

June 21, 1955

H. W. TAYLOR

2,711,245

RECIPROCATING FEEDING MECHANISM

Filed Sept. 10, 1952

4 Sheets-Sheet 1

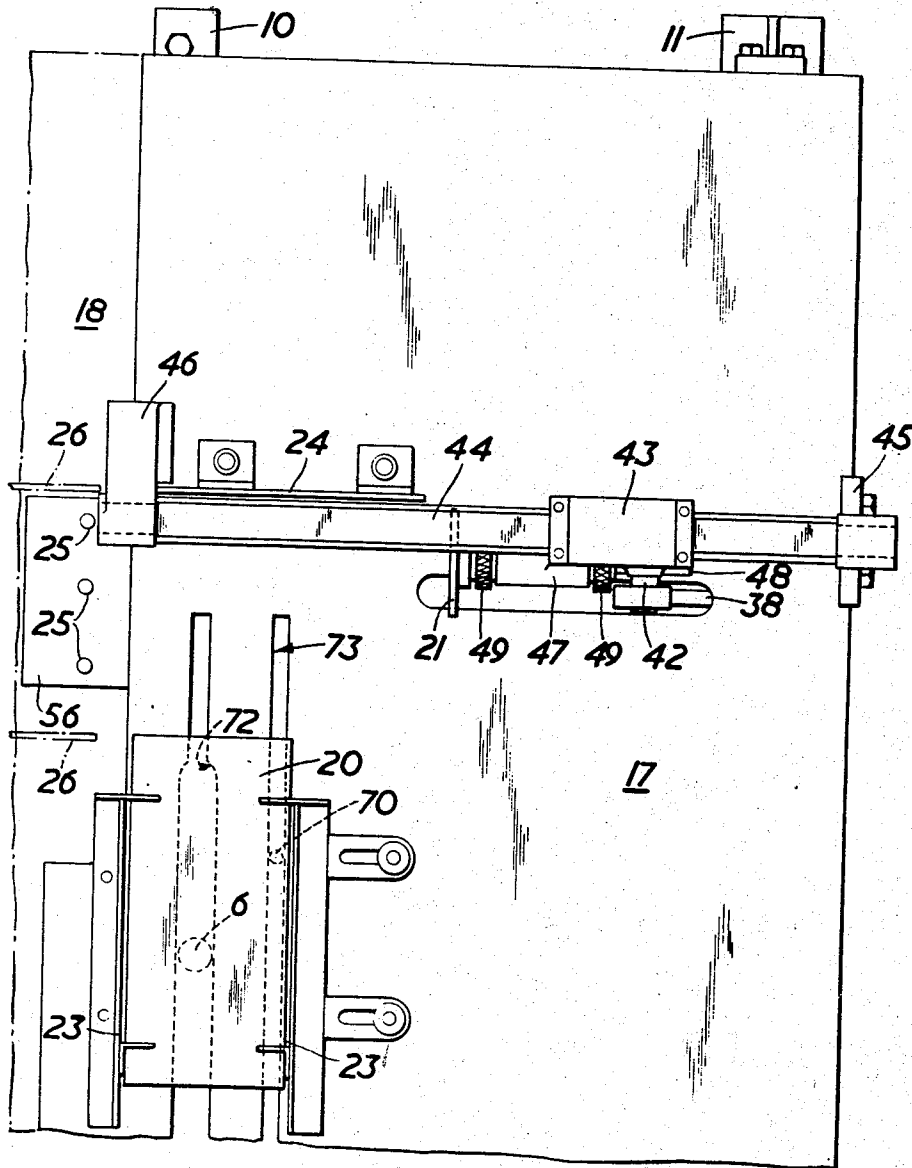


FIG. 1.

Inventor
HARRY WILLIAM TAYLOR

By *Fredrick E. Hays*
Attorney

June 21, 1955

H. W. TAYLOR

2,711,245

RECIPROCATING FEEDING MECHANISM

Filed Sept. 10, 1952

4 Sheets-Sheet 2

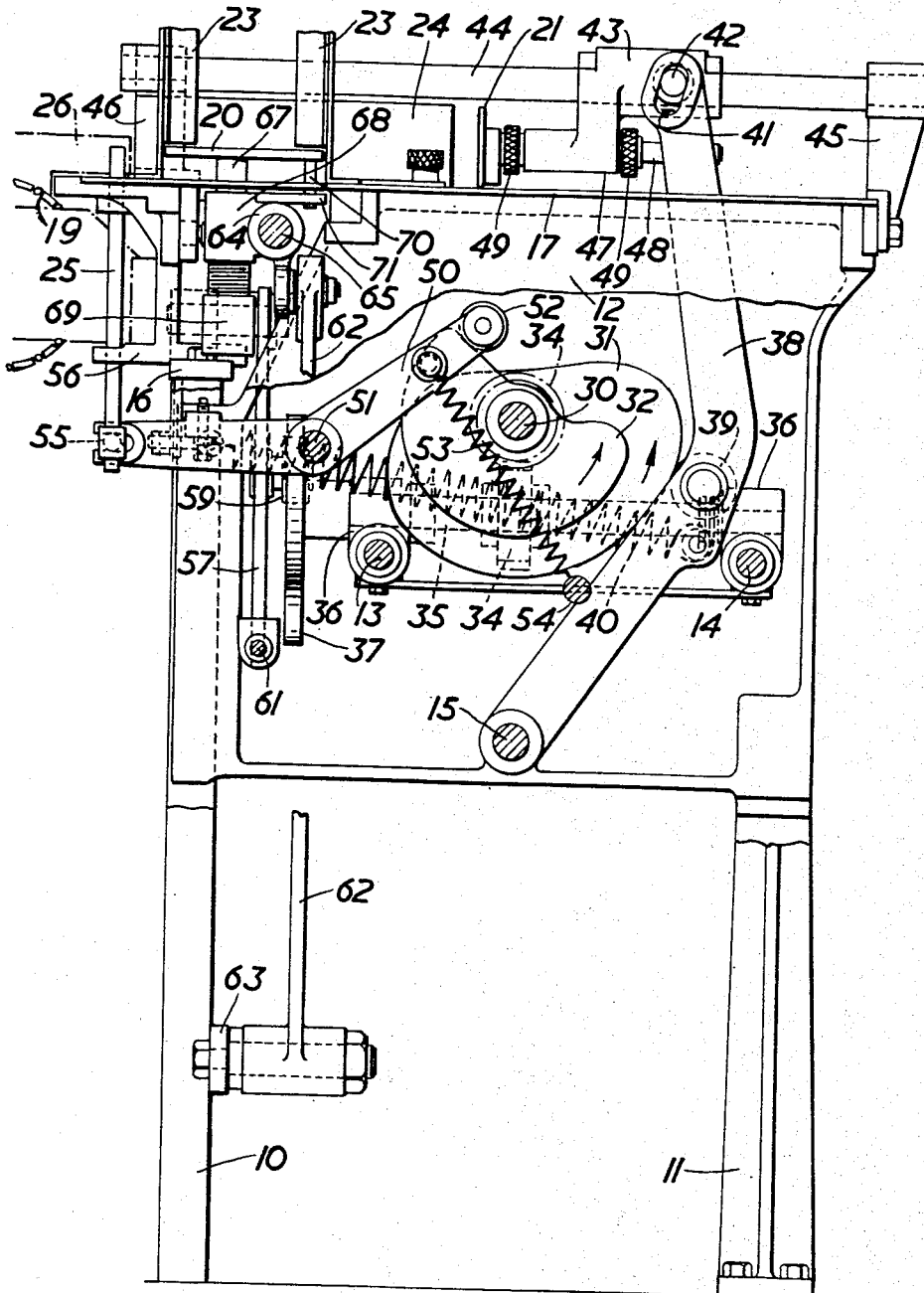


FIG. 2.

Inventor
HARRY WILLIAM TAYLOR
By *Fredrick L. Hays*
Attorney

June 21, 1955

H. W. TAYLOR

2,711,245

RECIPROCATING FEEDING MECHANISM

Filed Sept. 10, 1952.

4 Sheets-Sheet 3

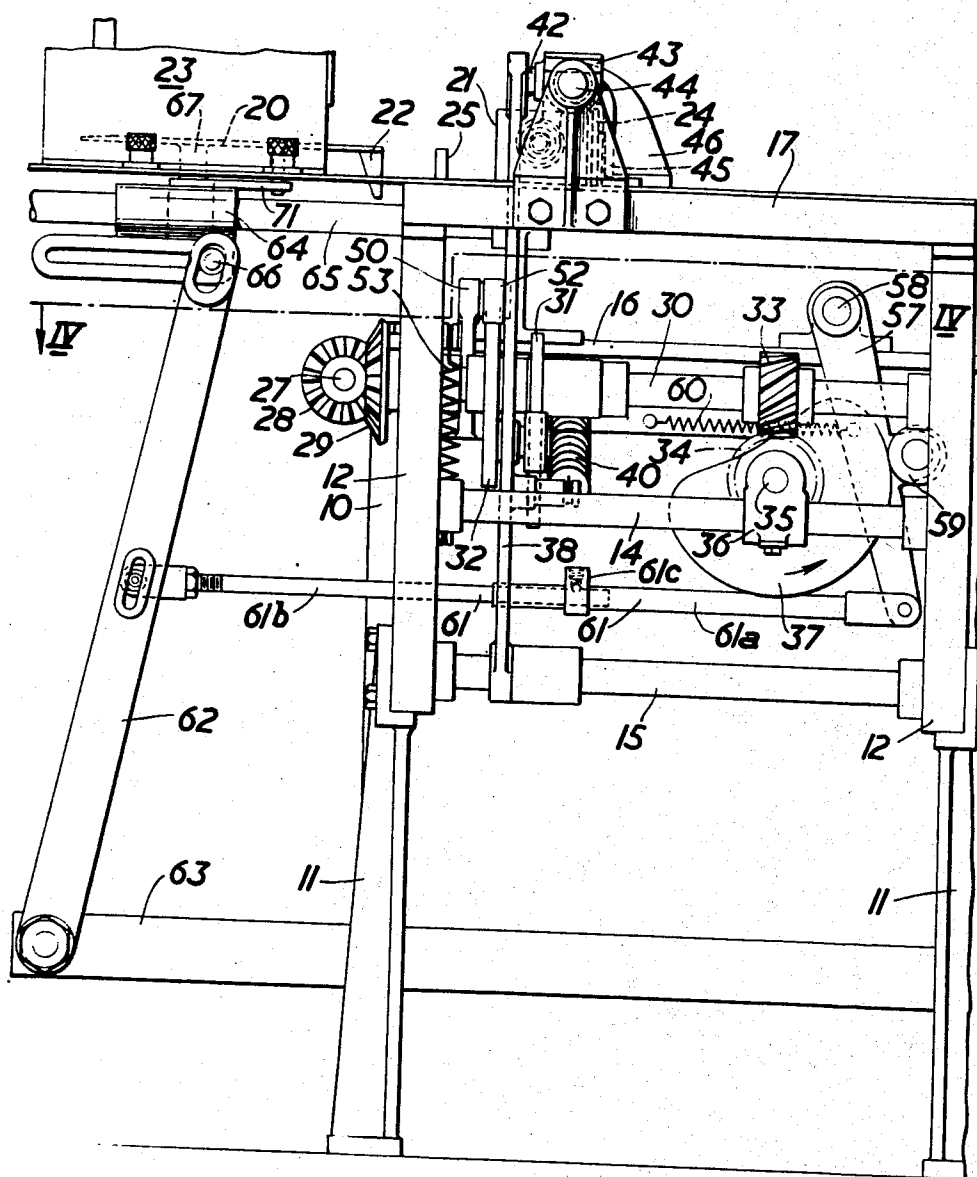


FIG. 3.

Inventor
HARRY WILLIAM TAYLOR
By *Fredrick L. Hare*
Attorney

June 21, 1955

H. W. TAYLOR

2,711,245

RECIPROCATING FEEDING MECHANISM

Filed Sept. 10, 1952

4 Sheets-Sheet 4

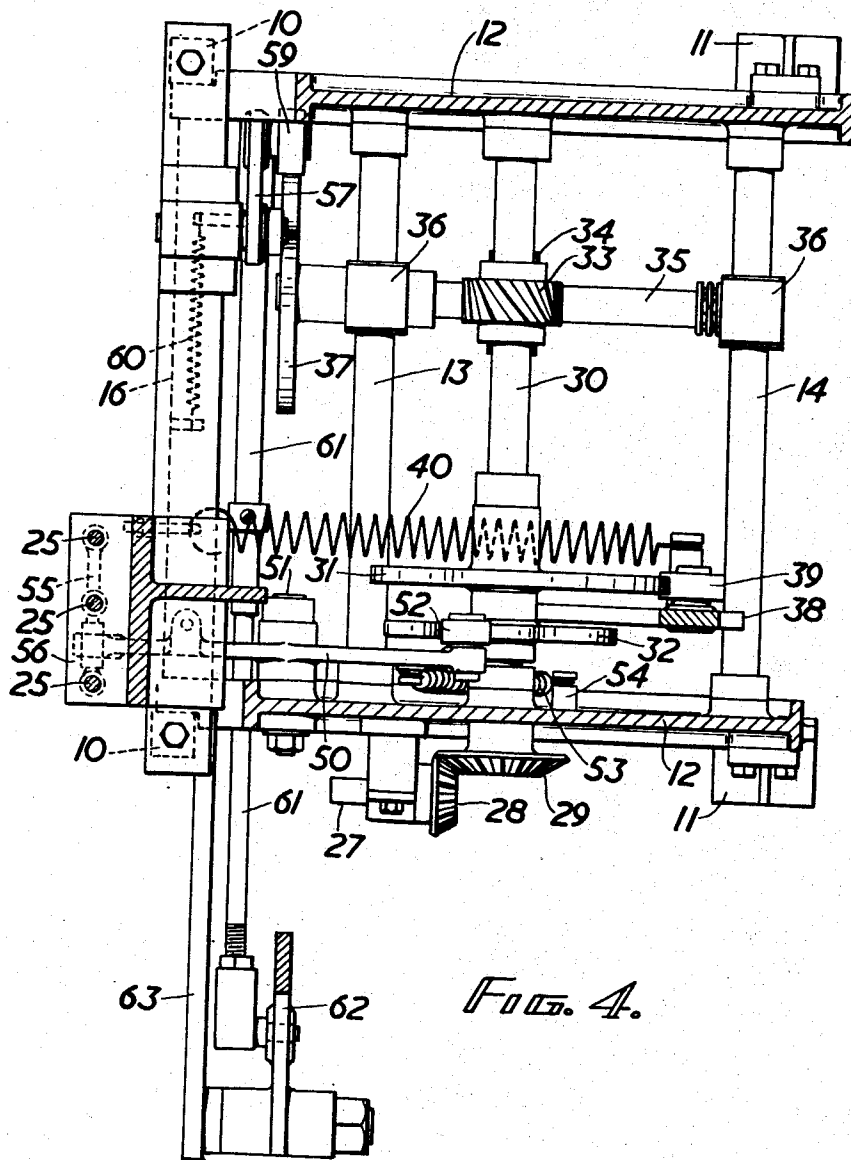


FIG. 4.

Inventor
HARRY WILLIAM TAYLOR

By *Fredrick E. Hays*

Attorney

1

2,711,245

RECIPROCATING FEEDING MECHANISM

Harry William Taylor, Chingford, London, England, assignor to Smyth-Horne Limited, London, England, a British company

Application September 10, 1952, Serial No. 308,743

11 Claims. (Cl. 198—24)

This invention relates to feeding mechanisms and more particularly to a mechanism for feeding books into a machine in which glue is applied to the backs of the books, prior to rounding and backing.

The books pass through the machine on a conveyor, and it is important that the books should be accurately positioned on the conveyor so that glue is applied correctly to the back of the book. In order to achieve this purpose, a feeding mechanism is provided, in accordance with the present invention, which "squares up" or registers and aligns the books before actually feeding them onto the conveyor.

According to the invention there is provided a feeding mechanism which aligns and feeds articles in a required direction and comprises two pushers arranged for reciprocating movement in paths at right angles to one another, a first or aligning pusher moving an article against a guide member and then remaining stationary while the second or feed pusher moves the article in the required direction, through the guide means formed by the first pusher and the guide member.

In order that the invention may be more fully and clearly understood, a feeding mechanism constructed in accordance with the invention and intended for a book-back gluing machine will be described with reference to the accompanying drawings.

In the drawings:

Figure 1 is a part plan view of the feeding mechanism;

Figure 2 is a side sectional view of the mechanism with certain parts broken away for the sake of clarity;

Figure 3 is an end view of the mechanism; and

Figure 4 is a sectional plan view of the mechanism, taken on the line IV—IV of Figure 3.

Briefly, the functions performed by the feeding mechanism shown in the drawings, are the removal of the unbound books one at a time from a hopper, the squaring up of the sheets composing the book, the orientating of the book with respect to the path of a conveyor on the gluing machine and the feeding of the book on to the conveyor at the same speed as that of the conveyor.

The moving parts of the feeding mechanism are carried by a framework comprising forward uprights 10 and rear uprights 11 which support side plates 12 joined by three cross members 13, 14 and 15. The top ends of the uprights 10 are joined by a flanged bar 16.

To the top of the side plates 12, a horizontal platform 17 is secured. This platform is arranged so as to form a continuation of a small platform 18 (see Figure 1) at one end of the gluing machine, the conveyor 19 of which is indicated in Figure 2.

The conveyor comprises two endless bands each formed by a series of hinged slats, one band being arranged directly above the other. The lower band only is indicated in Figure 2, since the upper band starts somewhat to the left of the drawing. The upper surface of the lower band is in the plane of the platform 17 and

2

the books rest on it and are held in position by the lower surface of the upper band.

The books are aligned and fed to the conveyor by means of two pushers 20 and 21. The first pusher 20 comprises a flat plate with a small, downwardly extending flange 22 (Figure 3) at one end, and which together with the adjacent edge of the plate forms the actual pushing face. This pusher is reciprocated (by means described hereafter) in a horizontal path at right angles to the path of the conveyor and serves to move the books one at a time into the path of the second pusher 21. The first pusher 20 will for the sake of convenience be termed the aligning pusher although the alignment of the books is in fact completed by the second pusher 21. This pusher 21 is reciprocated in a horizontal path which is at right angles to that of the aligning pusher and in line with the conveyor path. Pusher 21 actually feeds the books on to the conveyor after completing the aligning operation and accordingly will be termed the feed pusher.

The manner in which the books are "squared" and orientated or aligned, and finally fed into the machine by the pushers is as follows. A pile of unbound books which are to be glued are placed on the plate constituting the aligning pusher 20, the pile being maintained vertical by a frame or hopper 23. The feeding mechanism is set into operation, and the aligning pusher moves rearwardly (to the left in Figure 3; towards the bottom of the drawing in Figure 1) until it is clear of the pile of books in the hopper 23.

The bottom book will thus fall onto the platform 17 in the path of the pusher 20 which then moves forward until it has pushed the book against a guide plate 24 secured to the platform. The pusher 20 now remains stationary so as to form with the guide plate 24, guide means for the book, while the aligning and feeding is completed by the feed pusher 21.

The feed pusher 21 makes a short forward movement to push the book against stop means constituted by three pins 25 which project above the level of the platform 17. At this point in the operation the book has been "squared" and is correctly orientated in the path of the conveyor.

While the pusher 21 halts momentarily, the pins 25 are withdrawn below the surface of the platform 17, and the pusher then continues its forward movement to feed the book onto the conveyor. It is arranged that the speed of the pusher 21 and hence of the book, is the same as that of the conveyor during the actual transfer of the book from the platform to the conveyor. The final guiding of the book is provided by guide plates 26 attached to the machine.

The mechanism for producing the required movements of the pushers 20 and 21 and stop pins 25 will now be described. The drive is taken from the conveyor by means of a transmission shaft 27 (Figures 3 and 4) having a gear 28 which meshes with a gear 29 on a shaft 30 journaled in the side plates 12. Fast on shaft 30 are cam 31 for operating the feed pusher 21 and cam 32 for operating the stop pins 25.

A gear 33 on shaft 30 meshes with a gear 34 on a shaft 35 which is journaled in bearings 36 secured to the cross members 13 and 14. The shaft 35 carries a third cam 37 which operates the aligning pusher 20.

The rotary movement of the cam 31 is translated into the reciprocating movement of the pusher 21 by means of an arm 38 which is pivoted at one end on the cross member 15 and carries intermediate its ends a roller 39. The roller is held against the contour of cam 31 by a helical spring 40 connecting the arm 38 to the framework. The upper end of arm 38 extends through a slot in the platform 17 and is provided with a slot 41 which is engaged

3

by a pin 42 on a carriage 43 mounted for sliding movement on a rod 44. The rod 44 is attached to the platform by means of brackets 45, 46 and is provided with a flat on its upper surface which mates with a flat in the carriage 43 so that the carriage cannot rotate on the rod. The carriage 43 has a sleeve 47 in which a rod 48 is supported; the pusher 21 is attached to this rod which may be longitudinally adjusted in the sleeve by means of knurled nuts 49 so as to vary the position of the pusher according to the size of the books being dealt with.

The pins 25 are moved up and down between their operative or stopping position and inoperative or retracted position by means of a lever 50 which is pivoted intermediate its ends on a stud 51 secured to one of the side plates 12. One end of the lever 50 is provided with a roller 52 which is held against the cam 32 by a helical spring 53 extending from the lever to a pin 54 secured to the side plate 12. The other end of the lever 50 has a notch which engages a rod 55 joining the lower ends of the three pins 25. The pins are guided for vertical movement in aligned holes in the two limbs of a U-bracket 56 secured to the framework.

The means for producing the reciprocating movement of the pusher 20 include an arm 57, one end of which is pivoted on a stud 58 secured to the bar 16. Intermediate its ends the arm 57 is provided with a roller 59 which is held against the contour of cam 37 by means of a helical spring 60 secured to the arm 57 and the flange of bar 16. The lower end of arm 57 is connected by a pivoted link 61 to a lever 62 pivoted at its lower end to a bar 63 secured to the framework. The upper end of the lever 62 is pivotally connected to a carriage 64 supporting the pusher 20 and slidable on a rod 65 secured to the framework. The carriage is provided with a slotted flange in which a pin 66 can be adjustably secured, a slot in the upper end of lever 62 engaging the pin; this arrangement permits the position of the pusher 20 to be varied according to the size of the book. The pusher is secured to a rod 67 which rests in a collar 68 of the carriage 64, the lower end of the collar being closed by a screw 69 which permits the height of the pusher above the platform 17 to be adjusted for books of different thicknesses. A pin 70 projecting from the pusher enters a hole in a flange 71 on the carriage to lock the pusher thereto. The rod 66 and pin 70 move in slots 72 and 73 respectively, provided in the platform.

It will be noted that the driving or forward stroke of pusher 20 (from left to right in Figure 3) is produced positively by cam 37. Provision must therefore be made to prevent possible damage by enabling the mechanism to become disconnected from this pusher if a book becomes jammed or if the resistance to pusher 20 otherwise increases unduly. To this end link 61 is made in two parts, a tube 61a and a rod 61b which fits into the tube. The two parts are held together by a spring-loaded ball catch 61c which allows the two parts 61a and b to become disconnected if undue stress is put on the link. It will be clear from Figure 2 that the pusher 21 is driven forward by the spring 40 which will allow the pusher to give if it meets undue resistance.

In the drawing the parts are shown with the aligning pusher 20 in its fully forward position (i. e. where it forms part of the guide means), the pusher 21 in its rearmost position, and the stop pins 25 moved part of the way to their upper or operative position. The directions of rotation of the three cams are indicated by arrows in Figures 2 and 3. As the cams rotate, cam 32 will complete the upward movement of the stop pins, there being no movement of the pushers since constant radius portions of cams 31 and 37 are in contact with rollers 39 and 59 respectively. A portion of cam 31 of slightly decreasing radius then comes into contact with roller 39 so that pusher 21 executes a short forward movement and, assuming a book is in position between the guide means, pushes the book against the stop pins. The cam 52 has

4

now reached a cam portion of quickly increasing radius so that the pins are withdrawn below the surface of the platform, while the pusher 21 remains stationary, since roller 39 is again on a constant radius portion of cam 31. With the pins fully retracted, roller 39 now engages a cam portion of decreasing radius which causes the pusher 21 to move forward with increasing speed so that it finally feeds the book on to the conveyor at the same speed as the conveyor. Cam 31 then moves pusher 21 rearwardly to the position shown in Figure 2, while pusher 20, which up to this point has remained stationary, is moved rearwardly by cam 37 so that the next book in the hopper 23 falls in front of it. The pusher 20 now moves forward, pushing the book against guide plate 24, and then remains stationary in its guiding position. The parts are now again in the position shown in the drawings.

It will be appreciated that a feeding mechanism according to the invention can be employed with book-binding machines other than gluing machines, and furthermore can be employed in other cases where articles have to be orientated and fed in a given direction.

What is claimed, is:

1. A feeding mechanism for orientating articles with respect to a given direction and feeding the same in that direction, the said feeding mechanism comprising horizontal support means, a guide member, a first reciprocating pusher adapted to move an article on said support means against said guide member and then to remain stationary, stop means, and a second reciprocating pusher mounted for reciprocation in a path at right angles to that of said first pusher and adapted to move an article on said support means disposed between said guide member and said first pusher against said stop means and then to halt, said stop means being adapted to move between a position in the path of an article and a position out of the path of the article while said second pusher is at rest and said second pusher being adapted thereafter to continue to move the article whereby the article is fed in the required direction.

2. A feeding mechanism according to claim 1 and further comprising a conveyor on to which the articles are to be fed, and drive means coupled with the mechanism and the conveyor for driving the mechanism from the conveyor, said second pusher being arranged to move articles, one by one, from said horizontal support means on to the conveyor in the direction of movement of the latter and at a rate of speed equal to that of the conveyor.

3. A feeding mechanism according to claim 2 and further comprising a first cam for reciprocating said first pusher and a second cam for reciprocating said second pusher, the said cams being rotated by said drive means.

4. A feeding mechanism according to claim 3 and further comprising a third cam for moving said stop means between the aforesaid positions thereof, said third cam also being rotated by said drive means.

5. A feeding mechanism according to claim 1, wherein said horizontal support means comprise a platform on which the articles are moved by the pushers, wherein a framework supports said platform, and wherein means for moving said pushers are supported by said framework.

6. A feeding mechanism according to claim 5 and further comprising a rod mounted above and parallel to said platform, a carriage slidable on said rod and attached to said second pusher, an arm pivotally attached to the framework at one end and to said carriage at the other end, said platform having a slot and said arm being passed through said slot, said arm having a roller intermediate its ends, a rotatable cam, and a spring extending between the arm and the framework so as to hold said roller in engagement with said cam whereby rotation of said cam produces reciprocation of said second pusher.

7. A feeding mechanism according to claim 1, wherein said first pusher comprises a horizontal plate adapted to support a pile of articles, said first pusher being arranged

5

initially to move rearwardly to an extent such that the lowermost article in said pile falls onto said support means in front of the first pusher.

8. A feeding mechanism according to claim 7 and further comprising a member downwardly extending from said plate, said horizontal support means being in form of a platform having a slot and said member extending through said slot, a rod mounted beneath and parallel to the platform, a carriage slidable on said rod and supporting said member, a framework supporting said platform, a lever pivotally attached at one end of said carriage and at the other end to said framework, an arm pivotally attached to said framework, a link having one end pivotally attached to said lever intermediate its ends and the other end to said arm, a rotatable cam, a roller carried by said cam, and spring means adapted to hold said roller against said cam whereby rotation of said cam causes reciprocation of said first pusher.

9. A feeding mechanism according to claim 8, wherein said link comprises two parts, and wherein a spring catch detachably holds together said two parts whereby the said two parts become detached from each other when said first pusher encounters a resistance to its movement exceeding a predetermined value.

10. A feeding mechanism according to claim 1 and further comprising a framework supporting said horizontal support means, the said stop means comprising a number of pins supported for vertical movement, a lever pivoted to the framework intermediate its ends and having

6

one end pivotally attached to the lower ends of said pins, a rotatable cam, a roller carried by the other end of said lever, and spring means adapted to hold said roller against said cam whereby rotation of said cam causes said pins to be moved into and out of their stopping positions in the path of the articles.

11. In a book-binding machine which includes a conveyor; a mechanism for feeding an unbound book on to the conveyor in the direction in which the book is to be conveyed and at the speed of the conveyor; said feeding mechanism comprising a horizontal platform, a guide plate fixed on said platform, a first horizontally-reciprocating pusher adapted to slide a book on said platform and to hold it against said guide plate, a vertically-reciprocating stop member, and a second horizontally-reciprocating pusher movable in a path at right angles to that of said first pusher, said second pusher being adapted to slide the book on said platform between said guide plate and said first pusher until the book engages against said stop member, the arrangement being such that said stop member then moves out of engagement with the book and that thereafter said second pusher continues to slide the book on the platform until it is received by the conveyor.

References Cited in the file of this patent

UNITED STATES PATENTS

714,175	Haley	Nov. 25, 1902
1,676,293	Simmons	July 10, 1928
1,959,854	Cameron	May 22, 1934