March 4, 1969 H. R. W. MARSH ET AL 3,430,950

SHEET FEEDING MECHANISM

Filed Dec. 20, 1966 Sheet 1 of 3

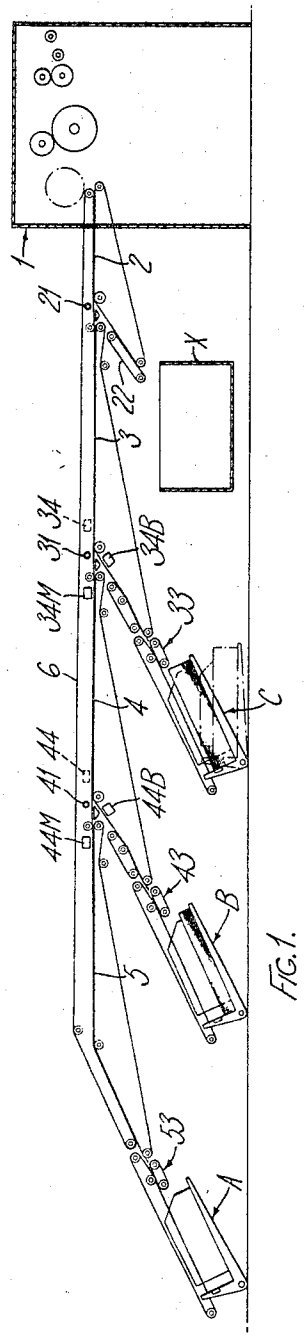


FIG. 1.

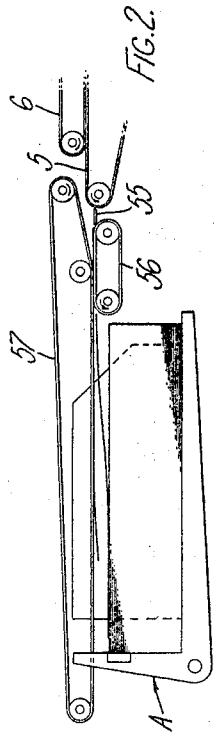


FIG. 2.

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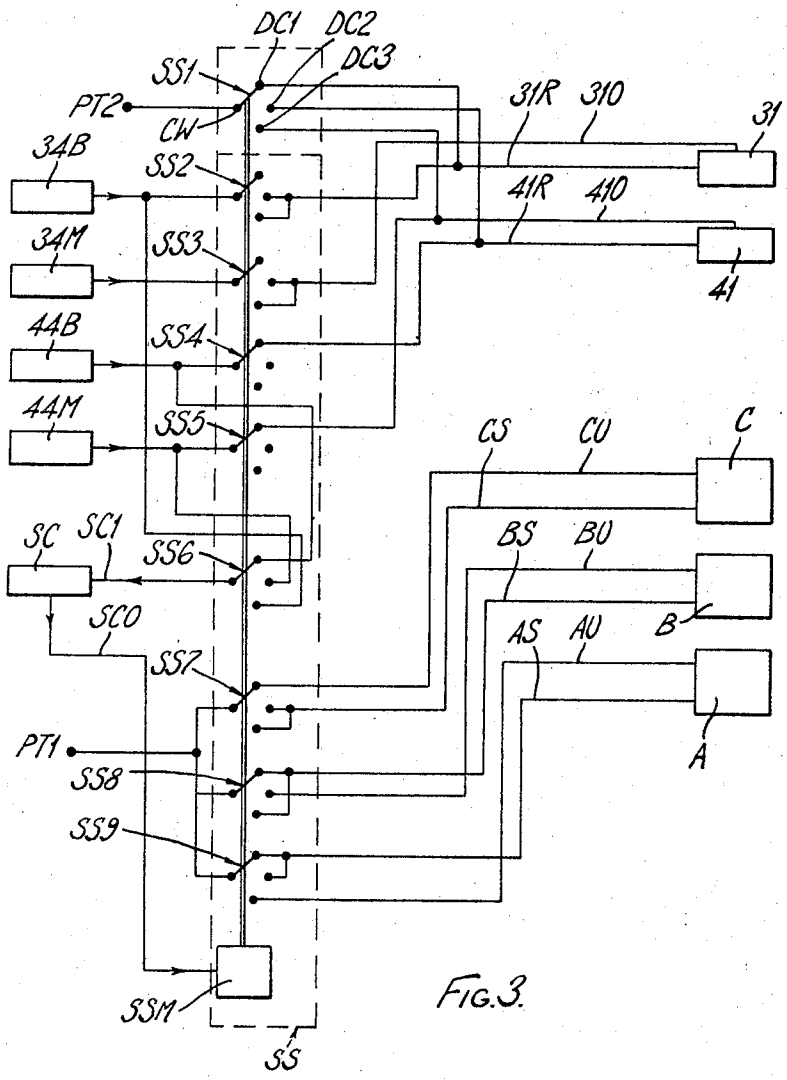


FIG. 3.

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SHEET FEEDING MECHANISM

Filed Dec. 20, 1966 Sheet 3 of 3

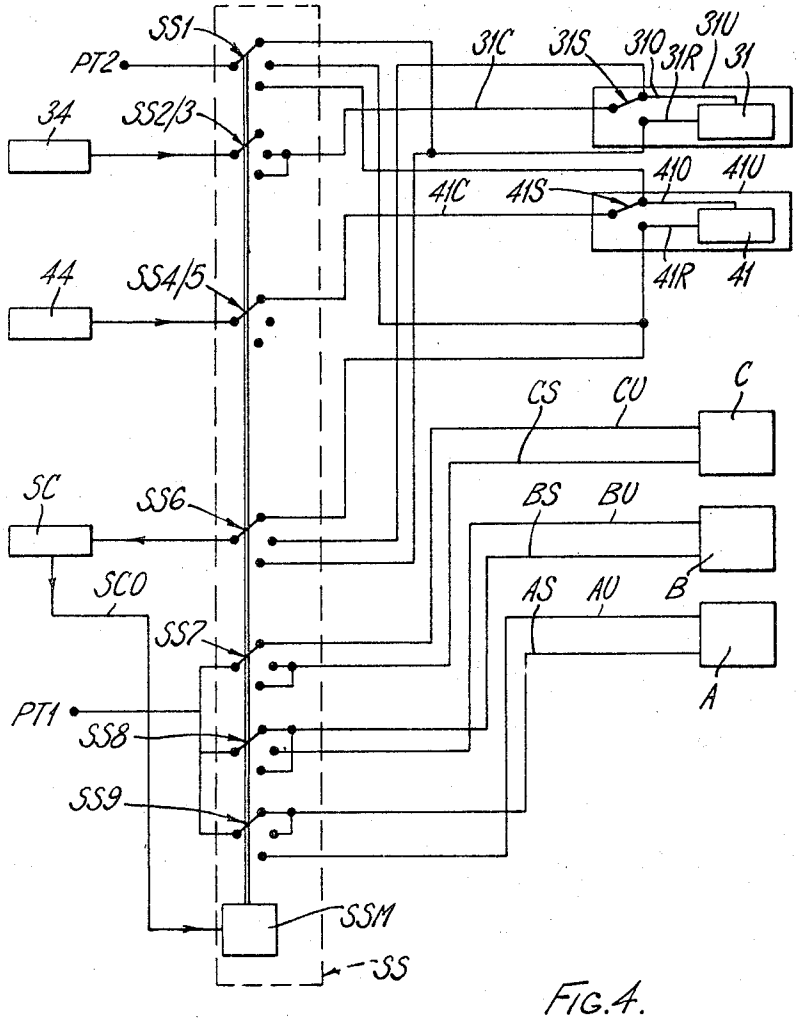


FIG. 4.

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3,430,950

SHEET FEEDING MECHANISM

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Claims priority, application Great Britain, Dec. 23, 1965, 54,705/65

U.S. Cl. 271—64 12 Claims

Int. Cl. B65h 3/04, 3/44

ABSTRACT OF THE DISCLOSURE

A device is disclosed for diverting to a plurality of stacking devices sheets fed in succession along a main path. Deflector means is provided to successively deflect sheets from the main path to branch paths leading to the stacking devices. Means is provided for controlling the deflector so that the stacking devices have idle periods sequentially in rotation so that during the idle periods of each stacking device sheets are diverted to the other stacking devices in order that the idle stacking device may be unloaded.

This invention relates to feeding mechanism for cut sheets of material such as paper. (In the following specification we shall refer only to paper, it being understood that the invention may be applied to feeding sheets of other materials.)

It is a common requirement when feeding paper sheets, (e.g., in a cutting machine producing cut sheets from a continuous web) that the sheets should be delivered in measured stacks each containing a preselected number of sheets, e.g., one ream. When as is often the case it is desired that the measured stacks should be individually removable as they are completed, the problem arises that it is difficult to remove a stack if feed of sheets continues, yet it is most undesirable to stop the machine while removal is effected; apart from the obvious reduction of the mean rate of output, restarting may require considerable operator time and/or give rise to some waste of material, so that the economic efficiency of the machine is substantially impaired.

It is an object of the present invention to provide an improved sheet feeding mechanism capable of producing measured stacks of sheets and permitting removal of successively completed stacks while sheet feeding continues.

According to the invention, we provide sheet feeding mechanism comprising means for feeding sheets in succession along a main path, deflector means operable to deflect selected sheets into either of two branch paths, three separate stacking devices for sheets deflected into each of said branch paths and for sheets remaining in the main path without deflection, and means for controlling said deflector so that the stacking devices have idle periods one at a time in rotation and so that during the idle period of each stacking device sheets reaching the deflector means are fed to the other two stacking devices alternately.

With such a mechanism, the sequence of operation is such that the idle period of any one stacking device (device A) commences when the device is full, i.e., contains a stack of a predetermined quantity of sheets; at the same time, one of the other stacking devices (device B) is half-full and the third stacking device (device C) is empty. During the idle period of device A, unloading of device A can be performed and during this period sheets are delivered alternately to devices B and C. When device B is full, its idle period commences and that of device A terminates; device C is half-full at this instant; during

the idle period of device B, that device can be unloaded while sheets are fed alternately to devices A and C. When device C is full, device A will be half-full and device B will be empty, after unloading, so that device C then has its idle (unloading) period while sheets go to devices A and B, so that at the end of the idle period of device C, we have device A full, device B half-full and device C empty, the condition of the mechanism has returned to that as a starting- point for this analysis and the above sequence is repeated; operation may be said to occur in cycles of three phases each.

The control means may take various forms, but in general we prefer to provide a main control of the nature of a sequencing switch, i.e., for the sequence of operations set out above the main control would have three positions or conditions corresponding to the three phases of each cycle of operation. The control means also then includes means for sensing when each stacking device is full and thereupon causing the main control to move to its next position or condition. Such sensing means itself may take various forms, i.e., each stacking device may be fitted with means for sensing the height or weight of a stack carried thereon, or alternatively there may be means for detecting the passage of each sheet into the stacking device and a counter for accumulating the total number of sheet reaching the device under control of the detecting means; in this latter form which is preferred there may be a counter for each stacking device but some economy of equipment may be achieved by providing only one or two counters arranged to be associated via the main control to the several stacking devices as required, i.e., so that when any one stacking device is idle, there is no counter standing idle too.

A further feature of the invention is an improved decelerator for sheets about to be stacked. With all established layboys or other stacking devices, there is a definite upper limit to the speed at which sheets may enter if damage thereto is to be avoided; as this limit speed is substantially lower than at which sheets are usually fed, there must be provision for deceleration of sheets before stacking. As in most instances the stream of sheets being handled is continuous, deceleration thereof necessarily introduces overlapping and although special (and expensive) provision for securing proper overlap is usually provided, damage to sheets is still a factor worthy of consideration. With a sheet feeding mechanism embodying the invention, it is possible to effect deceleration in each branch path, where the spacing between successive sheets is at least the length (measured in the direction of travel) of a sheet.

According to a further feature of the invention we provide a sheet feeding device changing the speed of travel of spaced sheets being fed in succession, comprising a pair of feed members arranged to grip and propel each successive sheet in turn, and means for driving said members at varying speeds so that as each sheet engages said feed members the latter are travelling at a speed corresponding to that of the arriving sheet but before the said sheet passes out of engagement with said feed members the speed of the latter has changed so that the sheet leaves at a desired different speed.

The said feed members may be rollers but at present we prefer to employ a pair of conveyor belts, with an upper run of one belt and a lower run of the other belt arranged in juxtaposition so as to grip sheets between said two runs.

While sheet feeding devices as above defined are most often required to effect deceleration of sheets fed thereby, it should be understood that such a device may equally well be employed where the speed of travel of sheets is required to be raised.

In order that the invention may be well understood we will now describe a preferred embodiment thereof, illustrated in the accompanying drawings, in which:

FIGURE 1 shows the general layout of a sheet feeding mechanism embodying the invention;

FIGURE 2 shows in similar manner, but on a larger scale, one sheet stacking device as used in the mechanism of FIGURE 1; and

FIGURES 3 and 4 are schematic diagrams of control means for the mechanism of FIGURE 1.

It will be appreciated that the drawings have been made rather diagrammatic for clarity and because the structure of each of the various parts to be mentioned may take any form customary or accepted in the sheet feeding art.

Referring first to FIGURE 1, there is shown a mechanism wherein paper or like sheets produced from a continuous strip or web in a cutter device generally indicated at **1** are delivered to a succession of belt conveyors **2, 3, 4, 5** whose upper runs together with the lower run of a single top belt conveyor **6** extending above all said conveyors **2, 3, 4, 5** define and feed said sheets along a main path to a sheet stacking device A.

At the delivery (i.e., downstream) end of the top run of the belt conveyor **2** there is provided in the main path a deflector assembly **21** of any convenient form capable of operation to deflect any selected sheet or sheets from the main path into a branch path defined by a descending run of conveyor **2** and a secondary top conveyor **22** and leading to a so-called "broke box" X, i.e., a container for rejected sheets.

At the delivery ends of the top runs of conveyors **3, 4** there are provided further deflector assemblies **31, 41** by operation of which sheets may be deflected into further branch paths respectively leading to a sheet stacking device C and to a sheet stacking device B. Between deflector assembly **31** and stacking device C is located a decelerator feed assembly **33**, and correspondingly between deflector assembly **41** and stacking device B, also between the delivery end of belt conveyor **5** and stacking device A, there are similar decelerator feed assemblies **43, 53**, respectively. Assembly **53**, which is exactly similar to assemblies **33, 43**, is later described in detail with reference to FIGURE 2.

At the entrance to the branch path leading to stacking device C (i.e., just past the deflector assembly **31**) we provide a sensing device **34B**, preferably a photoelectric device, to sense the passage of each sheet directed to the stacking device C while a second similar sensing device **34M** is provided in the main path just past assembly **31**. Further such sensing devices **44B, 44M** are provided in corresponding positions adjacent deflector assembly **41** so as to sense the passage of sheets via the second branch path or the main path to stacking devices B, A respectively.

The operation of the mechanism of FIGURE 1 may now be briefly described; operation is cyclic, and each cycle of operation has three phases.

As shown in FIGURE 1, no sheets are present in stacking device A, while stacking device B is half-full and stacking device C is full. This is one of the conditions in which a change from one phase of operation to the next takes place, and in the new phase now commenced the deflector assembly **31** remains unoperated, so that no sheets are deflected to reach stacking device C, while deflector assembly **41** is operated whenever a sheet passes sensing device **44M** and returned to unoperated condition whenever a sheet passes sensing device **44B**; thus whenever a sheet comes to deflector assembly **41** when the latter is unoperated, that sheet travels on undeflected and ultimately arrives in stacking device A, but as it passes sensing device **44M** on its way, the deflector assembly **41** is operated before the next following sheet reaches said assembly **41**, hence said next sheet goes to device B; in turn, however, that next sheet passes sensing device **44B** so that deflector assembly **41** is reset to unoperated

condition and the sequence is repeated for succeeding sheets. During this phase of operation, therefore, alternate sheets go to stacking device A and stacking device B; it is not material that the flow of sheets reaching the deflector assembly **41** may be irregular due to rejection of occasional sheets to the broke box X as the deflector assembly **41** is during this phase under control of the sensing devices **44M, 44B**.

Signals provided by the sensing devices **44M, 44B** also serve to operate one or more counters to determine when the filling of one of the stacking devices requires that one phase of operation be ended and the next phase begun, as will later be described.

When the first phase of operation is complete, i.e. device B contains a stack of the desired number of sheets, a new phase is initiated. During the said first phase, device C has had an idle period as no sheets have been entering it and during this phase therefore device C will have been emptied. Hence during the second phase, sheets are fed alternately to stacking device A (half-filled during the first phase) and device C. No sheets go to device B, which has its idle period and will accordingly be emptied. When the device A contains the desired number of sheets, the second phase is complete and a third phase commences in which device A is idle, and is unloaded, while sheets are fed alternately to devices B and C. It will be apparent that during the second phase, deflector assembly **41** must be held in the unoperation condition, and the alternate feed of sheets to devices A and C is secured by deflector assembly **31** under control of sensing devices **34M, 34B**. In the third phase, deflector assembly **41** is held in the operated condition, alternate feed still being controlled by assembly **31** and devices **34M, 34B**.

At the end of the third phase, a complete cycle has been completed, and the condition of the apparatus returns to that of the first phase for the start of the next cycle.

Each of the stacking devices A, B, C is normally (i.e., during reception of sheets to form a stack) inclined as devices A, B are shown in FIGURE 1. During the idle period of each stacking device, however, it moves to a horizontal position as device C is shown in broken lines in FIGURE 1, to facilitate unloading. Although no part of the present invention, it may briefly be mentioned that, when each stacking device is horizontal for unloading, the stack may conveniently be removed by a pusher plate travelling across the stacking device (normal to the plane of FIGURE 1) so as to urge the stack on to an "air table" alongside the stacking device for convenient transfer to wherever the stack is required.

To complete the description of the mechanical elements of the apparatus we now turn to FIGURE 2, showing the decelerator associated with stacking device A—those associated with devices B and C are exactly similar.

As sheets approach the device A, they reach the downstream end of the conveyor **5** and cross a small gap, filled by a stationary bridge **55**, on to another belt conveyor **56** provided with an associated top belt conveyor **57** so that each sheet is gripped between the two belt conveyors **56, 57** in conventional manner.

As a sheet is crossing bridge **55** and entering the grip of conveyors **56, 57** the linear speed of the latter is equal to that of conveyor **5** for obvious reasons. After the sheet ceases to be engaged between conveyor **5** and its associated top belt **6**, however the speed of conveyors **56, 57** is changed (usually reduced) to the speed found best for "laying" (i.e., placing the sheet on the stack being formed) and conveyors **56, 57** run at this changed speed until the sheet has passed from their grip. The upper belt conveyor **57** extends completely across the device A, as this arrangement is found to assist in proper feeding of sheets into said device.

The necessary changes of the speed of conveyors **56, 57** may be secured in a variety of ways. Thus for example we may simply drive said conveyors through a mechanism such as a four-bar kinematic chain producing a suitable cyclic speed variation and synchronised with the feed of sheets. Alternatively and preferably we may provide two separate drive transmissions one for each desired speed, in which each transmission includes a clutch, and control means for engagement of one clutch and disengagement of the other at appropriate times. The two transmissions may both connect the belts **56, 57** to the conveyor **5**, but have different ratios, or alternatively one transmission may connect belts **56, 57** to the conveyor **5** while the other transmission connects belts **56, 57** to a separate prime mover e.g. an electric motor. Synchronisation between the speed changes of conveyors **56, 57** and the arrival of sheets may be achieved in various ways, e.g. by means of signals derived from the sensing device **44M**; preferably an extra pair of sensing devices such as photoelectric cells are arranged to sense when the trailing edge of a sheet leaves conveyor **5** and when it leaves belts **56, 57**, at which times the speed of belts **56, 57** requires to be decreased and increased respectively.

While the details of the stacking devices are not directly relevant to the present invention, it may be mentioned here that we prefer to provide said devices with means for producing vibration thereof during stacking as this tends to improve the alignment of the stack produced.

From the foregoing description of cyclic operation of the apparatus of FIGURE 1, it will have become apparent that an important part of that apparatus which does not appear in FIGURE 1 is the means for control of the various elements, notably the deflector assemblies **31, 41**. Accordingly we now turn to FIGURE 3 which shows diagrammatically a simple form of control for the apparatus of FIGURE 1.

In relation to FIGURE 3 it must be stated at the outset that said figure is drawn on the assumption that the apparatus of FIGURE 1 will be driven and controlled by electrical means; however, it would be possible to provide for control by other means, e.g., such control could be, at least in part, pneumatic or hydraulic.

In FIGURE 3, we show deflector assemblies **31, 41**, stacking devices A, B, and C, and sensing devices **34B, 34M, 44B**, and **44M** all in block form. Deflector assembly **31** is shown as having control input lines **31O, 31R** (each comprising one or more electrical conductors) such that when line **31O** is electrically energised, assembly **31** is brought to the operated condition, while when line **31R** is energised the assembly **31** resets to the unoperated condition; assembly **41** has corresponding control input lines **41O, 41R**.

Stacking device C also has two control input lines CU, CS; when line CU is energised, the device C is put into the unloading condition, while when line CS is energised, device C assumes the stacking condition. Devices A, B have corresponding control input lines AU, AS and BU, BS respectively.

Also shown in FIGURE 3 is a sheet counter SC; this device has an input line SCI and an output line SCO and may be of any convenient electro-mechanical or electronic type; its necessary function is to count i.e. accumulate a total of electric pulses fed to its input line SCI and to deliver an electrical output on line SCO when said total reaches a preselected value (here one-half of the number of sheets desired in each stack).

FIGURE 3 also includes two power terminals **PT1, PT2** which in operation will be connected to suitable external power supplies; it should however be noted that in this figure we do not attempt to show all necessary power supplies e.g. counter SC will require electric power for its operation. Lastly, this figure includes a sequencing switch SS; this switch includes an operating magnet SSM and nine sets of contacts **SS1–SS9**. The set of contacts **SS1** includes a common wiper contact CW and three dependent contacts **DC1, DC2, DC3**, (the other eight sets of contacts being of similar form) and the switch is so constructed that whenever an electric pulse is supplied to the magnet SSM, all the wiper contacts move from one dependent contact to the next, in the sequence **DC1, DC2, DC3, DC1** . . . and so on (i.e., the switch SS is in essence similar to the "uniselectors" employed in automatic telephone exchanges).

When all the wiper contacts rest on dependent contacts **DC1**, the apparatus of FIGURE 1 operates as in the first phase of the cycle as previously described, while when they rest on contacts **DC2** or **DC3** the apparatus operates as in the second or third phase respectively. The magnet SSM is connected to the output line SCO of sheet counter SC.

Considering the position when the wipers rest on contacts **DC1**, as drawn, we see that contacts **SS1** connect power terminal **PT2** to line **31R**, hence deflector assembly **31** is held in the unoperated condition. Contacts **SS2** and **SS3** connect the outputs of sensing devices **34B** and **34M** respectively to nothing, these sensing devices having no function while assembly **31** is held unoperated. Contacts **SS4** connect the output of sensing device **44B** to line **41R** of deflector assembly **41** and contacts **SS5** connect the output of sensing device **44M** to line **41O** of assembly **41**, establishing the necessary conditions for feed of alternate sheets to stacking devices A and B. Contacts **SS6** connect the output of sensing device **44B** additionally to input line SCI of the sheet counter SC, while contacts **SS7, SS8** and **SS9** connect the power terminal **PT1** to line CU of device C, line BS of device B, and line AS of device A respectively, so that device C is held in the unloading condition and devices B and A are both held in the stacking condition.

At the beginning of the first phase of the cycle of operation of the apparatus of FIGURE 1, it will be remembered that (as drawn in FIGURE 1) device B is half-full (i.e., contains half the number of sheets desired to form each stack), and at this time counter SC registers zero. As sheets pass into device B during the first phase, pulses from sensing device **44B** cause the counter SC to accumulate a corresponding total and when said counter reaches a total equal to half said desired number, device B will be full. As this state is reached, counter SC resets itself to zero and emits an electric pulse to magnet SSM and all the switch wipers CW move on to contacts **DC2**. In this new position of the switch, contacts **SS7, SS8, SS9** now connect terminal **PT1** to lines CS, BU, AS, accordingly device B goes to the unloading condition and devices C and A to the stacking condition. At the moment of change, device A is half-full and contacts **SS6** now connect counter input line SCI to the output of sensing device **44M** so that the counter SC will in the second phase accumulate the total of sheets going to device A. Contacts **SS1** in their new position connect terminal **PT2** to line **41R** so that deflector assembly **41** is held unoperated, contacts **SS2, SS3** connect sensing devices **34B, 34M** to lines **31R, 31O** respectively, placing deflector assembly **31** under control of said sensing devices **34B, 34M**, and contacts **SS4, SS5** connect the output of sensing devices **44B, 44M** to nothing. It will be seen by review of the foregoing description of the second phase of operation of the apparatus of FIGURE 1 that switch SS in its second position as just described establishes the required conditions for said second phase.

When the wiper contacts of switch SS move to their third position, in response to the next signal from the counter SC, suitable connections for the third phase of operation are established as can readily be traced on FIGURE 3.

A point worthy of note is that whenever feed of sheets to device A stops at each change from the second to the third phase of a cycle, this change is initiated by a signal from sensing device **44M** and the sheet thus sensed has farther to travel to reach device A than does the last

sheet to go to device B or device C, sensed by device 44B or device 34B respectively. Whether the difference in timing is significant depends upon the relative speeds of operation of the various elements of the apparatus but in certain conditions it may be necessary to provide for a slight delay in the operation of the stacking device A; for example, an electrical delay circuit could be included in the connection to line AU.

A variant of the control means of FIGURE 3 is shown in FIGURE 4; this variant is designed to be used with the mechanism of FIGURE 1, but (referring to FIGURE 1) the sensing devices 34B, 34M, 44B, and 44M are all omitted, and in their place two sensing devices 34, 44 are provided a short distance upstream of the deflector assemblies 34, 41 respectively.

The sequencing switch SS has in FIGURE 4 only seven sets of contacts, the two sets SS2, SS3 of FIGURE 3 being replaced by a single set SS2/3, and the two sets SS4, SS5 being replaced by a single set SS4/5. Sensing device 34 is associated with contact set SS2/3 and sensing device 44 is associated with contact set SS4/5.

The deflector assemblies 31, 41 are each in FIGURE 4 part of a larger unit 31U, 41U respectively. In the unit 31U, we have a deflector assembly 31, with control lines 31O, 31R exactly as before but the unit also includes a switch 31S so arranged (e.g., mechanically connected) to the actual deflector that whenever the latter is unoperated the switch 31S connects a common control line 31C to the control line 31O, while whenever the actual deflector is operated said switch 31S connects the line 31C to the control line 31R. Unit 41 is similar and the parts have corresponding references.

In operation, the contacts sets SS1, SS7, SS8 and SS9 of the sequencing switch SS operate as described with reference to FIGURE 3. Contacts SS4/5 serve only to connect sensing device 44 to control line 41C during the first phase of each cycle of operation, contacts SS2/3 serve to connect sensing device 34 to control line 31C during both the second phase and the third phase of each cycle. It must here be noted that each of the sensing devices 34, 44 is arranged to deliver an electric pulse whenever the trailing edge of a sheet passes it.

Taking the first phase of a cycle as an example, at the start of this phase we will assume that deflector assembly 41 is in the unoperated condition, hence the first sheet to pass the assembly 41 goes to stacking device A. As the trailing edge of this first sheet passes sensing device 44, an electric pulse emitted by said device travels via contacts SS4/5 to control line 41C; switch 41S then (the deflector assembly 41 being unoperated) carries the pulse to line 41O and the deflector assembly 41 moves to its operated position. This however does not affect the destination of the sheet whose passage caused this operation.

The next sheet to reach deflector assembly 41 is accordingly fed to the stacking device B, and as its trailing edge passes device 44 the electric pulse emitted from the latter goes via contacts SS4/5 and switch 41S (which will have changed its position when the deflector assembly operated) to line 41R and the deflector assembly resets to the unoperated position, again without affecting the destination of the sheet.

These two operations go on continuously so long as there is a flow of sheets, so that, as before, throughout the first phase of operation the sheets feed alternately to device A and device B. During this time, the input line SCI of the sheet counter SC is connected by contacts SS6 to reset control line 41R of deflector assembly 41, which it will be appreciated carries an electric pulse every time a sheet is deflected to stacking device B, as is required during this first phase.

From FIGURE 4, it can readily be seen that analogous circuit connections are established in the second and third phases of each cycle, so that the overall operation of the mechanism of FIGURE 1 is as previously described. It may be noted however that the sensing devices 34, 44 must not be further upstream of their associated deflector assemblies 31, 41 than the length of the individual sheets being fed, so that each sheet has commenced feeding into the proper path before any movement of the deflector assembly through which it is passing can occur due to the trailing edge of that same sheet passing the associated sensing device. Moreover, the deflector assemblies must, when this form of control is employed (or indeed with the control means of FIGURE 3 if the devise 34M, 34B, 44M, 44B respond to the leading edge of a sheet) be such that the deflector assembly's position can be changed as a sheet is passing through that assembly without damage to the sheet or effect on its destination; a suitable form of deflector is disclosed in our British patent specification No. 973,369.

It will be understood that the invention is not limited to specific details of the apparatus and control arrangements described above, a variety of changes and modifications being possible.

What we claim as our invention and desire to secure by Letters Patent is:

1. In sheet feeding mechanism for conveying sheets along a main path and two branch paths comprising means for feeding sheets in succession along said main path, means for feeding sheets from said main path along each of said branch paths, deflector means operable to selectively deflect sheet from said main path into said branch paths, and three separate stacking devices for receiving deflected sheets from said branch paths and the remaining sheets from said main path, the improvement comprising means for controlling said deflector means so that the stacking devices have idle periods one at a time in rotation and so that during the idle period of each stacking device sheets reaching the deflector means are fed to the other two stacking devices alternately.

2. Mechanism as claimed in claim 1, in which a cycle comprising a series of one idle period for each of said stacking devices and the control means includes a main control having three positions corresponding to three phases of each cycle of operation, the idle period of each of the stacking devices occupying a different phase.

3. Mechanism as claimed in claim 2, including a sensing means associated with each stacking device and arranged to cause the main control to move to its next position.

4. Mechanism as claimed in claim 3, in which each sensing means is arranged to detect the passage of sheets into its associated stacking device and at least one counter is provided for accumulating the total number of sheets reaching each device under control of the sensing means.

5. Mechanism as claimed in claim 4, in which a counter is provided for each stacking device.

6. Mechanism as claimed in claim 4, including a single counter connected through the main control to one of the sensing means at a time so that said counter is under the control of a different sensing means for each phase of the cycle.

7. Mechanism as claimed in claim 6, in which the main control is so arranged that in each cycle of operation said counter is connected to the sensing means for each of the stacking devices during the phase immediately prior to the idle period of that device.

8. Mechanism as claimed in claim 7, in which each sensing means comprises a photoelectric device.

9. Mechanism as claimed in claim 7, in which the main control comprises a sequencing switch having a plurality of sets of contacts and an operating magnet, each set of contacts consisting of a wiper contact and three associated contacts and the operating magnet being arranged upon receipt of an electric pulse to cause all the wiper contacts to move from one associated contact to the next in sequence.

10. In sheet feeding mechanism for conveying sheets along a main path and a plurality of branch paths comprising means for feeding sheets in succession along said

main path, means for feeding sheets from said main path along each of said branch paths, deflector means operable to successively deflect sheets from said main path to each of said branch paths, and a plurality of separate stacking devices for receiving sheets deflected from each of said branch paths and the remaining sheets from said main path, the improvement comprising means for controlling said deflector means so that the stacking devices have idle periods sequentially in rotation and so that during the idle period of each stacking devices sheets reaching the deflector means are feed alternately to the other stacking devices.

11. Mechanism as claimed in claim **10** in which a cycle comprises a series of one idle period for each of said stacking devices and the control means includes a main control having a plurality of positions corresponding to a plurality of phases of each cycle of operation, the number of phases being equal to the number of stacking devices and the idle period of each of the stacking devices occupying a different phase.

12. A method of feeding sheets comprising feeding said sheets in succession alternately into two of three stacking positions at any one time while the third stacking position having the maximum predetermined number of sheets receives no sheets and remains idle, said feeding being shifted to a different combination of two of said three stacking positions upon any stacking position receiving said predetermined number of sheets, whereby each of said stacking positions has an idle period in rotation and the stack of sheets is removed during said idle period.

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RICHARD E. AEGERTER, *Primary Examiner.*