March 9, 1965 L. MESTRE 3,172,548

DEPOSIT TABLE SHIFTING MECHANISM FOR A COLLATOR WITH CONTROL MEANS

Filed March 27, 1963 3 Sheets-Sheet 1

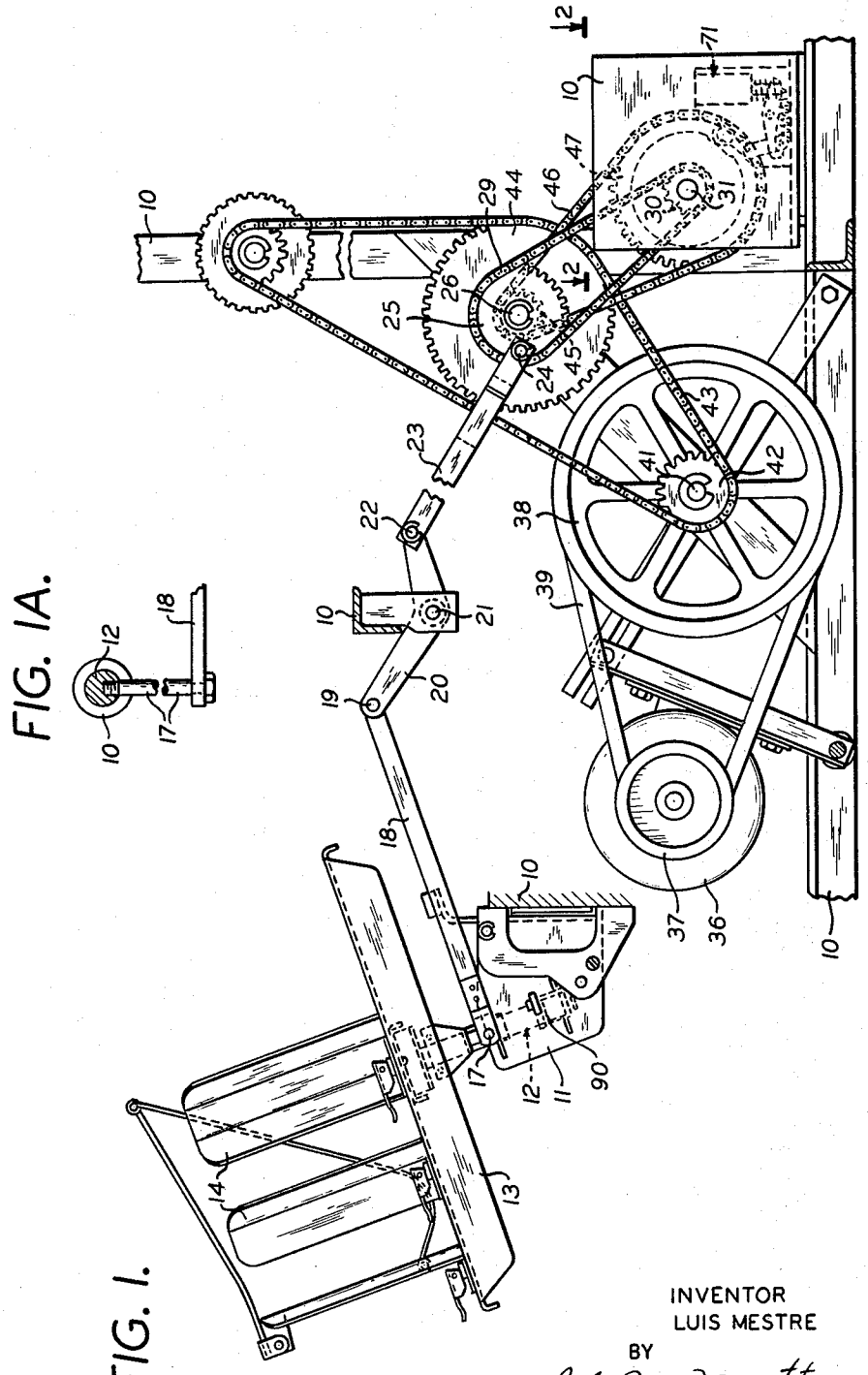


FIG. 1A.

FIG. 1.

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DEPOSIT TABLE SHIFTING MECHANISM FOR A COLLATOR WITH CONTROL MEANS

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FIG. 2.

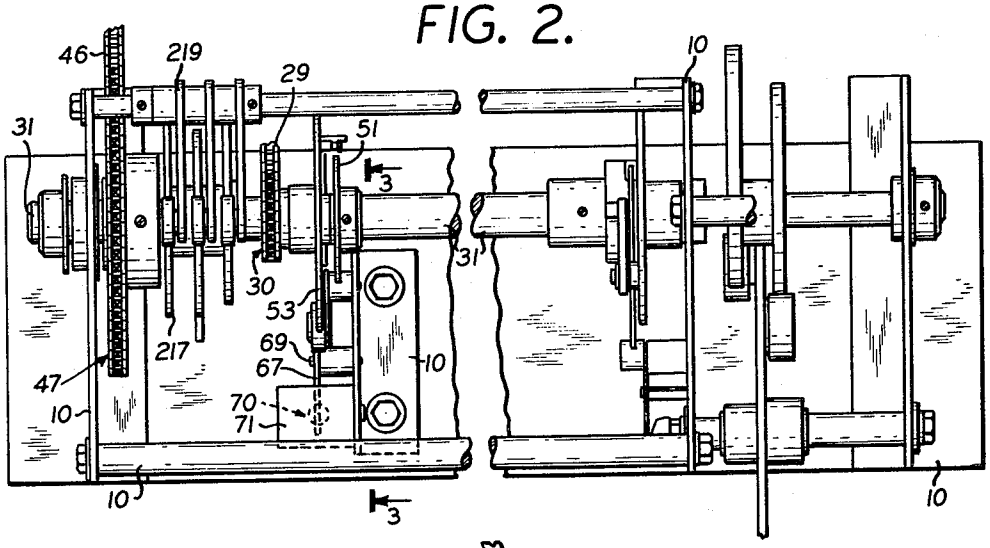
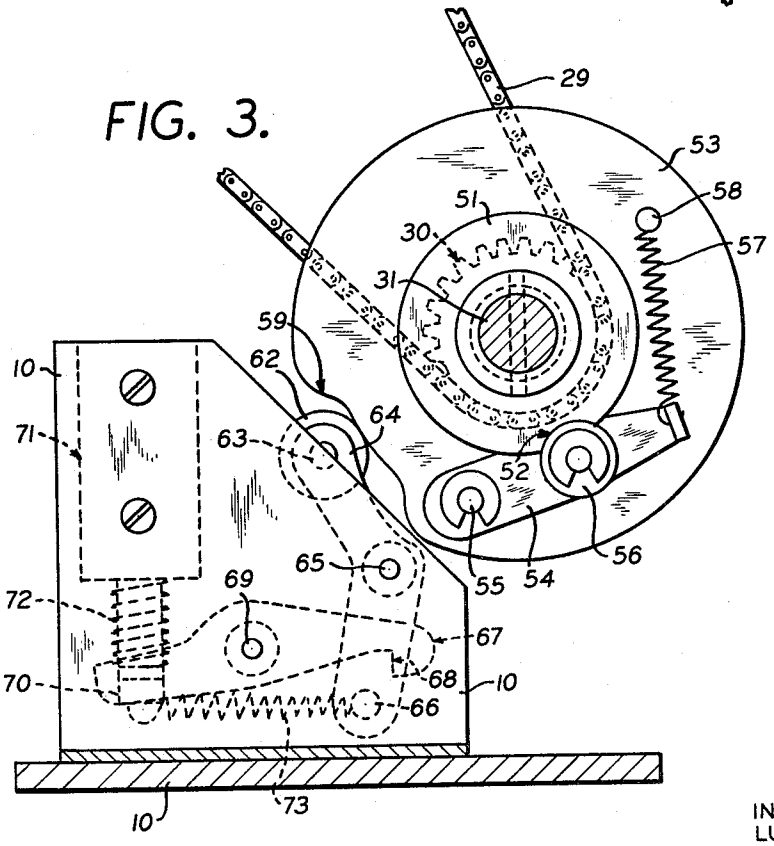


FIG. 3.



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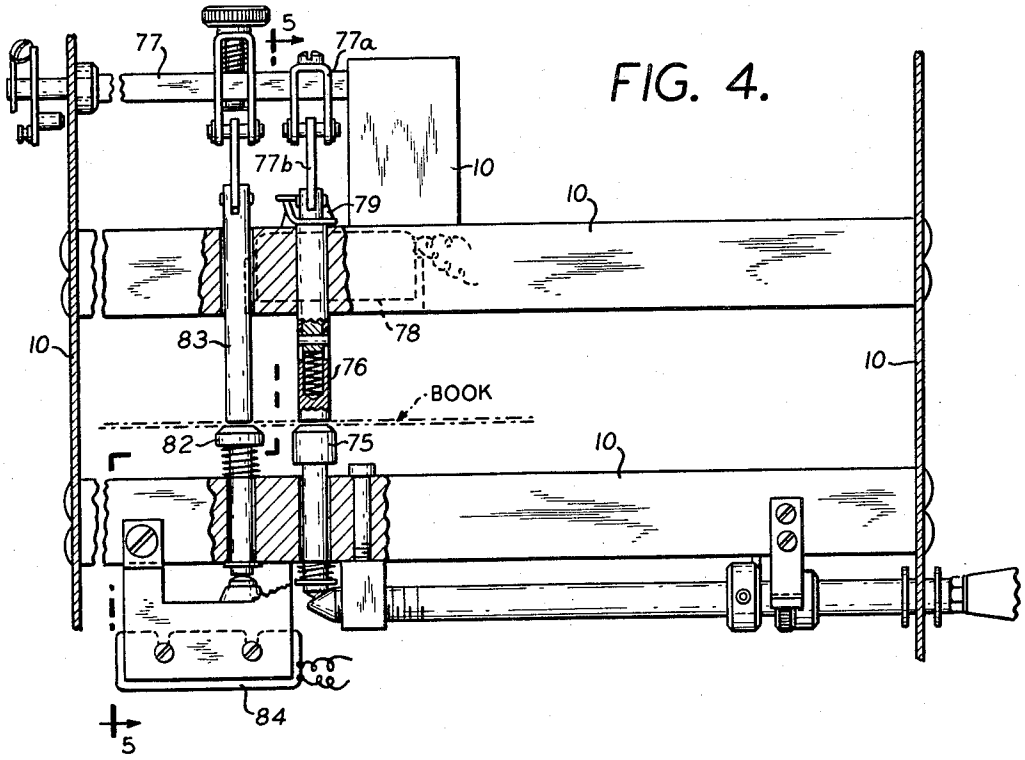


FIG. 4.

FIG. 5.

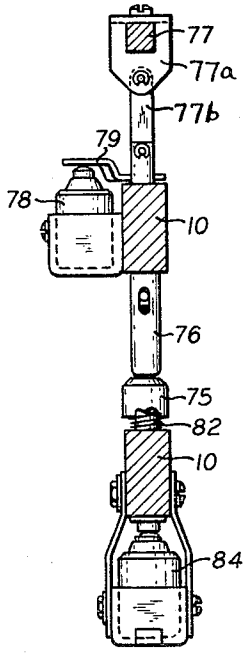
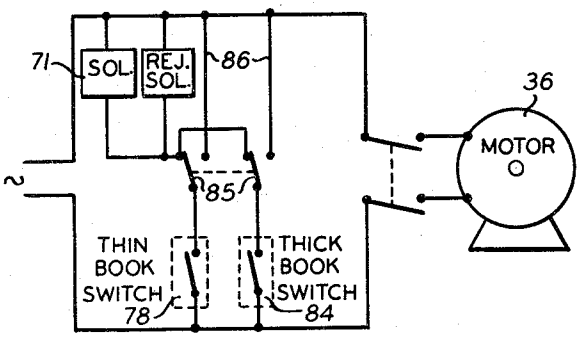


FIG. 6.



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DEPOSIT TABLE SHIFTING MECHANISM FOR A COLLATOR WITH CONTROL MEANS

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20 Claims. (Cl. 214—6)

This invention relates to a deposit table shifting mechanism for collators constructed to discontinue the shifting of the table off for one cycle of operation of the collator in the event that a book of sheets is rejected by the gaging means of the collator. The collator collects a set of sheets to form a book, brings the sheets into alignment, gages the sheets of the book, and should the book contain one or more missing sheets or one or more added sheets, the book is rejected by by-passing the book so that it is not delivered to the deposit table. Usually a rejection bin or position is provided. The deposit table is held stationary, that is it is not shifted for any rejected book or books. In collators heretofore, the table is shifted for each cycle of operation of the collator so that if a rejected book is not deposited on the deposit table, there will be two adjacent books in the same alignment and not staggered with respect to the preceding book as is desirable for easy separation of the individual books. In order to avoid this, a collator is automatically stopped by the gaging means if a book has an improper number of sheets so that a sheet or sheets could be added or removed, as the case may be, to complete a proper book. This causes delay in the collating operation. The mechanism for shifting the table of the invention herein does not shift the table to its other position for one cycle of operation of the collator when a book is rejected. The deposit table shifting mechanism is constructed particularly to be used with the collator of the Luis Mestre application, S.N. 191,141, filed April 30, 1962, Patent No. 3,108,797, although it is useable with other collators.

It is an object of the invention to construct a shifting mechanism for the deposit table of a collator which retains the deposit table in the same position when a book is rejected so that the next accepted book will be deposited on the table in staggered relation with respect to the preceding and the following books.

A further object of the invention is as above and in addition thereto the shifting mechanism retains the timing relation of the shifting of the table with the cycle of operation of the collator.

Another object is to construct a shifting mechanism for a deposit table which does not require the stopping of the collator for a rejected book.

A further object of the invention is to construct shifting mechanism for a deposit table with a friction connection which releases or breaks the driving connection to the table upon rejection of a book by the gaging means for one cycle of operation of the collator so that the next accepted book is placed on the deposit table in the same staggered position which the rejected book would have been placed thereon.

Another object is to construct a shifting mechanism for a deposit table which releases in the event inadvertent pressure is placed thereon.

Other objects of the invention will be more apparent from the following description when taken in connection with the accompanying drawings illustrating a preferred embodiment thereof in which:

FIG. 1 is a side view of a shifting deposit table and shifting means for moving the deposit table;

FIG. 1A is a detail of the table connection;

FIG. 2 is a view of the drive or cam shaft of the collator and the means for halting shifting of the table when a book is rejected;

FIG. 3 is an enlarged view of a releasable frictional driving connection in the shifting means or connection for the table;

FIG. 4 is an enlarged view of gaging means for gaging a book and rejects the same for one or more missing sheets or one or more additional sheets;

FIG. 5 is a partial section taken on line 5—5 of FIG. 4 of the gaging means;

FIG. 6 is a wiring diagram of the control circuit which disconnects the shifting means or connection so that the table is not shifted for a rejected book.

The collator includes a frame **10** of suitable construction to mount the various parts of the mechanism. A deposit table is suitably mounted on the frame for successively shifting the same to and from one of its two positions. For an oscillating table the frame carries a table bracket **11** which mounts a spindle **12** of a deposit table or platform **13** which is secured to the spindle. The deposit table carries a plurality of posts **14** which receive the deposited books. These posts are at least four in number and are located so that one pair of posts retain the set of alternately deposited books at one angle and a second set of alternately deposited books in staggered relation. In other words the first book is deposited between one pair of posts after which the table is oscillated so that the book engages another pair of posts at a different angle after which the table is oscillated to its first position so that the third book or each odd number of books is in the same position as the first book but is staggered with respect to the second and all subsequent even number of books.

Shifting means are provided to shift the table to and from one of its two positions to the other position and then back to the first position and so forth so that each book is in staggered relation with its preceding and following books. The shifting means also includes a releasable connection which breaks the driving connection to the table upon rejection of a book.

For an oscillating table, as shown, oscillating means is provided which includes an operating lever **17** secured to and projecting from the spindle **12** which lever is connected with one end of a link **18**. The other end of the link **18** is pivotally connected by a pivot **19** with an arm of a bell crank lever **20** which is pivotally mounted on the frame by a pivot **21**. The other arm of the bell crank lever is connected by a pivot **22** to crank lever means including a crank **23**, which is in turn connected by a pivot **24** to a crank disk **25** which is rotatably mounted on a shaft **26**. The pivot or crank pin **24** is spaced from the center axis of the shaft. The crank disk is shown as being combined with a sprocket. Because of the arcuate movement of the pivot **24** of the crank means at the limits of the movement of the table the latter is in practical effect stationary for a period at each of the limits of oscillation of the table so that ample time is provided to deposit the book on the table. The crank means is well suited for other forms of shifting of a deposit table other than oscillating such as sliding movement.

Means are provided to rotate the crank disk or sprocket **25** a half revolution for each cycle of operation of the collator. This means includes the sprocket crank disk **25** and a chain **29** which is connected to a sprocket **30** rotatably mounted on a main or cam shaft **31**. The sprocket ratio is such that the crank disk **25** and crank pivot **24** makes a one half revolution for each revolution of the cam shaft **31**. The cam shaft **31** carries other cams for controlling other functions of the collator so that this shaft rotates once for each cycle of operation of the collator. One of the cams is connected with the gaging means to operate the same, as will appear.

The cam shaft **31** is driven from a motor **36**, pulleys **37** and **38**, and belt **39**. The pulley **38** is mounted on a

shaft 41 which carries a sprocket 42. A chain 42 passes around the sprocket 42 and drives a sprocket 44 secured to the shaft 26 and this shaft drives a sprocket 45 carrying a chain 46 which passes around a sprocket 47 which is secured to the cam shaft 31. The sprockets 25 and 30 are selected to have a two to one ratio so that the sprocket crank disk 25 rotates a half revolution for each rotation of the shaft 31 for each cycle of operation of the collator.

The connection between the drive shaft 31 and the crank means is a releasable drive connection and preferably a frictional connection so that the connection may be broken upon receiving a signal from the gaging means whereby the deposit platform or table is not shifted or oscillated to the other of its two positions in the event that a book is rejected by the gaging means. This releasable or frictional connection (FIGS. 2 and 3) is particularly shown as being between the drive shaft 31 and the sprocket 30 and includes a driving member, shown as a disk 51, which is secured to the drive shaft 31. The sprocket 30 is secured to a driven member 53 which is preferably a disk. The driving member has a driving shoulder and the driven member has a driven shoulder. The driving shoulder engages the driven shoulder and one of these shoulders is yieldable to provide a releasable connection. One of the members or disks, and as shown it is the driving disk or member 51, carries a fixed driving shoulder particularly shown as formed by the side of a notch 52 and further shown particularly as carried by the periphery of the disk. The notch 52 is a convenient way of providing a fixed driving shoulder. The other member or disk carries a driven shoulder which is shown as being provided by a driving or release lever or pawl 54, mounted on a pivot 55 and the driving lever preferably has a roller follower 56 which engages the driving shoulder formed by the notch 52. As shown the release lever is carried by the driven member. A spring 57 is secured to one end of the release member or pawl and to a pin 56 carried by the driven member to propel the follower 56 radially inwardly and into yieldable contact with the fixed shoulder of the notch. The follower provides a yieldable shoulder in that it establishes a driving connection with the fixed shoulder 52 and releases the later.

While suitable means are provided, controlled by the gaging means to release the releasable connection between the driving member or disk 51 and driven member or disk 53 the means particularly shown for releasing the releasable connection is a holding means which may hold any part of the operating or driving connection between the driven member and the deposit table and including both of these parts. The holding means shown includes a holding shoulder 59, shown particularly on the periphery of the driven member and formed by a notch or slot therein. Engaging means is carried by the frame and positioned to engage the holding shoulder. The engaging means is shown as a holding pawl or lever 64 has a holding follower 62 which is rotatably mounted on a pin 63 carried by the holding lever. This lever is pivotally mounted on a pin 65 carried by the frame 10 or particularly by a bracket forming a part of the frame. A spring 73 propels the lever 64 and the follower into contact with the driven member. The holding shoulder and holding lever are located such that when in engagement, the table is at one of its two limiting positions or deposit positions. Preferably the holding means is between the driven disk and the crank means.

Suitable means are provided to lock the holding lever or pawl and hence the driven disk, the driving connection and table against movement until release of the driving pawl or lever 54 from the driving notch. This means includes the lever 64 which carries a locking pin 66. A latch 67 carries a latching shoulder 68 on one end thereof for engagment with the locking pin 66. The latch is pivotally mounted on a pin 69 carried by the frame and the other end of the latch is connected with the armature 70 of a solenoid 71. A spring 72 propels the armature to unlatched position, as shown in FIG. 3.

The release of the releasable or frictional connection operates from a signal from the gaging means. Such a signal energizes the solenoid 71 which propels the latching shoulder 68 into engagement with the locking pin 66 when the notch formed shoulder 89 reaches the follower 62 so that the holding pawl or lever 64 is held against movement. The holding follower 62 cannot move radially outwardly so that when the shoulder 59 engages the follower, the driven disk 53 is held stationary which holds the release lever 54 stationary whereupon the release follower 56 is forced out of the driving notch 52 or released from the fixed shoulder formed thereby, against the tension of the spring 57. The driving connection between the driving disk 51 and driven disk 55 is released or disconnected. The holding lever 62 need be held in holding position only long enough to release the driving connection between the disks or shoulders. The latch 67 is released upon disconnection of the driving notch or shoulder 52 with the release follower 56 and lever 54 so that, as the driving member or disk 51 rotates, the follower 56 rolls the periphery of the driving disk until the driving notch 52 makes one revolution to bring the notch with its fixed shoulder in position to receive the release follower 56 of the driving lever whereupon the follower enters the notch and a driving connection is re-established between the driving disk and the driven disk. This driving connection is re-established after one revolution of the main shaft 31 and hence after one cycle of operation of the collator and because the notch 52 is fixed with respect to the other operating mechanism of the collator, the driving connection for the oscillating table has been broken for one complete cycle of operation of the collator. The timing relation, therefore, is maintained between the other operations of the collator and the oscillation of the deposit table. Since the sprocket 30 is attached to the driven disk 53, the sprocket remains stationary to hold the deposit platform stationary for one cycle of operation of the collator. If the next book is also rejected, the mechanism operates again to retain the deposit table in the same position. The next accepted book, however, is deposited on the deposit platform in staggered relation with respect to the preceding book on the deposit table which would have been taken by the rejected book. It is clear that so long as there are rejected books in succession the deposit table remains in position to receive the next accepted book.

The gaging means for gaging a book to determine whether or not it is a too thin book in that it lacks one or more sheets or the book is too thick in that one or more additional sheets are contained in the book may be any suitable gaging means, that shown being the same gaging means described fully in the above identified application. So far as the invention herein is concerned, the gaging means includes a thin book gaging means including a fixed anvil 75 and a spring pressed plunger 76 in alignment therewith which is moved by a gaging means shaft 77 and lever 77*a* and link 77*b* in contact with the book which is momentarily halted by stop means (not shown) at gaging position on the collator ahead of the deposit table. A switch 78 is positioned to be operated by an operating flange 79 carried by the plunger when the book is too thin. In other words for a book having the proper number of sheets or thickness, the flange 75 does not move far enough to engage and close the switch 78. If, however, the book is too thin the flange 76 moves far enough so that the flange 79 closes the switch. The gaging shaft 77 is connected with the cam 217 and cam lever 219 (FIG. 2) for oscillation once for each cycle of operation of the collator.

The gage for a too thick book includes a spring pressed anvil 82 which is in axial alignment with a plunger 83 which is also moved into contact with the book once for

each cycle of operation of the collator by the oscillation of the gaging means shaft **77**. This plunger moves a fixed distance so that for a proper thickness of book, the anvil **82** remains stationary or is not moved. If, however, the book has one or more additional sheets and hence is too thick, the spring pressed anvil **82** is moved downwardly, as viewed in FIG. 4, to close a gaging switch **84**.

The two gaging switches **78** and **84** are connected in parallel, as shown in the circuit diagram of FIG. 6, with the latch solenoid **71**, so that closing of either gaging switch **78** or **84** for a too thin book or a too thick book operates the solenoid to break the connection between the driving member or disk **51** and the deposit table which remains in the same position, that is, it is not oscillated. A double throw switch **85** preferably is connected in series with the switch **78** and **84** to by-pass the solenoid **71** through connections **86** when adjusting the gages so that they will accept or pass a book with the proper number of sheets.

The gaging means, as a part of the collator above referred to, when rejecting a book, triggers a deflector so that the book is not deposited on the deposit table but is by-passed to a reject bin or means.

With the releasable connection between the drive shaft **31** and the deposit table, if the latter should be jammed against oscillation for any reason such as a factory truck being pushed against the table so that it cannot oscillate, the release connection releases. Similarly any jamming in the mechanism between the driving disk and the deposit table will release the releasable connection. In other words such inadvertent jamming is the equivalent, so far as result is concerned, with intentional or operational latching of the driven disk. The releasable connection is, therefore, a safety connection which prevents damage to this part of the collator.

This invention is presented to fill a need for improvements in deposit table shifting mechanism for a collator with control means. It is understood that various modifications in structure, as well as changes in mode of operation, assembly and manner of use, may and often do occur to those skilled in the art, especially after benefiting from the teachings of the invention. This disclosure illustrates the preferred means embodying the invention in useful form.

I claim:

1. A deposit table shifting mechanism for a collator having gaging means ahead of the table to gage each book comprising a frame, a drive shaft, a deposit table, mounting means mounting the deposit table on the frame for shifting, shifting means operatively connecting the drive shaft with the table to shift the latter to and from one of two positions including a releasable connection and a drive connection between the releasable connection and the table, and means to release the releasable connection for one revolution of the drive shaft when the deposit table is in one of its two positions.

2. Deposit table shifting mechanism as in claim 1 in which the releasable connection is a frictional connection releasable upon resisting pressure being applied to the drive connection.

3. Deposit table shifting mechanism as in claim 2 including means to hold the drive connection against movement.

4. Deposit table shifting mechanism as in claim 1 in which the drive connection includes a driven member, and in which the releasable connection includes a driving member operatively connected with the driving shaft, a fixed shoulder carried by one member, a yieldable shoulder carried by the other member including a spring engaging the same, and the shoulders engaging for a releasable driving connection between the shoulders and members which releases upon holding of the drive connection.

5. Deposit table shifting mechanism as in claim 4 including means to hold the drive connection against movement.

6. Deposit table shifting mechanism as in claim 1 including a driving member operatively connected with the drive shaft, an operating connection between the driving member and the table including a driven member, the releasable connection including a driving shoulder carried by one of the members, a releasable driving lever pivotally carried by the other member, spring means propelling the releasable lever into engagement with the driving shoulder and releasable therefrom, and the means to release the releasable connection including holding means connected with the operating connection to hold the same and release the releasable connection for one rotation of the driving shaft.

7. Deposit table shifting mechanism as in claim 6 in which the fixed shoulder is carried by the driving member and the releasable driving lever is carried by the driven member.

8. Deposit table shifting mechanism as in claim 6 in which the holding means includes a holding shoulder carried by the driven member, a holding lever pivotally mounted on the frame and positioned to engage the holding shoulder, and latch means operatively connected with the holding lever to lock the same against pivoting.

9. Deposit table shifting mechanism as in claim 8 in which the driving shoulder is carried by the driving member and the driving lever is carried by the driven member.

10. Deposit table shifting mechanism as in claim 9 in which the holding means includes a locking pin carried by the holding lever, a latch located to engage the locking pin, and a solenoid connected with the latch to bring it into engagement with the locking pin, the gaging means being connected with the solenoid.

11. Deposit table shifting mechanism as in claim 10 in which the driven member is a disk having a periphery and a recess in the periphery and the holding shoulder is the end of the recess whereby latching is prevented except when the deposit table is at or approximately at one of its two positions.

12. Deposit table shifting mechanism as in claim 11 in which the mounting means for the table includes a spindle to oscillate the same, and the operating connection includes a crank means including a crank disk and a crank connected therewith, and means operatively connecting the driven member and the crank disk in a one to two ratio.

13. A deposit table shifting mechanism for a collator comprising a frame, a drive shaft, a deposit table, mounting means mounting the deposit table on the frame for shifting, shifting means operatively connecting the drive shaft with the table to shift the latter to and from one of two positions including a releasable connection operable for one revolution and a drive connection between the releasable connection and the table, gaging means ahead of the table to gage each book, and means operatively connected with the gaging means to release the releasable connection when the deposit table is in one of its two positions.

14. Deposit table shifting mechanism as in claim 13 in which the releasable connection is a frictional connection, and the means to release the releasable connection applying resisting pressure to one of the connections.

15. Deposit table shifting mechanism as in claim 13 in which the drive connection includes a driven member, and in which the releasable connection includes a driving member connected with the drive shaft, a fixed driving shoulder carried by one member, a yieldable shoulder carried by the other member including a spring engaging the same, and the shoulders engaging for a releasable driving connection between the shoulders and members.

16. Deposit table shifting mechanism as in claim 13 in which the shifting means includes a driving member operatively connected with the drive shaft, an operating

connection between the driving member and the table including a driven member, the releasable connection including a fixed driving shoulder carried by one of the members, a releasable driving lever pivotally carried by the other member, spring means propelling the releasable lever into engagement with the driving shoulder and releasable therefrom, and the means to release the releasable connection including holding means connected with the operating connection to hold the same to release the releasable connection for one rotation of the driving shaft.

17. Deposit table shifting mechanism as in claim 16 in which the holding means includes a holding shoulder carried by the driven member, a holding shoulder engaging means mounted on the frame and positioned to engage the holding shoulder, and latch means operatively connected with the shoulder engaging means to lock the same in holding position.

18. Deposit table shifting mechanism as in claim 17 in which the holding shoulder engaging means includes a holding lever pivotally mounted on the frame, a locking pin carried by the holding lever, a latch located to engage the locking pin, and a solenoid connected with the

latch to bring it into engagement with the locking pin, and the gaging means being electrically connected with the solenoid.

19. Deposit table shifting mechanism as in claim 18 in which the driven member is a disk having a periphery and a recess in the periphery and the holding shoulder is the end of the recess whereby latching is prevented except when the deposit table is at or approximately at one of its two positions.

20. Deposit table shifting mechanism as in claim 19 in which the mounting means for the table includes a spindle to oscillate the same, and the operating connection includes a crank disk and a crank lever connected with the spindle, and means operatively connecting the driven member and the crank disk in a one to two ratio.

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