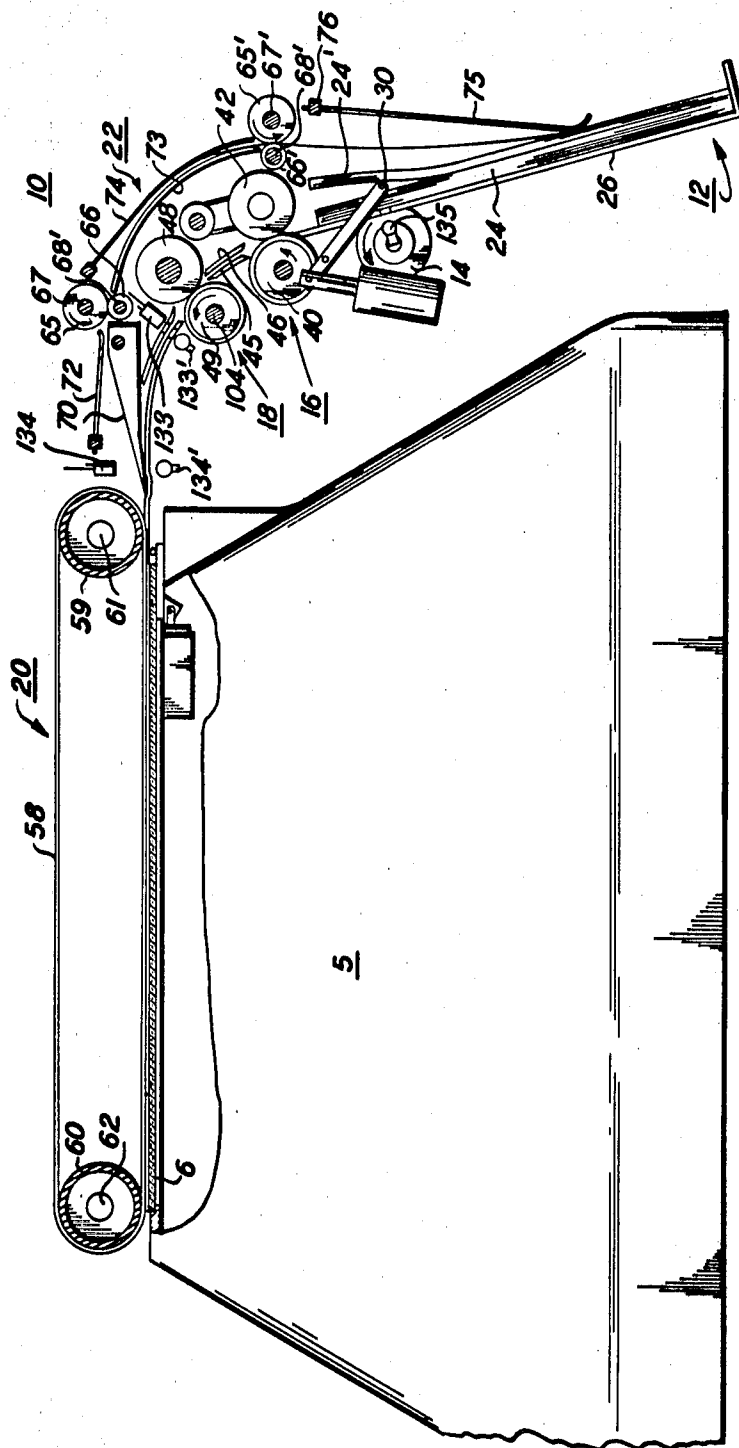


FIG. 1

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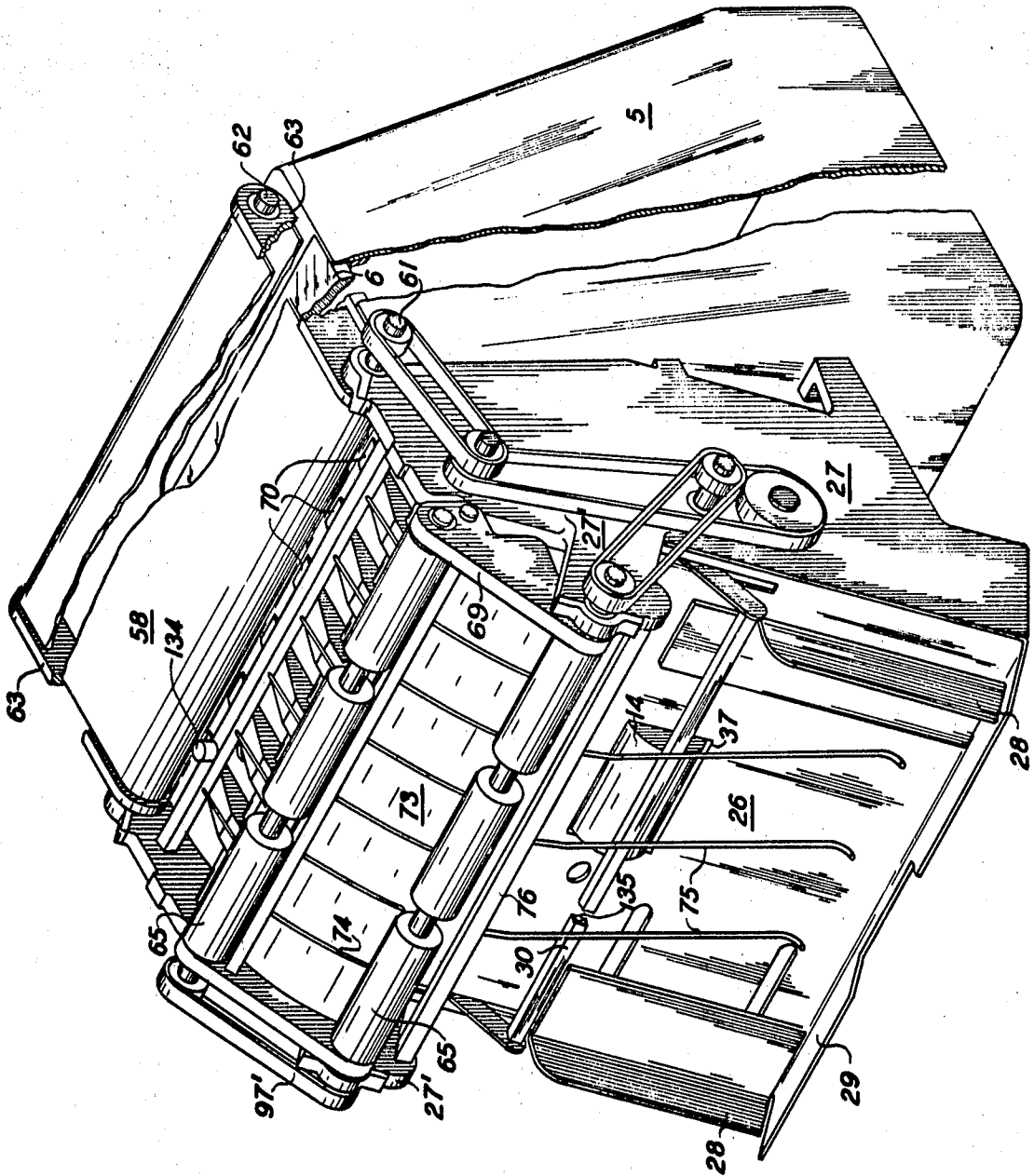
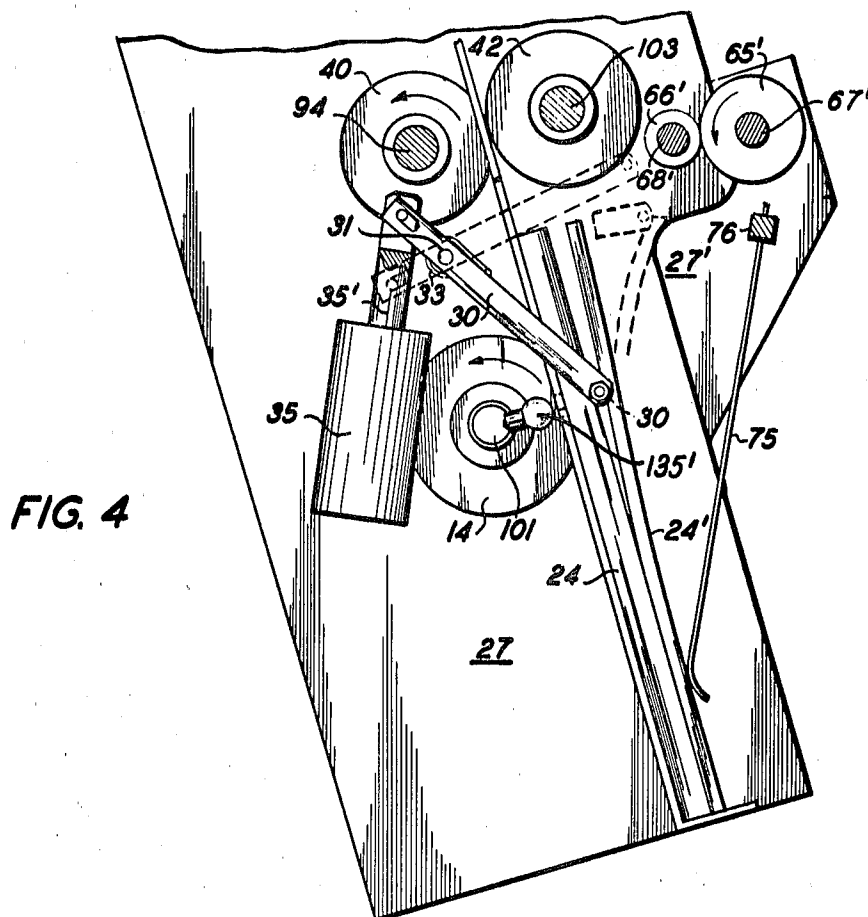
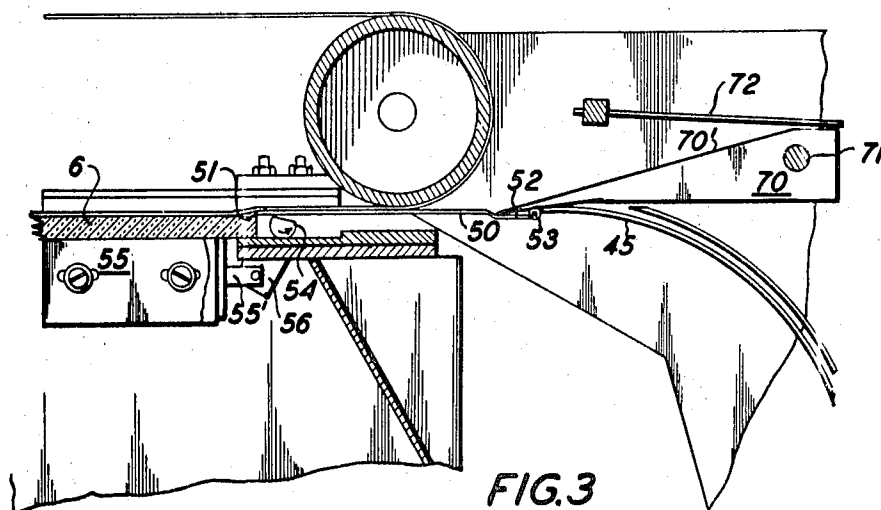
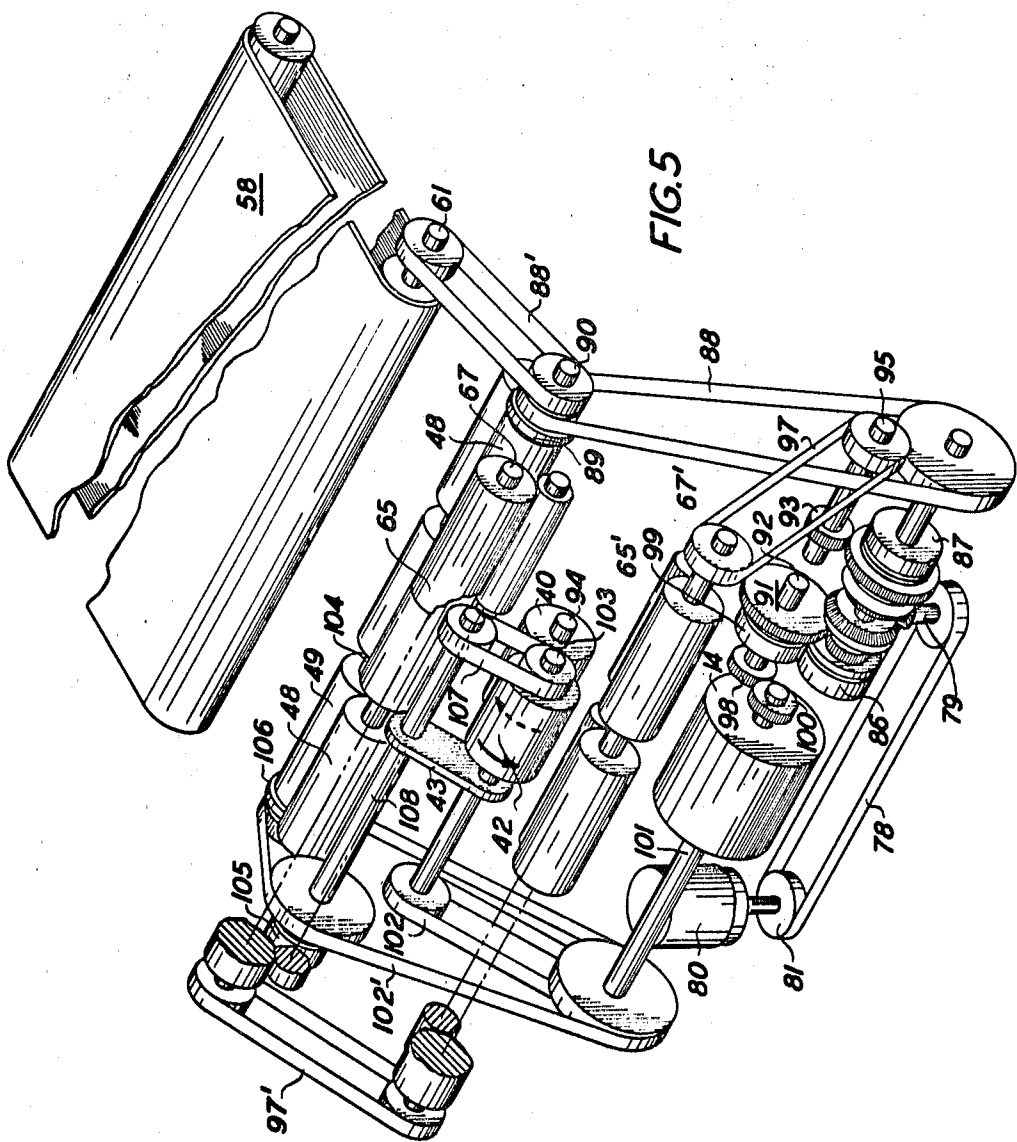


FIG. 2





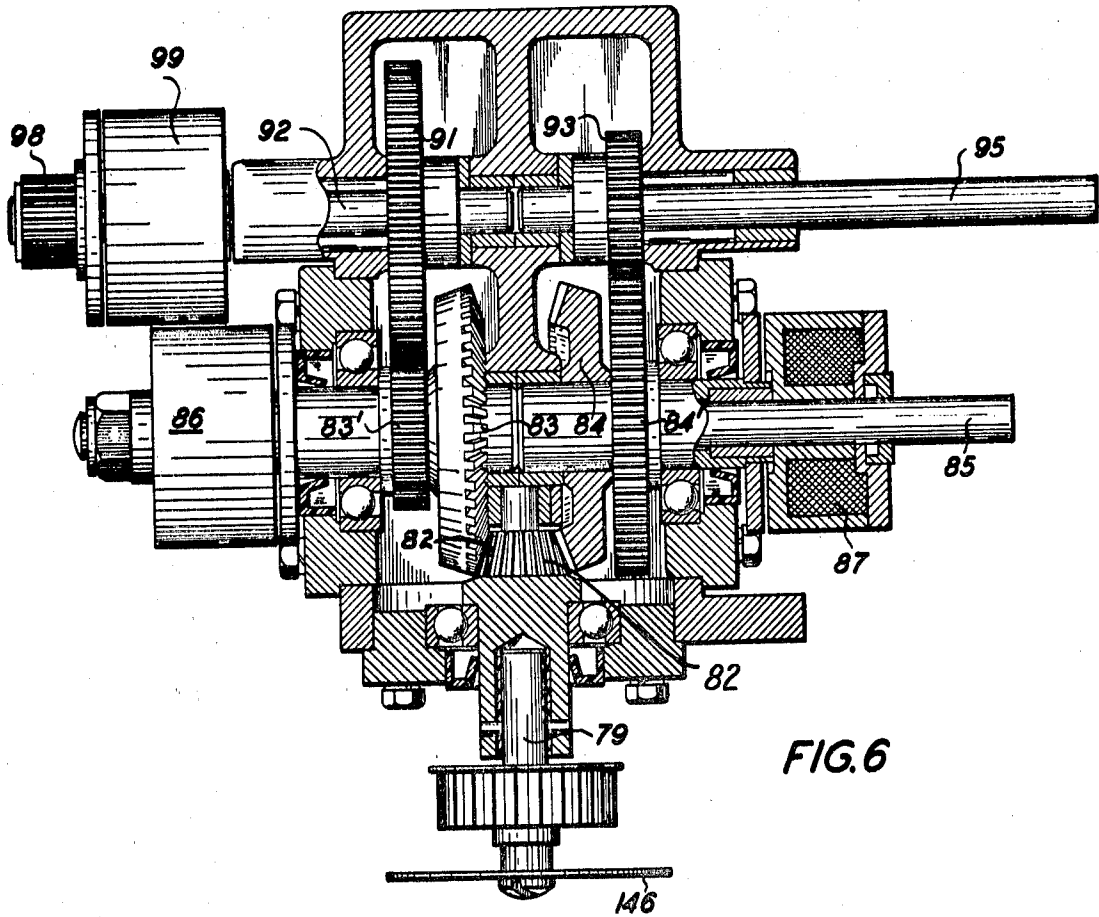


FIG. 6

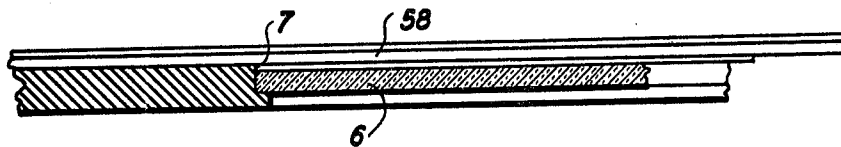
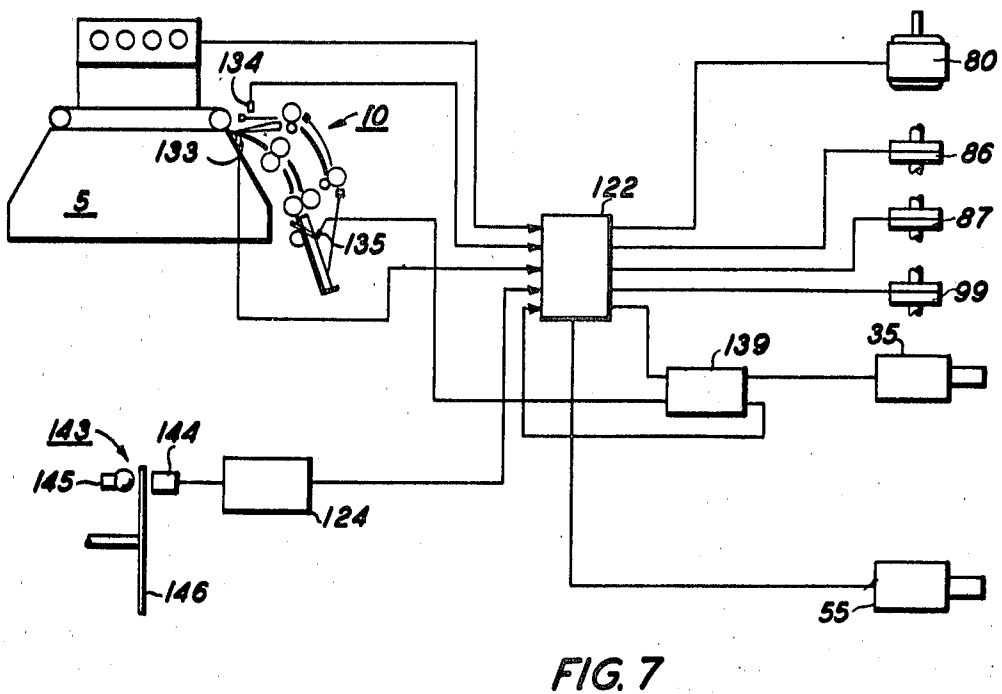
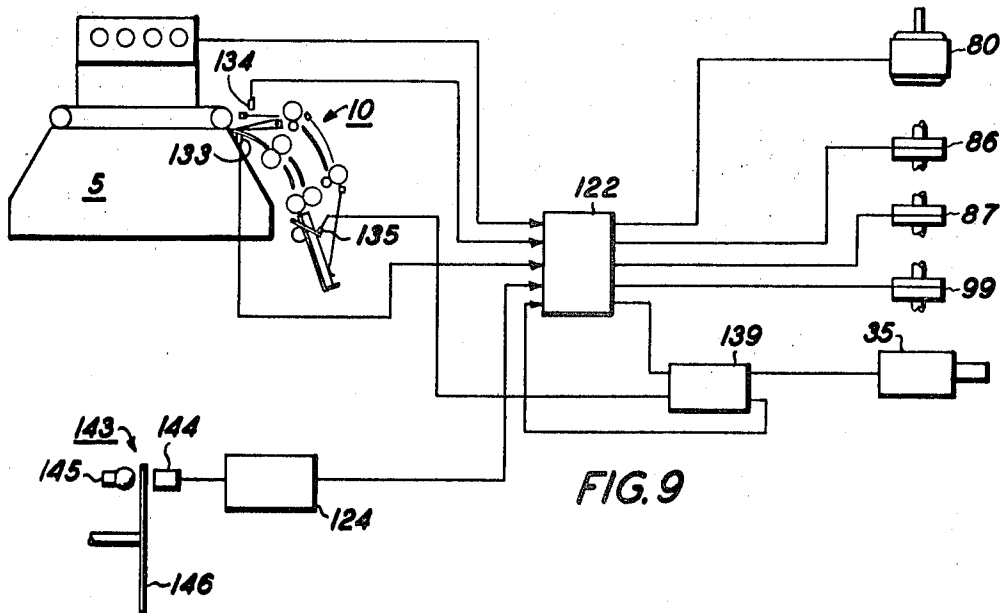


FIG. 8



DOCUMENT FEED APPARATUS

The invention relates to a document feed apparatus, and more particularly, to a transmission for an automatic document feed apparatus.

Where it is desired to copy a multipage original, for example, a report or book and provide copies having the same page order as the original, each page of the original may be copied the requisite number of times in its proper page order or sequence and the page copies forwarded to a collator. There each copy is routed to an individual storage bin so that there results in each collator bin copies of the original arranged in the same page order as the original. As can be understood, this system requires that a collator of some type be used, increasing both the expense and complexity of the system.

Alternately, each page of the original may be copied once in the order or sequence in which it appears. There results a single copy of the original having each page arranged in the order in which it appears in the original. The process is repeated as many times as required to provide the desired number of copies of the original. However, this latter process necessitates that some means be provided to handle the pages of the original so as to repeatedly present each page of the original at the copy station in the proper sequence and at the proper time.

It is a principal object of the present invention to provide a new and improved document feed apparatus.

It is a further object of the present invention to provide an improved transmission for a document handling apparatus adapted to provide reversible drive to one of the apparatus document transports with unidirectional drive to another of the apparatus document transports.

It is an object of the present invention to provide, in a document feed apparatus having plural transports, transmission means adapted to drive one document transport in either a forward or reverse direction at high speed while simultaneously driving a second transport in one direction at low speed.

It is an object of the present invention to provide a gear transmission for a precollating-type document feed apparatus enabling the apparatus to place one document in a predetermined registered position at a work station while simultaneously bringing the next document forward to a waiting station proximate the work station.

This invention relates to a document handling apparatus comprising, in combination: plural document transport means, one of the transport means being adapted for bidirectional transporting movement; gear means including a drive gear and a pair of first driven gears in meshing engagement with the drive gear such that rotation of the drive gear rotates the first driven gears in opposite directions; clutch means for coupling one or the other of the first driven gears with the one transport means whereby to selectively move the one transport means forward or backward; and a second driven gear for a second one of the transport means, the second driven gear being in meshing engagement with one of the first driven gears whereby to move the second transport means forward so that on rotation of the drive gear the first driven gears and the clutch means cooperated to selectively move the one transport means either forward or backward while the second driven gear simultaneously moves the second transport means forward.

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

FIG. 1 is a schematic view of the document feed apparatus of the present invention;

FIG. 2 is an isometric view of the document feed apparatus of the present invention;

FIG. 3 is an enlarged sectional view showing the document registering mechanism of the document feed apparatus of the present invention;

FIG. 4 is an enlarged sectional view showing the document separating mechanism for the document feed apparatus of the present invention;

FIG. 5 is an isometric view of the document feed apparatus drive train;

FIG. 6 is a sectional view of document feed apparatus transmission;

FIG. 7 is a schematic view showing the control system for the document feed apparatus of the present invention;

FIG. 8 is an enlarged sectional view showing an alternate document registering mechanism for the document feed apparatus of the present invention; and

FIG. 9 is a schematic view showing the control system for the document feed apparatus incorporating the document registering mechanism of FIG. 8.

Referring to the drawings, there is shown the document feed apparatus, designated generally by the numeral 10, of the present invention. For purposes of explanation, the apparatus 10 is combined with a Xerographic-type document copying or reproduction machine 5 having a transparent platen 6 on which documents to be copied rest. It is understood that document feed apparatus 10 may be used with other types of reproduction machines or other apparatus requiring repeated input, in seriatim, of documents, papers, etc. thereto.

Feed apparatus 10, which includes document supply tray 12, primary document feed roll 14, single document limiter 16, intermediate document transport 18, platen transport 20, and document return transport 22, is adapted to handle any bendable sheetlike material, such as paper, film, etc. As will become more apparent hereinafter, feed apparatus 10 transports one document at a time from document stack 24 in tray 12 to a registered position at a work station exemplified by platen 6 of reproduction machine 5 and following completion of the work cycle returns that document to tray 12. While the preceding document is on platen 6, the apparatus 10 feeds the next document forward to a waiting station proximate the inlet to platen 6. Where a collated copy output is required, the apparatus 10 repeatedly transports each document onto platen 6 in the order in which the document is arranged in stack 24 to provide the requisite numbers of collated copies.

In operation, the lowermost document in tray 12 is advanced by feed roll 14 into the nip of rolls 40, 42 of single document limiter 16 which serves to prevent feed of more than one document at a time. From single document limiter 16, the document is fed by intermediate transport 18 and platen transport 20 onto the platen 6 where, as will appear more fully, the document is registered. Following copying, platen transport 20 and transport 22 cooperate to return the document to tray 12.

Separator bar 30 in tray 12 prevents feed of the returning documents 24' following feed of the documents 24 disposed below bar 30. Where a second copy cycle is required, as where collated copies are being made, bar 30 is automatically moved out from below the stack 24' of returned documents and onto the top thereof when the last document in stack 24 has returned to tray 12.

Referring particularly to FIG. 1 through 4 of the drawings, document tray 12 includes base 26 on frame supports 27. Upstanding end and sidewalls 29, 28 respectively cooperate with base 26 to form a traylike receptacle 12. Walls 28, 29 may be movable to allow different size documents to be accommodated.

Referring particularly to FIG. 4 of the drawings, separator bar 30 is preferably U-shaped with depending legs 30' thereof secured to rockable cross-shaft 31 journaled in frame supports 27 adjacent the discharge end of tray 12. Spring 33 biases bar 30 toward feed roll 14. Solenoid 35 has armature 35' thereof suitably secured to the terminal end of one leg 30'. Solenoid 35 serves when actuated to pivot bar 30 upwardly to the dotted line position shown in FIG. 4 whereby bar 30 is moved out from under the returned documents 24' in tray 12. As will be understood, bar 30 serves to prevent returning documents 24' from being fed forward by roll 14 following feed of the last one of the documents 24 from under bar 30.

Base 26 of tray 12 includes opening 37 for primary feed roll 14, shaft 101 of roll 14 being suitably journaled on tray 12 such that the periphery of roll 14 projects slightly above tray base 26. As will appear more fully, primary feed roll 14 is driven intermittently (in the counterclockwise direction

shown by the solid line arrow in FIG. 1) to advance the lowermost document in tray 12 forward. It is understood that a suitable belt-type feeding mechanism may be employed in place of roll 14.

Feed and slip rolls 40, 42 respectively, of single document limiter 16 are arranged downstream of and preferably in alignment with primary feed roll 14. A portion of the periphery of feed roll 40, which is carried by shaft 94 and driven in a document feeding direction (counterclockwise as shown by the solid line arrow in FIG. 1 of the drawings) projects slightly above base 26 of tray 12.

As best seen in FIG. 5, slip roll 42 is carried on stub shaft 103 journaled in members 43. Members 43 are supported from driven shaft 108 by suitable journal means (not shown). Suitable spring means (not shown) are provided to maintain roll 42 in contact engagement with roll 40 and the document passing therebetween. As will appear more fully, roll 42 normally rotates in the direction opposite that of feed roll 40.

Base 26 includes a curved outlet segment 45 extending in the direction of platen 6. A curved guide 46 spacedly overlays curved base segment 45 and cooperates therewith to route documents leaving singled document limiter 16 toward platen 6 of reproduction machine 5.

Intermediate transport 18 comprises one or more pairs of upper and lower feed rolls 48, 49, respectively, the peripheral surfaces of which project through suitable openings (not shown) in curved guide 46 and base segment 45 into contact engagement with one another. Suitable means, (not shown) are preferably provided to maintain rolls 48, 49 in releasable contact with one another. Rolls 48, 49 feed the documents along the curved path formed by base segment 45 and guide 46 toward platen transport 20.

Platen 6 comprises a generally rectangular transparent section having an inlet border delimited by edge 51 of register 50. Referring particularly to FIG. 3 of the drawing, register 50 comprises a platelike member supported at one end by hinge means 53. The opposite end 51 of register 50, which is suitably formed to provide a substantially flat edge surface, is adjacent the inlet to platen 6. Camshaft 54 is journaled in frame supports 27 under register 50 adjacent registering end 51 thereof. Suitable spring means (not shown) bias register 50 into contact with camshaft 54. Camshaft 54 is normally in the position shown in FIG. 3 whereby register 50 is held in a raised position.

Register drive solenoid 55 is provided, armature 55' thereof being connected to camshaft 54 by means of link 56. As can be understood, actuation of solenoid 55 rotated camshaft 54 in the direction of the solid line arrow enabling the register spring means (not shown) to retract register 50. It is understood that register 50 may be normally retracted. In that event, actuation of solenoid 55 raises register 50.

In the embodiment illustrated in FIG. 8, the remote border 7 of platen 6 is raised slightly above the level of platen 6 to provide a stop or register for the leading edge of the documents. In this arrangement, documents on platen 6 are located or registered through abutment of the document leading edge with raised border 7. In this arrangement, register 50 is stationary, the register 50 preferably being substantially flush with platen 6.

Platen transport 20 includes feed belt 58 operatively supported on drive and idler rollers 59, 60 respectively. Rollers 59, 60 are mounted on shafts 61, 62 respectively journaled in frame sides 63. Sides 63 of transport 20 are preferably journaled through shaft 61 in frame supports 27 to permit platen transport 20 to be pivoted upwardly about shaft 61 when it is desired to uncover platen 6. As may be understood, this construction facilitates clearing of document jams and enables copying of single documents without operating the document feed apparatus 10. In the arrangement illustrated, the weight of transport 20 establishes the necessary frictional relationship between the working surface of belt 58 and the document on platen 6.

Belt 58, which serves as both a light reflector and as a document feeder, preferably has an outer working layer or coating formed from a suitable light reflective material, to enhance the copying or reproduction process.

Return transport 22 includes spaced pinch roll pairs 65, 66 and 65', 66' respectively. Rolls 65, 65' are supported on driven shafts 67, 67' while rolls 66, 66' thereof are supported on idler shafts 68, 68', respectively. Shafts 66, 67', 68, 68' may be rotatably journaled in supports 69 attached to frame parts 27'.

As best seen in FIG. 3, a plurality of spaced triangular-shaped, fingerlike document guides 70 are mounted on rockable shaft 71 upstream of return transport 22. Fingers 70 project in the direction of platen 6, the terminal ends thereof being adapted to rest lightly within transverse depression 52 in the surface of register 50. Shaft 71 is journaled in tray frame supports 27. Suitable bias means (not shown) may be provided to assure light contact of finger guides 70 with the surface of register 50.

Resilient guide strips 72 are arranged slightly above each document guide 70. Strips 72 cooperate with the upper surface 70' of fingers 70 to guide returning documents into the nip of the first return pinch roll pair 65, 66.

Opposing arcuate members 73, 74, are disposed between pinch roll pairs 65, 66 and 65', 66'. Guide members 73, 74 cooperate to route documents from pinch roll pair 65, 66 to pinch roll pair 65', 66'.

To assure return of documents into tray 12 and prevent documents from falling out of tray 12, springlike pressure members 75 are provided. Pressure members 75 are attached to support rod 76 journaled in upstanding parts 27' of frame supports 27. It is understood that pressure members 75 are manually raised to permit loading or unloading of tray 12. Suitable spring means (not shown) are provided to bias pressure members 75 toward base 26 of tray 12. As can be understood, pressure members 75 cooperate with bar 30 to prevent documents from falling out of tray 12 and to maintain the bottommost document in operative contact with primary feed roll 14. Pressure members 75 and support rod 76 therefor are suitably spaced from bar 30 to prevent members 75 and rod 76 from interfering with lifting movement of bar 30. Where desired, a suitable cover (not shown) may be provided for tray 12.

Referring to particularly FIGS. 5 and 6, drive motor 80 may be supported below base 26 of document tray 12. Drive belt 78 operably connects shaft 81 of motor 80 with transmission input shaft 79. Shaft 79 has drive pinion 82 thereon in meshing engagement with bevel-type output gears 83, 84 rotatably mounted on output shaft 85 and selectively coupled thereto by means of clutches 86, 87, respectively, to drive shaft 85 in either a clockwise or counterclockwise direction.

Drive belts 88, 88' drive shaft 90 of intermediate transport roll 48 through one-way clutch 89 and shaft 61 of platen transport drive roller 59 directly from output shaft 85. One-way clutch 89 serves, on engagement of clutch 86 and clockwise rotation of output shaft 85, to uncouple shaft 90 from drive belt 88.

Output gears 83, 84 have toothed hub portions 83', 84', respectively. Gear 91 on forward document drive shaft 92 meshes with geared hub 83' of gear 83 while gear 93 on return document drive shaft 95 meshes with geared hub 84' of gear 84. Drive belts 97, 97' couple shaft 95 with shafts 67', 67' of rolls 65', 65' of return transport 22.

Drive shaft 92 has output gear 98 rotatably mounted thereon and selectively coupled thereto by means of clutch 99. Output gear 98 meshes with reduction gear 100 on primary feed roll drive shaft 101. As will appear, gears 98, 100 cooperate to drive primary feed roll 14, rolls 40, 42 of single document limiter 16, and lower feed roll 49 of intermediate transport 18 at reduced speed.

Shaft 94 of single document limiter feed roll 40 is driven from shaft 101 by drive belt 102. Shaft 104 of intermediate transport lower feed roll 49 is driven from shaft 101 through

one-way clutch 106 by drive belt 102'. As can be understood, one-way clutch 106 uncouples shaft 104 from belt 102' when lower feed rolls 49 are driven at high speed by upper feed rolls 48. Additionally, shaft 108 is driven from shaft 101 through slip clutch 105 by drive belt 102'.

Slip clutch 105 comprises a suitable clutch mechanism of a type adapted on a predetermined torque to slip or disengage so that where rolls 40, 42 are in direct contact or where a single document is disposed therebetween, the frictional force between rolls 40, 42 effectively disengages clutch 105 to drive roll 42 in a document feeding direction (the solid line arrow in FIG. 5). Where the frictional force between rolls 40, 42 is reduced as where two documents attempt to pass therebetween, clutch 105 engages to turn roll 42 in the reverse direction (the dotted line arrow in FIG. 5) whereby roll 42 rejects the topmost one of the superimposed documents while enabling feed roll 40 to feed the lower document forward.

Clutches 86, 87, 99 are preferably electromagnetic-type clutches with suitable operating coils therefor.

Referring to FIG. 7 of the drawings, there is shown in schematic outline an exemplary arrangement of for controlling the document feed apparatus 10. A suitable controller 122 is provided to control motor 80, clutches 86, 87, 99, and solenoids 35, 55 to operate document feed apparatus 10 in accordance with the demands of the machine with which feed apparatus 10 is used, as for example, reproduction machine 5. As will appear, counting means 124, sheet detectors 133, 134 and timing means 139 provide additional controlling inputs to controller 122.

As best seen in FIG. 1, detectors 133, 134 and detector 135, which may comprise phototransistor-type pickups, have cooperating light sources 133', 134', 135' spaced opposite thereto, are provided. Detector 133 is disposed adjacent the discharge side of intermediate transport 18 while detector 134 is disposed adjacent the inlet of return pinch roll pair 65, 66. Detector 135, which control timing means 139, is located on bar 30 to sense the presence of documents thereunder as will appear more fully.

Counting means 124 preferably comprises a suitable pulse-type counter adapted to be driven by signal generator 143 in accordance with movement of platen feed belt 58. Generator 143 includes signal pickup 144, light source 145 arranged opposite thereto and apertured masking disc 146 therebetween. Disc 146 which rotates in unison with input shaft 79 enables light from the light source 145 to intermittently strike pickup 144 in accordance with the number and disposition of the apertures in disc 146. As will appear, the signal output of generator 143 effectively measures forward and reverse movement of platen belt 58. Timing means 139 comprises any suitable timing mechanism adapted when triggered to generate an output signal following a predetermined time interval.

On a starting signal from reproduction machine 5, controller 122 energizes motor 80 and actuates clutch 99 to couple shaft 92 with gear 98. Primary feed roll 14, feed roll 40 of single document limiter 16, and feed roll 49 of intermediate transport 18 are accordingly driven by motor 80 through gears 83, 91, shaft 92 and reduction gears 98, 100, in a document feeding direction.

Transport roll 14 feeds the lowermost document in stack 24 forward into the nip of rolls 40, 42 of single document limiter 16. The document passes along curved base segment 45 and under guide 46 into the nip of intermediate transport rolls 48, 49 rotating at slow speed.

As the first document emerges from intermediate transport 18, the signal from detector 133 to controller 122 disengages clutch 99 and engages clutch 87. Disengagement of clutch 99 stops feed roll 14 and inactivates single document limiter 16 while interrupting power to feed roll 49 of intermediate transport 18. Clutch 87 couples gear 84 with output shaft 85 to drive roll 48 of intermediate transport 18 and belt 58 of platen transport 20 in a document feeding direction. Intermediate transport 18, which is now driven at high speed, feeds the first document under guides 70 and over register 50 to platen transport belt 58, which carries the document onto platen 6.

It is understood that masking disc 146 of signal generator 143 rotates in unison with transmission input shaft 79. Following start-up of platen feed belt 58, counting means 124, on the input of a preset number of signal pulses sufficient to enable belt 58 to transport the document onto platen 6 and beyond registering edge 51, triggers on controller 122. Controller 122 disengages forward clutch 37 and engages reverse clutch 86 to couple gear 83 to output shaft 85. Platen transport belt 58 is accordingly reversed to move the document backwardly on platen 6 until the document trailing edge abuts edge 51 of register 50. With further backward movement of the document prevented by register 50, belt 58 slips across the document surface of on the continued movement thereof.

Where desired, belt 58 may be stopped during the work cycle. In that event, counting means 124 is arranged to actuate controller 122 and disengage reverse clutch 86 to stop platen belt 58 following a preset number of signal pulses adequate to enable belt 58 to bring the document trailing edge into abutment with edge 51 of register 50. With movement of the first document onto platen 6, a signal from detector 133 to controller 122 actuates auxiliary clutch 99 to operate primary transport roll 14, single document limiter 16, and intermediate transport 18 to feed the next document in stack 24 forward. It is understood, that intermediate transport 18 will operate at low speed while platen feed belt 58 is being driven backwardly, one-way clutch 89 serving to uncouple intermediate transport roll 48 from the reversely operating drive belt 88.

As the leading edge of the next document reaches detector 133, the signal from detector 133 to controller 122 disengages clutch 99 to stop roll 14, single document limiter 16, and intermediate transport 18. It is understood that platen belt 58, which is regulated by controller 122 in response to signal input from counting means 124, may have been previously stopped or may continue to operate backwardly.

On a signal from copy machine 5 at the completion of the copy cycle, controller 122 momentarily actuates solenoid 55 to rotate cam shaft 54 and retract register 50. At the same time, clutch 86, where previously disengaged to stop belt 58 during the copy process, is reengaged to drive platen transport belt 58 backwardly.

The momentary retraction of register 50 enables belt 58 to carry the document over register 50 to document guides 70 which deflect the document into the nip of return pinch roll pair 65, 66. Rolls 65, 66 feed the document through return guide 73 to roll pair 65', 66' for return to document tray 12. It is understood that the forward portion of the returned document(s) rests on separator bar 30.

As the returning document passes detector 134, the signal from detector 134 to controller 122 disengages clutch 86 to terminate reverse drive to platen transport belt 58 while engaging clutch 87 to drive intermediate transport 18 and platen feed belt 58 forward to feed the waiting document forward from intermediate transport 18 onto platen 6 at high speed as described heretofore. It is understood that return pinch rolls 65, 66, 65', 66', which are continuously rotated in the reverse direction by motor 80 through gears 84', 93, return the first document to tray 12.

On feed of the last document from under pressure bar 30, a signal from detector 135 readies timing means 139 for operation. When copying of the last document is completed, the actuating signal from reproduction machine 5 to controller 122 starts timing means 139.

Where reproduction machine 5 is programmed to copy plural documents automatically, the signal from timing means 139 following an interval sufficient for the last document to be returned to tray 12 to controller 122 renders motor 80 inoperative stopping document feed apparatus 10. The user may then raise pressure members 75 and remove the returned documents from tray 12.

Where the reproduction machine 5 is programmed to provide a collated output, the signal from timing means 139 to controller 122 following the aforementioned interval momentarily actuates solenoid 35 to lift bar 30 out from under the

stack of returned documents 24' in tray 12. On deenergization of solenoid 35, bar 30 drops back atop the stack of returned documents thereby readying document feed apparatus 10 for the next cycle. It is understood that suitable cycle counting means (not shown) may be provided to prevent actuation of solenoid 35 and lifting of bar 30 while shutting down the document feed apparatus 10 on completion of the last copying cycle.

In FIG. 9, wherein like numerals refer to like parts, there is shown the control arrangement for the FIG. 8 embodiment. Inasmuch as in this embodiment register 50 is fixed, documents being registered through abutment of the document leading edge with raised platen border 7, the control function for the register operation solenoid 55 is omitted in FIG. 9.

In this embodiment, documents are transported onto platen 6 in the manner described hereto fore, platen belt 58 serving to transport the document across platen 6 until the leading edge thereof strikes raised border 7. With further forward motion of the document prevented, belt 58 slides along the surface of the document. Where it is desired to stop belt 58 following abutment of the document leading edge with border 7, counting means 125 may be arranged, following a preset number of signal pulses sufficient to assure movement of the document into abutment with border 7, to actuate controller 122 and disengage clutch 87 to stop belt 58.

As documents are transported forward from detector 133 to platen 6, a signal from detector 133 readies controller 122 whereby controller 122, during the copy cycle of reproduction machine 5, actuates auxiliary clutch 99 to operate primary transport roll 14, single document limiter 16, and intermediate transport 18 to feed the next document forward. As the next document emerges from intermediate transport 18, the signal from detector 133 to controller 122 disengages clutch 99 to stop roll 14, single document limiter 16, and intermediate transport 18.

When the copy cycle is completed, controller 122, on a signal from copy machine 5, actuates clutch 86 to couple output shaft 85 with gear 83 to drive platen belt 58 backward. Belt 58 carries the document backwards to guides 70 which route the document to transport 22 for return to tray 12. As the document passes detector 134, detector 134 signals controller 122 to disengage clutch 86 and terminate reverse drive to belt 58. At the same time, controller 122 actuates clutch 87 to drive platen belt 58 and roll 48 of intermediate transport 18 in the forward direction to bring the waiting document onto platen 6.

On feed of the last document from under bar 30, timing

means 139, following an interval adequate to allow the document to be returned to tray 12 at the close of the copy cycle, shuts down the feed apparatus 10 or actuates solenoid 55 to move bar 30 out from under the returned documents as described heretofore.

While we have described and illustrated herein a preferred form of our invention, it will be apparent to those skilled in the art that changes and modifications may be made thereto without departing from the spirit and intent of the invention which is to be limited only by the scope of the appended claims.

We claim:

1. In a document handling apparatus having plural document transport means, one of said transport means being adapted for bidirectional transporting movement, the combination of:

gear means including drive gear and a pair of first driven gears in meshing engagement with said drive gear such that rotation of said drive gear rotates said first driven gears in opposite directions;

clutch means for coupling one or the other of said first driven gears with said one transport means whereby to selectively move said one transport means forward or backward; and

a second driven gear for a second one of said transport means, said second driven gear being in meshing engagement with one of said first driven gears whereby to move said second transport means forward so that on rotation of said drive gear, said first driven gears and said clutch means cooperate to selectively move said one transport means either forward or backwards while said second driven gear simultaneously moves said second transport means forward.

2. The apparatus according to claim 1 including a third driven gear for moving a third one of said document transport means backwards, said third driven gear being in meshing engagement with the other of said first driven gears whereby on rotation of said drive gear, said third driven gear moves said third transport means backwards.

3. The apparatus according to claim 1 including second clutch means for selective coupling said second driven gear with said second transport means.

4. The apparatus according to claim 1 in which said clutch means comprises first and second clutches for selectively coupling individual ones of said first driven gears with said one transport means, and a third clutch for selectively coupling said second driven gear with said second transport means.

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