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Craft

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[54] **SELECTIVE CUT SHEET FEED DEVICE**

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[73] Assignee: **International Business Machines Corporation,** Armonk, N.Y.

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[52] **U.S. Cl.** ..... **217/9,** 198/334 R, 271/117, 271/126

[51] **Int. Cl.** **B65h 3/44,** B65h 1/12, B65g 47/24

[58] **Field of Search** ..... 271/9, 61, 117, 126; 198/33 AC

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Assistant Examiner—James W. Miller
Attorney—Laurence R. Letson et al.

[57] **ABSTRACT**

The paper feed mechanism disclosed has the capability of accepting two packs of sheet material or paper of two different sizes, such as letter and legal size, and selectively feeding sheets from one of the stacks in accordance with the condition to which the paper feed mechanism has been conditioned. The placing of the paper stacks on edge with the picker feed mechanism intermediate the stacks allows the feeding of the sheets by one picker or feed mechanism without the shifting of the paper packs from a first or second position. This also allows the feeding of the sheets without having to overcome gravity effects of the paper stack.

3 Claims, 9 Drawing Figures

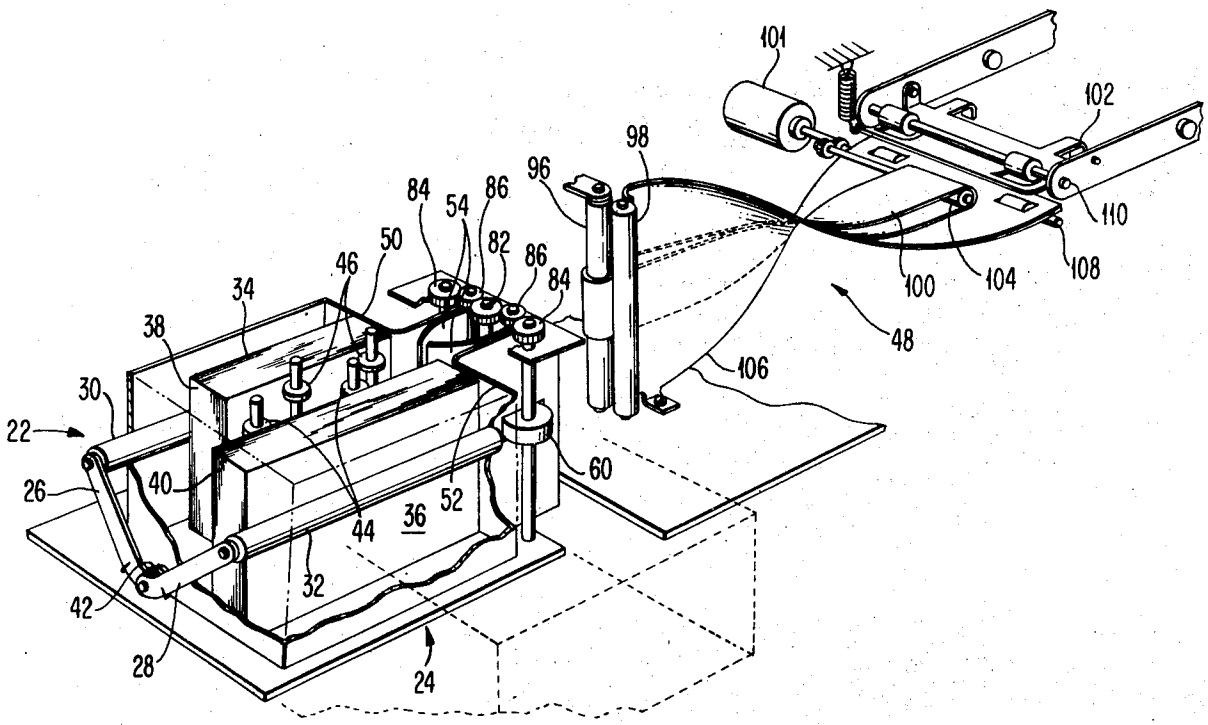

FIG. 1

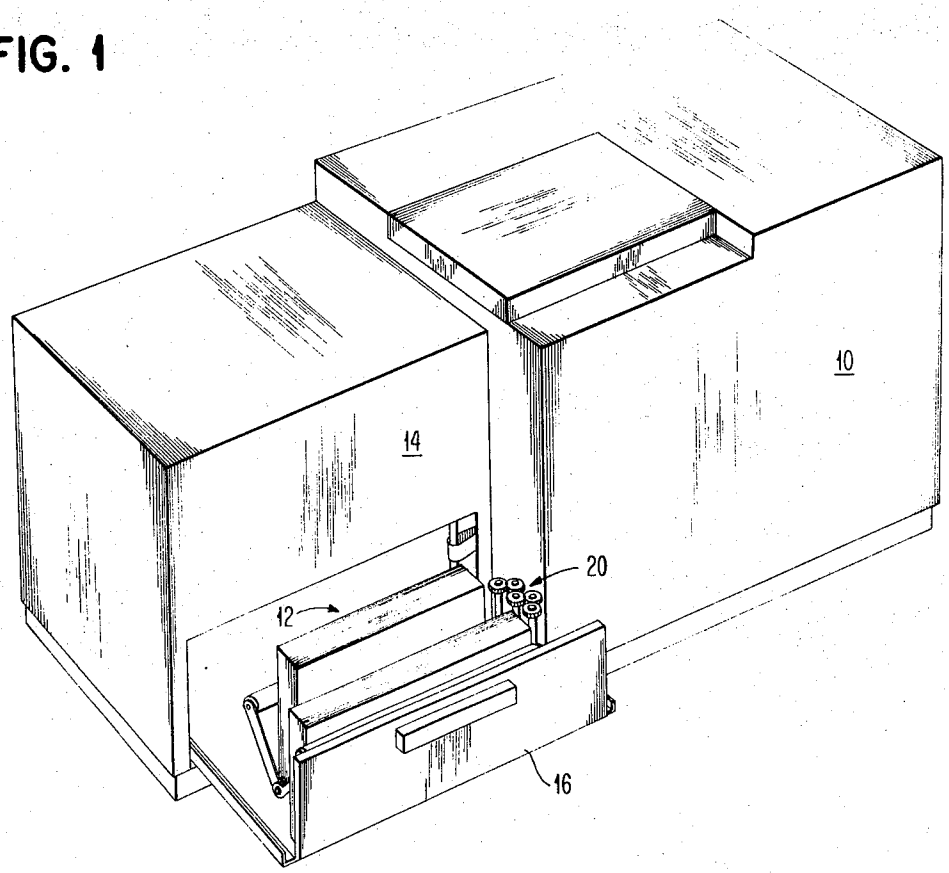
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FIG. 2

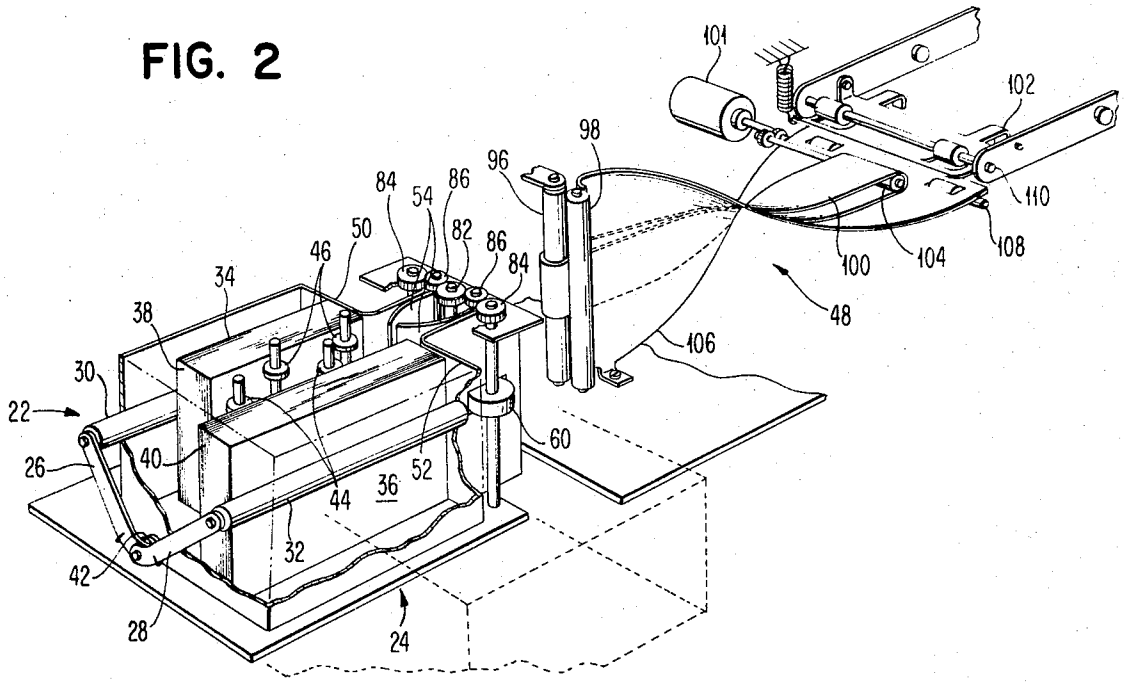
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FIG. 3

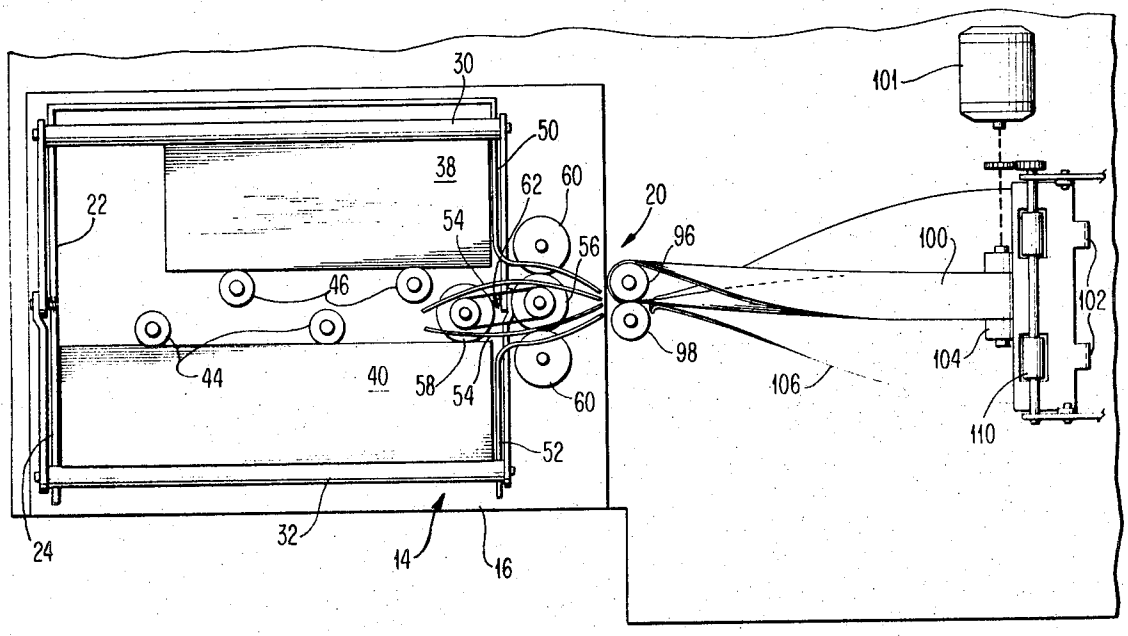


FIG. 4

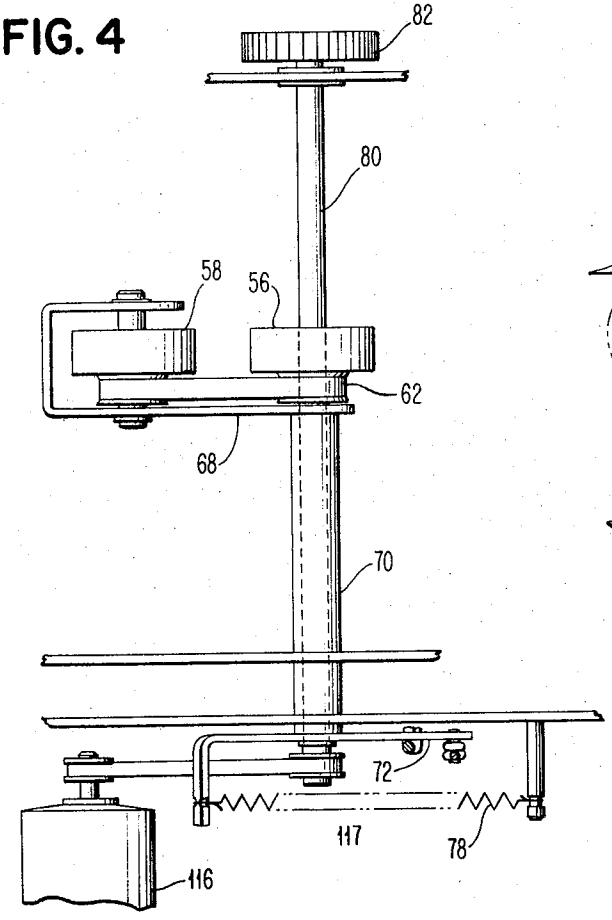


FIG. 7

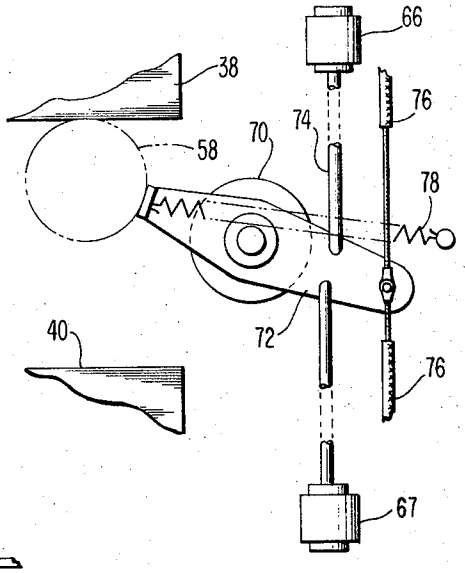


FIG. 5

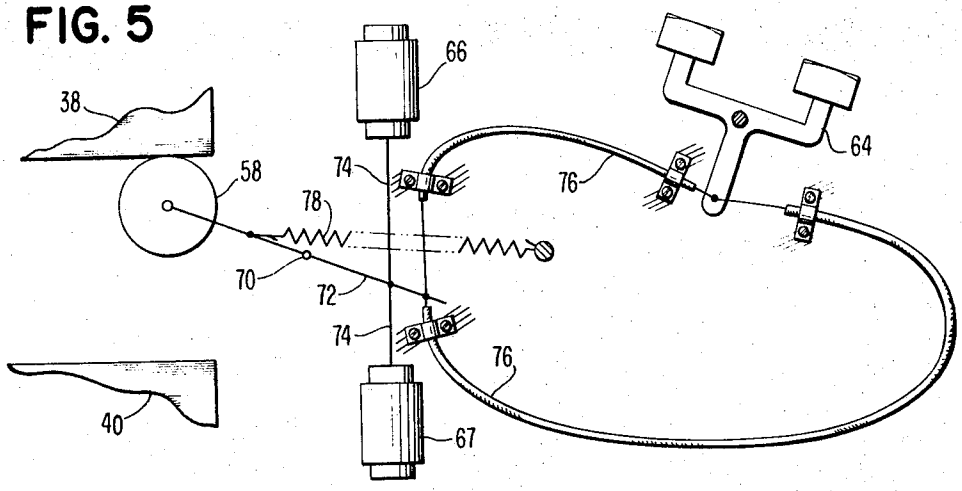


FIG. 6

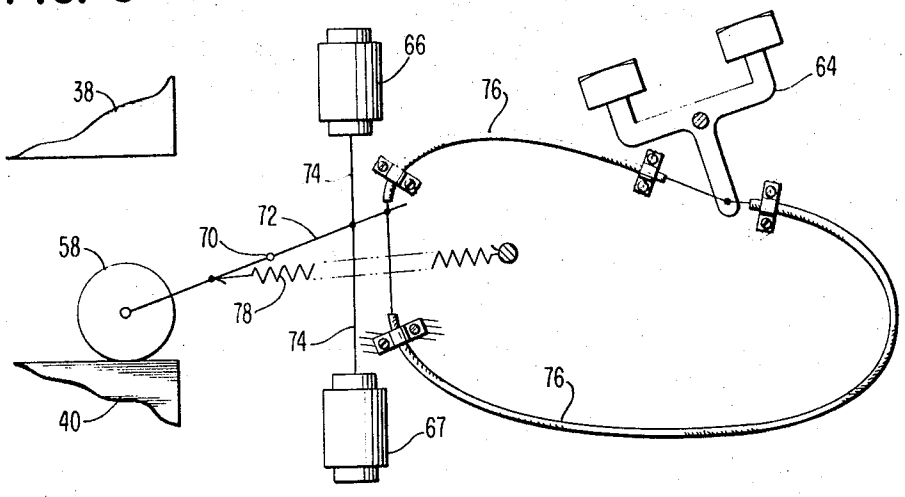


FIG. 8

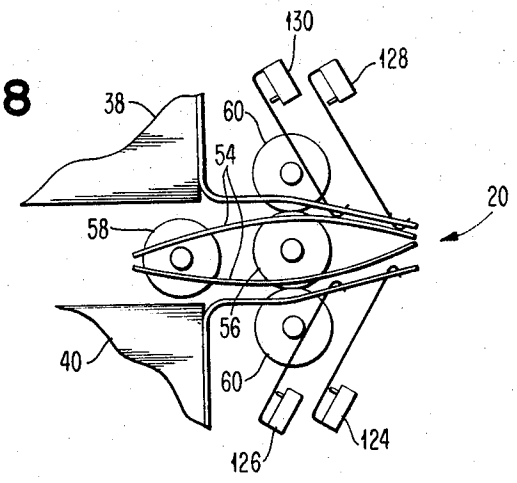
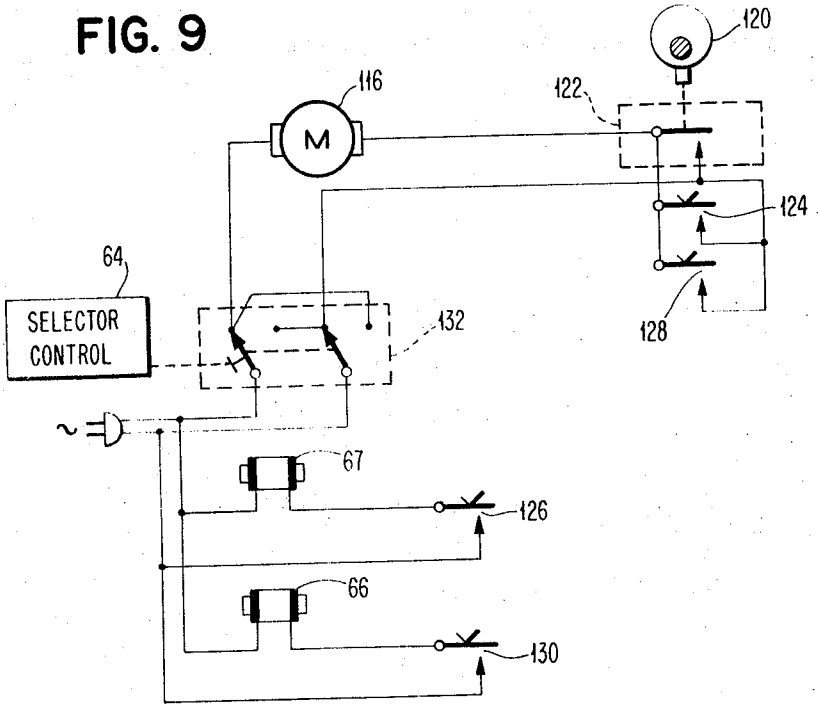


FIG. 9



SELECTIVE CUT SHEET FEED DEVICE

BACKGROUND OF THE INVENTION

Multisize sheet feeds for selectively feeding material from one of a plurality of sheet packs is well known in the prior art. The techniques which have been employed heretofore have been that of shifting the pack holders from a nonoperative position to an operative or feeding position. This is usually accompanied by some rather extensive equipment for raising and lowering the packs to the desired feed station so that the pack is accurately and properly positioned with respect to the picking and feeding mechanism.

Additional problems were encountered when the picking and separating mechanisms were of necessity inserted over the respective packs thereby requiring either duplication of the picking and separating mechanisms or the withdrawal of these mechanisms prior to shifting of the packs.

Alternate solutions were to shift the feeding route from the fixed pack positions such that the sheet was diverted through a series of guides or feed routes to a common station where subsequent handling was then accomplished. Difficulties with this mechanism required duplication of the initial separating and picking mechanisms as well as duplication of the sheet transport mechanisms to accomplish the transporting of the sheet from the packs to a timing and/or aligning station.

The timing of the feed of sheet material is fairly crucial because the paper must arrive at a waiting station in sufficient time to be allowed to pass from that station on command. In the past, timing has been accomplished in two major phases—the first phase being that of feeding a sheet from the pack and forwarding it to the waiting station. The feeding from the pack is timed such that it arrives at the waiting station shortly before it is required to pass through the waiting station. This allows a small safety factor. The timing coordination is substantially compounded when sheets are fed from the tops of fixed pack holders. This is due to the need for changing the timing such that the most distant pack holder has a feed signal transmitted to its picker earlier than the closest pack holder. If the pack holders are maintained at equidistant feed paths from the waiting and alignment station, the trade off is that of a surplus amount of feed path in one of the paths or a compromise in the positioning of the pack holders. When an effort is made to overcome this need for multiple feed paths and the sheets are fed from the adjacent surfaces of the packs using a single picker mechanism, the problem in the implementation of such a system has heretofore been that, when the sheet is fed from the top of one pack, the forces required to feed that sheet are substantially less than the force required to feed a sheet from the bottom of the pack immediately above. The topmost pack is exerting a force on the bottom sheet due to gravity which increases the picker force necessary to effect feeding. Additionally, the force is highly variable due to the changing quantity of paper in the pack.

It is an object of this invention to improve multicharacteristic paper feeds by obviating the need to shift paper packs from operative to inoperative positions.

It is another object of this invention to improve multicharacteristic paper feeds by equalizing the forces required to feed selectively from one of a plurality of paper packs.

It is still another object of this invention to feed paper selectively using a single simplified picker mechanism for effecting the sheet feed from one of a plurality of paper packs.

Additional objects of the invention will become clear from a detailed consideration of the invention described in detail below.

SUMMARY OF THE INVENTION

The foregoing objects are accomplished by the use of a single feed mechanism which is preferably embodied in a single picker mechanism having two separator rolls associated therewith. The picker mechanism is reversible so that it may operate in a feed direction when biased against either of two paper packs.

The paper packs are held by pack supports or pack holders in a vertical plane such that the surfaces of the sheets are perpendicular to the horizontal. The sheets are then fed in this vertical plane by the picker separator mechanism into a paper transport means where the sheet is oriented from its perpendicular position to a horizontal position for further processing. As the sheet progresses past the picker separator rolls to the transport mechanism, it is deflected from a vertical or perpendicular plane to the horizontal plane by a transport belt and deflector. As the sheet is positioned in the horizontal plane, it is stopped momentarily by a waiting and/or aligning station and, upon command of the machine utilizing the sheets, is then allowed to pass the paper onto the paper transport of the utilizing machine.

The paper packs are individually biased toward each other to present the sheets at identically the same position for feeding as any previously fed sheets. The picker mechanism is selectively movable and reversible so as to engage the closest sheet of either pack depending upon its mode of control.

The foregoing and other objects, features, and advantages of the invention will be apparent from the following more particular description of a preferred embodiment of the invention, as illustrated in the accompanying drawings.

IN THE DRAWINGS

FIG. **1** is a view of an office copier with the paper feed embodied in it and the related collator.

FIG. **2** is a perspective view of the paper pack holders and paper feed mechanism.

FIG. **3** is a top view of the picker and sheet feed and transport and paper pack assemblies.

FIG. **4** shows a side view of the picker and drive assembly.

FIGS. **5, 6** and **7** show diagrammatically the picker roller and the mechanism for controlling its position and movements.

FIG. **8** is a plan view of the picker separator assembly illustrating the control switch placement.

FIG. **9** is a schematic wiring diagram of the control circuit for charging the picker roller condition between characteristic packs.

FIG. **1** shows an office copier **10** wherein the paper feed mechanism **12** is embodied in a secondary attachment or housing **14** and supported in a drawer **16** for ease of loading and servicing. The paper supply mechanism embodying the paper feed may be housed within a sorter collator **14** or merely a sheet receiving apparatus. Alternatively, the paper mechanism can be built into the base machine **10** or be made to stand alone if

it is not feasible to embody it in a sheet receiving housing.

For the sake of ease in description and explanation, the characteristics of the sheets which will be described for use with the picker-separator, paper feed mechanism will be sheets of letter size and sheets of legal size having length dimensions of 11 and 14 inches, respectively. It should be understood that other characteristics of the sheets could equally be accommodated such as one pack being that of paper and the other pack being offset master sheets or card stock.

To provide ease of access, the paper drawer **16** is mounted on support slide rails for ease in opening and closing. Within the drawer **16** and exposed to the open top are the picker-separator assemblies **20.** The picker-separator assembly **20** is best illustrated in FIG. **3.**

The picker-separator assembly **20** is supported in the drawer **16** such that it moves to the exterior of the support housing **14** when the paper drawer **16** is opened. Also supported within the paper drawer **16** are the pack holders **22, 24** which can best be observed in FIG. **2.** The pack holders **22, 24** are comprised of spring urged biasing arms **26, 28** which tend to bias a roller **30, 32** on each arm **26, 28,** respectively, or backing plate could be used in lieu of the rollers **30, 32,** depending upon the embodiment, against the external surface **34, 36** of the paper packs **38, 40.** As one of the biasing arms **28** is urged by its spring **42** in a counterclockwise direction, the paper pack **40** illustrated in the drawing as the legal sized paper is urged or forced toward the support rolls **44.** The support rolls **44** provide a supporting function to hold the paper pack **40** in its vertical plane prior to feeding and also to eliminate or at least minimize the drag between the support and the paper as it is fed, sheet by sheet, into the paper transport mechanism **48.** FIG. **2** illustrates a roller **30, 32** urged against the exterior surface **34, 36** of the paper pack **38, 40.** This roller could advantageously be replaced by a plate which is pivotally mounted on the biasing arms **26, 28** such that they maintain the exterior surface of the paper packs **38, 40** in a vertical plane thereby preventing buckling of the individual paper sheets. The support rolls **44, 46** may be either shafts with a plurality of roller discs mounted thereon or may be rotatably mounted shafts of a suitable diameter to keep the interior surface of the paper packs **38, 40** in a substantially vertical planar position. Additional support rolls **46** are provided for the second paper pack **38** being of the letter size. The second set of support rolls **46** are identical to those of the first set **44** with the exception they are displaced slightly from the first set to prevent them from contacting the firstmost sheet of the first paper pack and likewise prevent the support rolls from contacting the firstmost sheet of the second paper pack. The second paper pack **38** is as described with respect to the first paper pack **40** urged into the support rolls **46** by a spring biasing arm **26** having pivotally attached thereto a roller **30** for exerting a force onto the exterior surface **34** of the second paper pack **38.** If a roller is used, the roller should be positioned such that its line of force is exerted between rolls on the support roll shafts **44, 46** to insure that contact is made with all the rolls on the shafts.

Adjacent to each of the paper packs **38, 40** is a flange **50, 52** which is utilized for aligning the paper packs **38, 40** and positioning them in such a manner that each time the paper is replenished the pack is reinserted in its same relative position. Between the two flanges **50, 52** which act as paper guides and extending between the paper packs **38, 40** are deflector vanes **54** which insure that sheets fed from either of the paper packs are deflected and guided to the power-separator rolls **56, 60.** These vanes **54** are fixedly attached to the support bracket **68** in FIG. **4** and serve only the guiding and deflecting function. Extending between the deflector vanes **54** to the region between the paper packs is a belt drive **62** extending from the power roll **56** to the picker roll **58.** The picker roll **58** is urged against one of the paper packs **38, 40,** thereby engaging the firstmost sheet of that paper pack, and as the power roll **56** is caused to rotate in the appropriate direction, counterclockwise for the legal pack **40** and clockwise for the letter pack **38,** the belt **62** transmits the driving force to the picker roll **58** thereby causing the picker roll **58** to rotate in the same direction which, in turn, urges the firstmost sheet toward the power roll **56** and separator roll **60.** The separator rolls **60** are gear driven thru gear trains **82, 86, 84** from the power roll **56** such that the separator roll **60** counterrotates its surface with respect to the point of engagement with the surface of the power roll **56** at a speed approximately one-third to one-fourth that of the power roll.

The power roll **56** through its drive shaft **80** powers drive gear **82.** Drive gear **82,** in turn, provides power to the driver gears **84** mounted to operate the separator rolls **60,** through roller gears **86.** This arrangement provides counterrotation of the surfaces at point of contact and the separating function. Relative speed is controlled by gear ratios and roll diameters. The separator rolls **60** are gear driven in the preferred embodiment, however, they may be belt driven or separately powered if that is desired. Preferably, the power roll **56** of the picker-separator assembly **20** is intermittently power driven in the desired direction. The picker roll **58** can be shifted about an axis which is the same as that of the power roll **56** of the picker assembly and may be swung through a small portion of an arc to position it against the firstmost sheet of either paper pack. This positioning mechanism is illustrated at FIGS. **5, 6** and **7.** When a selector control, member **64** on the paper feed housing or on the base machine, is conditioned for one paper size, the picker roll **58** and its associated belt **62** are positioned in the vicinity of the firstmost sheet of the paper pack. The picker roll **58** is movable toward and into contact with the firstmost sheet of the pack and upon the appropriate electromechanical command from the timing control of the base machine, rotates to feed that sheet. This intermittent engaging movement is accomplished by one of a pair of solenoids **66, 67** which are connected to the support member **68** of the picker separator assembly **20** through a support shaft **70** and crank **72** as illustrated in FIGS. **4** and **7.** Solenoid links **74** are attached to crank **72** and act through the energization of one of the solenoids **66,67** to shift crank **72** either clockwise or counterclockwise a small amount. This small shift CW or CCW will cause the picker roll **58** to disengage the firstmost sheet of the 11 inch or 14 inch paper packs **38** or **40,** respectively. After this momentary pulsing, the crank **72** is returned to its rest position by the action of the overcenter spring **78,** against the paper pack.

To accomplish the change of selection of the characteristic of the sheet to be fed, the appropriate control

button of selector control **64** is depressed. The control **64** is connected thru linkages or Bodien cables to one end of crank **72.** Crank **72** then acts thru support shaft **70** to cause picker support **68** to be moved around the axis of support shaft **70.** Overcenter spring **78** retains the crank in a position for cooperation with either the letter size pack **38** or legal size pack **40.**

Within the support shaft **70** is a power drive shaft **80** which drives power roller **56.** Power roller **56** in turn drives picker roller **58** through belt **62.** Drive shaft **80** is belt driven from any power source **116,** preferably an electric motor capable of reversing electrically. The electrical reversing of the drive motor **116** is illustrated in FIG. **9** and may be controlled from the characteristic selector control **64** acting on a switch. The direction of rotation is coordinated with the appropriate size sheet to be fed to insure the proper rotation of the picker roller **58,** power roller **56,** and separator rolls **60.**

The base machine may be equipped with a cam controlled switch to initiate paper feed. The paper feed switch completes the circuit to the motor.

The picker-separator assembly is provided with sheet operable switches which control the picker motor **116** and solenoids **66, 67.** Mounted with their feeler arms in the paper path of the 14 inch sheet feed is motor control switch **124** and solenoid control switch **126.** Likewise, motor control switch **128** and solenoid control switch **130** are mounted on the picker-separator assembly with their feeler arms in the 11 inch paper feed path.

Referring to FIG. **9,** picker motor **116** is connected in series to a bank of switches **122, 124, 128** in parallel with each other and independently operable to enable the picker motor **116.**

Inserted into the circuit between the power source and the motor is a reversing switch **132** which is controlled by the selector control **64.** Also connected to the power source and in parallel with each other are two solenoid circuits each having a lift solenoid **66** or **67** and a control switch **130** or **126,** respectively, in series within each loop.

In the base machine **10** and powered by a drive motor either through a gear train or in a direct drive fashion is the transport belt **100** (FIG. **3**) which receives the sheet from the power-separator rolls **56, 60** and transports the sheet to the exit gate **102** which acts as the timing and/or aligning station. The transport belt **100** is an endless belt driven by its support and aligning shafts **104** and is twisted from a plane parallel to the vertical, 90° to a plane parallel to the horizontal. The direction of twist clockwise or counterclockwise is dependent primarily upon the positioning of the sheet stock in the pack holder of the sheet feed drawer **16** and the requirement for presenting a particular surface of the sheet material to the base machine **10** in a particular relationship with its parts. The transport belt **100** is positioned adjacent to and lightly in contact with a deflector **106** which is a sheet of relatively low friction material such as a smooth metal or a plastic or a metal coated with Teflon* (*Teflon is a trademark of DuPont Corporation) or other low friction coating which has been shaped such that one end piece is twisted at 90° with respect to the other end so that the ends are perpendicular to each other when viewed from one end. The transport belt **100** terminates in proximity to the feed rolls **108** which are continuously driven by a drive motor **101.** The pinch rolls **110** which are positioned in proximity to and capable of being moved into engagement with the feed rolls **108** by the movement of the exit gate **102** support arms. The exit gate **102** or timing gate is capable of movement into and out of the path of the paper and may be actuated by conventional timing mechanisms to allow the paper or sheet to be fed on into the sheet transport means of the base machine **10** at the precise time required for proper phase timing of the sheet feed with respect to the other functions of the base machine.

A second roll **98** is in pinching relation with an idler roll **96** and the transport **100** adjacent the power separator roll assembly **20.** These rolls **96, 98** pinch the paper and insert the sheet between the belt **100** and the deflector **106.** The pinch rolls are powered from the belt **100.** The pack holder assembly which includes the picker-separator roll assembly **20** is mounted on a tray or drawer **16** which may be pulled out exposing the top of the pack assembly and making it convenient for loading or replenishing the packs as they are depleted. The drawer **16** which is movable contains the picker-separator assembly **20** and the picker motor **116.** The picker motor **116** provides drive power through a belt **117** to the drive shaft **80.**

MODE OF OPERATION

To initially load the paper pack holders and utilize the feed assembly with an office copying machine, the drawer **16** is pulled outward and opened to expose the top of the paper pack holding assemblies **22, 24.** The spring biased force arms **26, 28** and biasing rollers **30, 32** are moved away from the support rollers **44, 46** leaving a gap therebetween. A package or stack of paper is prepared and inserted edgewise down between the biasing roller **30** or **32** and the support rolls **46** or **44** and the biasing arm **26** or **28** and roller **30** or **32** are released and allowed to urge the paper pack **38** or **40** toward the support rolls **46** or **44.** The second pack of paper is accommodated in an analogous manner by moving its respective bias arm and allowing insertion of the paper pack between the biasing roller and the support rolls. The packs should be placed in reasonably close proximity to the sheet deflector guides **50, 52** but need not be in intimate contact therewith. During the insertion phase of loading the paper packs into the paper pack holders, the picker roll **58** is maintained in a position which does not interfere with the paper insertion and is between the two paper packs.

Upon completion of the loading phase, the paper drawer **16** is repositioned in its operative position. The picker roll **58** is power driven by motor **116** when the base machine is operated on command from cam control **120.** When the command for the picker to begin its function is generated by the paper feed switch being closed by cam control **120,** power is transmitted to the picker motor **116** which begins to continuously drive the power roll **56,** power belt **62,** and picker roll **58** until the feeding function is complete.

The separator rolls **60** through the gear train illustrated in FIG. **2** are driven in a counterrotating direction to that of the power roll **56.** The speed of rotation also is controlled by the gear ratios of the gear train **82, 86, 84** and is maintained at approximately one-third to one-fourth the rotational speed of the power roll for rolls of equal diameter.

When the base machine **10** is turned on and conditioned to run, transport belt **100** is powered and begins

its continuous operation until the base machine **10** is shut down upon its completion of operation. The transport belt **100** is in light frictional contact with the deflector **106** thus allowing trapping of any sheet between the belt **100** and the deflector **106.**

The operator selects the size sheet desired for the particular operation, i.e., letter or legal, by use of a selector control **64.** The control **64** acting through Bodien cables **76** pulls crank **72** and picker roll assembly **20** over center and maintains it in contact with the desired paper pack by an overcenter spring **78.** For example, if the operator selects the letter size, the picker assembly **20** will then be biased by the Bodien cables **76** toward the pack containing **11** inch paper. The picker **58** will remain in this general position throughout the following operations until such time as the operator changes the condition by causing the paper size selector control **64** to be operated to select **14** inch paper.

If the base machine **10** is an office copying machine, and an original is placed on the document plane and the machine **10** caused to begin its normal function at a time slightly before that required for the transportation of a sheet all the way from the paper pack to the timing or waiting station **102,** a signal is generated by cam control **120** which operates the picker motor causing the picker roll **58** to feed the first sheet in the letter size paper pack **38.** As the picker roll **58** in this instance would be rotating in a clockwise direction, the initial rotation of the picker roll **58** will cause the first sheet to move toward the power-separator roll assembly **56, 60.** As the first sheet begins this movement, the picker roll **58** continues in engagement with it for a period of time slightly more than is sufficient to transport the leading edge to engagement with the power separator rolls **56, 60** and into contact with the feeler arm of switch **128.** The closing of switch **128** causes the picker motor **116** to continue to run even after cam control **120** ceases to provide continuity through switch **122.** Switch **128** remains closed as long as there is paper acting on the feeler arm. After these two rolls **56, 60** have had a chance to engage the sheet and cause any second or more sheets to be urged back toward the paper pack, the paper passes toward switch **128** and engages switch **130** which completes the circuit through lift solenoid **66.** The solenoid **66** through its link **74** pulls crank **72** and picker roll **58** away from the paper pack **38.** The power-separator rolls **56, 60** continue to rotate in their predesignated directions and urge the paper toward pinch rolls **96, 98** which engage the paper and insert it between the transport belt and the deflector. The frictional engagement between the separator roll **60** and the power roll **56** is slight. The single sheet of paper may be actually pulled from between these two rolls with a minimum of force, but the force of separator roll **60** and power roll **56** is great enough to control the sheet as long as the roll **56, 60** engages any portion of the sheet.

The picker motor is partially controlled by the timing cam control **120** of the base machine **10** acting to close and open switch **122.** The picker motor circuit is opened by the cam control **120** opening switch **122** during the paper feeding and the opening of switch **128** after the paper has passed. When the sheet has passed switch **130** and allows it to open the circuit to solenoid **66** is broken and overcenter spring **78** pulls crank **72** clockwise and moves picker roll **58** into contact with pack **38,** awaiting the next paper feed sequence.

The paper feed sequence of switch controls is analogous for 14 inch paper. The motor **116** operates in the reverse direction due to reversing switch **132** being placed in its second position. The sequence of events is controlled by switches **126** and **124** the same as it was by switches **130** and **128.**

The belt **100** which is maintained around one of the pinch rolls or idler roll **96** is operated at a speed higher than the linear speed of the separator and power rolls **60, 56.** When the paper is inserted between the pinch roll **98** and the idler roll **96** having the belt riding thereon, the frictional engagement of the two counter-rotating surfaces is not sufficiently strong to pull the sheet from between the power-separator roll assembly **20,** but strong enough to transport the sheet when the power roll **56** and separator roll **60** no longer engage the sheet. The sheet is then trapped between the belt **100** and the deflector **106** and the frictional engagement of the belt **100** with the paper surface urges the paper in the direction of the belt travel where it ultimately will come to rest momentarily against the exit and/or timing gate **102.** As the base machine **10** reaches that portion of its operational cycle where the paper should be fed in a closely timed relation with the other machine functions, the timing gate **102** or exit gate is opened and the idler rolls or pinch rolls **110** are moved into operative relation to the powered feed rolls **108.** As the powered feed rolls **108** are continuously running when the base machine is operating, the paper is trapped between the feed rolls **108** and the idler rolls **110** and is rapidly urged forward into the sheet transport mechanism of the base machine. This sequence will repeat itself for every operation of the base machine **10** requiring a sheet to be fed from the pack. The sheets will continue to come from the preselected pack until such time as the operator overcomes the previous condition by activating the paper selection switch or control **64** to cause the picker assembly **58** to be moved over center and into contact with the second pack. When the picker assembly **58** is caused to move from one pack to the other pack, the electrical circuitry associated with the picker drive motor **116** is conditioned to reverse its direction of operation. This likewise reverses the direction of operation of the separator rolls **60** but does not effect the efficient operation of the machine **10,** as only the separator roll **60** associated with the pack from which sheets are to be fed will be operating in the required direction, while the other separator roll **60** will be idling and ineffective. The operation of the sheet feed and transport mechanism is identical to the operation described above with the exception that the solenoid **67** biasing of the picker roll **58** up off the paper pack **40** would be in the opposite direction. With the picker roll **58** being reversed in its direction of rotation as discussed above, the paper would then be fed from the second pack and inserted between the pinch rolls **96, 98** and trapped between the moving belt **100** and the deflector **106.**

To ease the transportation of the sheet between the belt **100** and the deflector **106,** it may be desirable to mount on the surface of the deflector **106** small rotating balls which are trapped within a bezel or retaining ring to allow a reduction of friction between the sheet material and the deflector **106** while maintaining suffi-

cient force between the sheet material and the transport belt **100** to insure the forward movement.

The timing of the operation of the picker **58** with respect to the time phasing of the base machine **10** is such that a fairly wide latitude of acceptable times is possible since the sheet is picked and fed and ultimately transported to the timing or exit gate **102** and the fine timing occurs with the release from the exit gate **102.** Therefore, the only requirement for the picking time is that it be sufficiently early to insure that the sheet arrive at the exit gate **102** prior to the exit gate opening. Therefore, the paper may even be fed relatively early in the cycle and in that way the paper can be waiting at the gate when the command from the base machine **10** activates the exit gate **102** and traps the paper between the power feed roll **108** and pinch roll **110.**

As can be seen from the foregoing, the feeding of sheets from two different packs, each having its own characteristics, for the sake of illustration, length, the disadvantages of the prior art have been overcome in that it is now unnecessary for the packs to be shifted with respect to the paper transport mechanism; and only a relatively small portion of the system, i.e., the picker, need be shifted to accomplish the feeding. Secondly, the positioning of the paper packs on edge eliminates the gravitational effect that weight has when attempting to feed the bottommost sheet of a horizontal pack.

It should be recognized that, while the disclosure above has been made with respect to sheets of two different sizes, it would be equally applicable to a system where the primary usage of the machine was for letter size copies and where the legal size pack is made up of offset masters such that when the control is activated to feed a legal sheet an offset master is made for further reproduction. Similarly, if there was a need for the intermittent making of paper copies and copies on card stock or colored paper, then one pack could be loaded with the standard copy paper and the other pack could be of a colored paper or a card stock material as desired. In this specification and the attached claims, the term characteristic when applied to the paper means any dissimilar property of the papers and is intended to include but not be limited to size (length and/or width), color, composition, function, weight, or other property of the sheet material being fed.

It should also be recognized that the principle of this mechanism, although disclosed for use with an office copying machine, would be equally applicable to the feeding of selected sheet sizes for an offset press, duplicator, or any other type machine which would require the selection of alternate characteristics in the sheet material being fed to the machine.

By fixing the location of the two-sheet packs and placing the picker mechanism intermediate the packs, duplication of picking and feeding apparatus together with duplication of feed paths and the requirement for complex and extensive timing arrangements have been obviated since one timing signal can be utilized regardless of which characteristic sheet is being fed, and as the feed path is identical, there is no difference in the feed times.

The pack arrangement disclosed provides the capability for large quantities of paper to be inserted into the paper drawer in a copying machine environment, thus reducing the frequency with which replenishment is required.

It should be recognized that a sensor may be installed for one or both of the paper packs to indicate a paper low condition and disable the machine when the paper quantity is insufficient to properly operate.

While the invention has been particularly shown and described with reference to a preferred embodiment thereof, it will be understood by those skilled in the art that the foregoing and other changes in form and details may be made therein without departing from the spirit and scope of the invention.

I claim:

1. A cut sheet paper feed apparatus for selectively feeding sheets from one of two packs having differing size characteristics comprising:

a support means;

first and second sheet pack holders supported by said support means for holding first and second sheet packs on one of said sheet packs' edges and holding said packs in a spaced apart, generally parallel position with respect to each other and said packs having sheet's faces in a position perpendicular to the horizonal;

first and second biasing means for exerting a force simultaneously on each of said first and second sheet packs to urge said packs toward each other;

friction reducing support means intermediate said packs to ease feeding of sheets from said packs;

selectively operable and selectively engageable picker means for picking said sheets from one of said packs;

transport means to receive said sheets from said picker means and transport said sheets toward the point of ultimate use;

fixed convoluted sheet deflector means to orient said sheet from a generally vertical plane to a generally horizontal plane during the time said sheet is being transported by said transport means;

timing means to intercept and release said sheet for further use at a predesignated time;

whereby sheets are selectively fed from the adjacent surfaces of two sheet packs without the shifting of said packs and where said sheets are then transferred to a horizontal plane for continued use.

2. The sheet feed apparatus of claim **1** wherein said selectively operable picker means further comprises a reversible power means operatively connected to said picker means for driving said picker means selectively in one of two directions.

3. The apparatus of claim **2** wherein said transport means comprises a continuously running belt for urging said sheet against said deflector means and for urging said sheets toward said timing means.

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