Sept. 27, 1932. J. DILL ET AL 1,880,077

MATCH STACKING MECHANISM

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Fig. 4

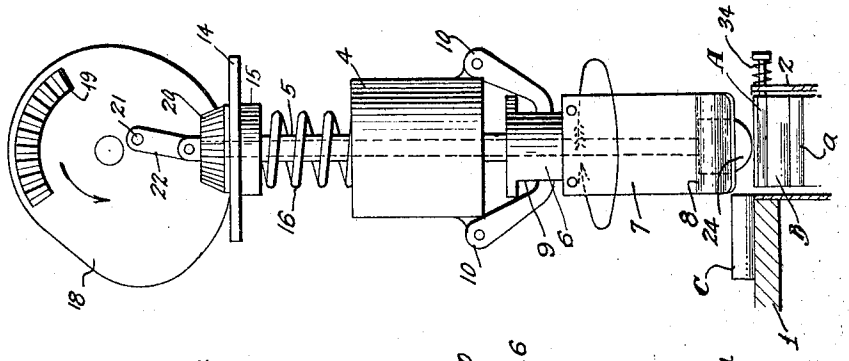


Fig. 3

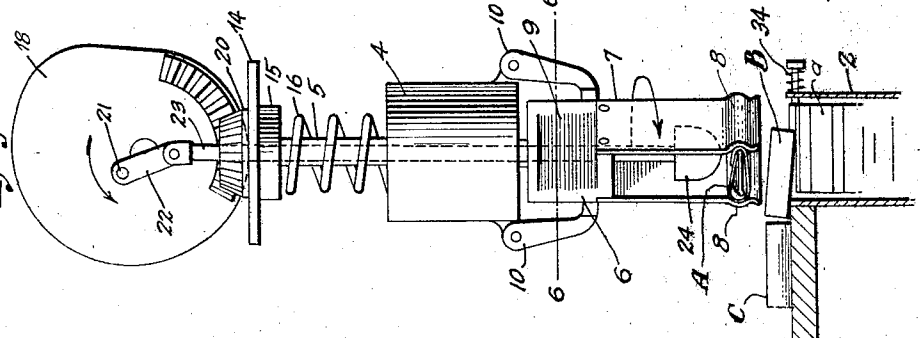


Fig. 2

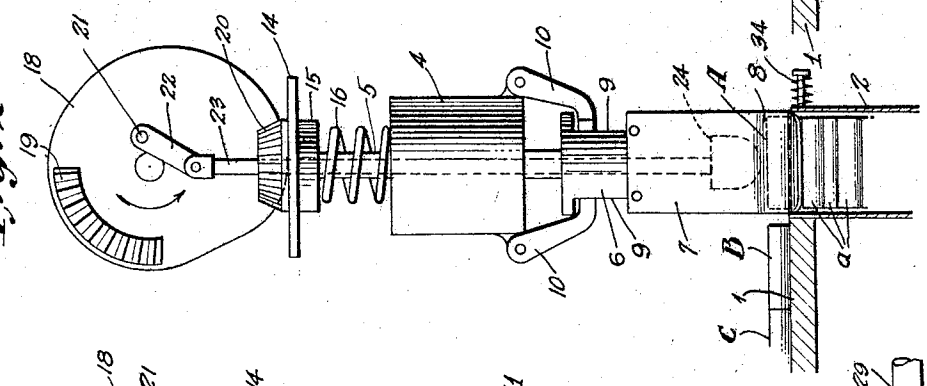
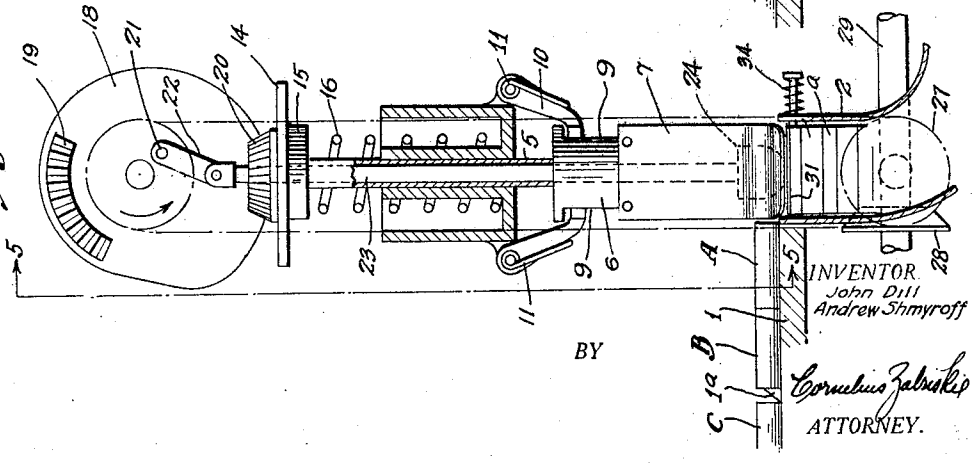


Fig. 1



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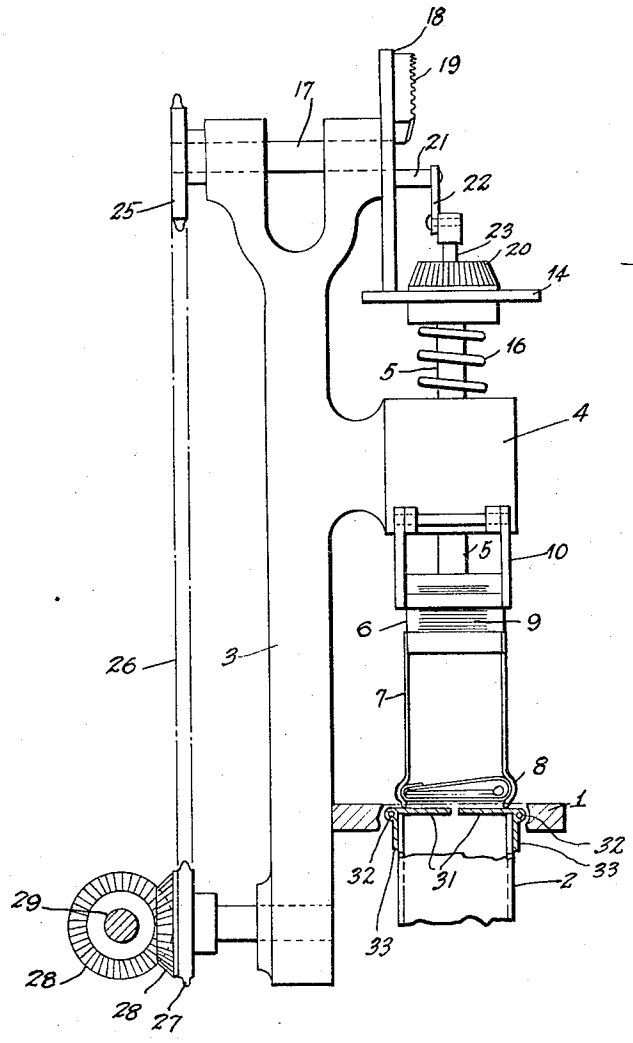


Fig. 5

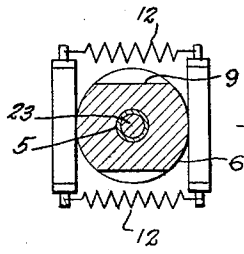


Fig. 6

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UNITED STATES PATENT OFFICE

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MATCH STACKING MECHANISM

Application filed July 11, 1930. Serial No. 467,248.

This invention relates to stacking mechanism for book match machines, the purpose of the mechanism being to receive the book matches from assembling apparatus and to thereupon arrange such book matches in a stack with the alternate books arranged in opposite directions in order that the books so stacked may be conveniently packaged for the market. As is well known book matches are of tapered thickness and in order to package properly, the alternate books must face in opposite directions. As the books come from an assembling apparatus, they all face in the same direction, and it is the purpose of this invention to receive them from such apparatus, reverse the alternate books and position the consecutive books in a stack.

Different forms of apparatus have been heretofore suggested and employed for this purpose, but the present invention accomplishes the stacking operation in a more expeditious and positive manner and through the employment of more simple mechanism than heretofore provided for this purpose.

The primary object of the invention is to provide for the purpose stated an apparatus of unusual simplicity and one susceptible of operating at the highest speeds with uniformly good results.

Features of the invention, other than those specified, will be apparent from the hereinafter detailed description and claims, when read in conjunction with the accompanying drawings.

The accompanying drawings illustrate one practical embodiment of the invention, but the construction therein shown is to be understood as illustrative, only, and not as defining the limits of the invention.

Figures 1 to 4 inclusive are elevations, partly in section showing apparatus embodying this invention in different stages of its operation.

Figure 5 is a section on the line 5—5 of Figure 1.

Figure 6 is a section on the line 6—6 of Figure 3.

Referring to the drawings, 1 designates table or conveyor along which match books adapted to be stacked are fed to the stacking apparatus of this invention. This table or conveyor 1 in practice may conveniently constitute the discharge table of an assembling machine, so that after the books have been assembled, they are fed in completed condition along the table 1 to the stacker unit. For graphic illustration, three consecutive books designated A, B and C are shown in Figures 1 to 4. Beyond the discharge end of the table 1 is a chute 2 and into the end of this chute the books are adapted to be fed by the stacker and they are adapted to move in stacked condition downwardly through this chute to either packaging mechanism or into convenient position wherein an operator may remove the books in stacked condition and manually place them in boxes or cartons.

Positioned in upstanding relation at the back edge of the table and at its discharge end is a standard 3 which standard carries a bearing 4. In this bearing a tubular spindle 5 is mounted for vertical reciprocation and to the lower end of this spindle is secured a stacker head 6. This stacker head is provided with a pair of spring holders 7, the lower ends of which are shaped as shown at 8 to receive between them a match book. The stacker head 6 is substantially cylindrical, but is provided with oppositely positioned flat faces 9 with which a pair of brackets 10 are adapted to cooperate. These brackets are pivoted to the bearing 4 as shown and are impelled by springs 11 into engagement with the head 6 at all times. Additional springs 12, shown in Figure 6, may be employed, so as to insure a firm gripping engagement of the brackets with the flat faces 9. These flat faces are so disposed that when the brackets are in engagement therewith, the seats 8 of the spring holder will be alined with the path of travel of the books along the table 1, so that as the books are fed along the table, they will be forced into engagement with the seats of the spring holder, for reasons hereinafter more fully explained.

The upper end of the tubular spindle 5 is provided with a cam follower plate 14 having a depending hub, and spring 16 is interposed between this hub and the bearing 4 to nor-

mally impel the stacker head in an upward direction. To allow of a fairly long spring, the bearing may be made hollow as shown in Figure 1.

Carried at the upper end of the standard 3 is a shaft 17 to the forward end of which shaft is secured a cam 18, and this cam is adapted for cooperation with the cam follower 14 to oppose the action of the spring 16 and through the operations of the cam, the tubular spindle 5 is vertically reciprocated. The cam is also provided with a segmental rack or mutilated gear 19 and this mutilated gear is adapted for periodical cooperation with a pinion 20 rigid with the cam follower 14, so that as the spindle is raised and lowered, it is periodically rotated. The gearing connections are such that for each rotary impulse the stacker head will be turned through 180 degrees. The cam 18 also carries a wrist pin 21, and this wrist pin is secured by means of a connecting rod 22 to the upper end of a plunger 23 having an enlarged pressure foot 24.

The shaft 17 is provided at its rear end with a sprocket 25 driven by a chain 26 from a sprocket 27 having a gearing connection 28 with a main power shaft 29.

At the upper end of the chute 2 are a pair of trap doors in the form of flaps 31. These are pivoted at 32 and are provided with stops 33. Springs 34 coact with the pivots of these trap doors, so as to normally hold the doors in the closed position shown in Figure 5. It will be noted, however, that if a match book is pressed down when it is lying either directly upon the trap doors or is carried by the holder 7, the doors will be caused to open in a downward direction to let the match book or the holder pass by, but as soon as the holder is elevated again, the doors will close so as to keep the matches previously introduced into the chute from lifting up and getting in the way of the feed of subsequent matches into position above the chute. These trap doors or flaps, therefore serve the function of holding the book matches in the chute after they have been placed therein. The operation of the apparatus will now be described.

Starting with the parts in the position shown in Figure 1, it will be noted that the plunger foot 24 is in a position wherein it has forced previous match books downwardly into the chute 2. The holder 7 is in position to receive book A and is at rest. As the disk continues to rotate in the direction of the arrow from the position of Figure 1 to the position of Fig. 2, the plunger foot 24 is elevated and as soon as it has moved above the plane of the table 1 suitable feed mechanism 1*a* associated with the table advances the match books to feed the book A into the holder so that by the time the parts come into the position of Figure 2, the book A has been positioned in the holder as indicated in this figure. The cam periphery of the disk 18 is such as to maintain the holder stationary during this period, but immediately thereafter the follower 14 passes on to a lower phase of the cam with the result that the holder is elevated and immediately thereafter the rack 19 engages with and drives the pinion 20 to rotate the holder as indicated in Fig. 3. This rotation continues until the holder is rotated through 180 degrees whereby the match book is reversed. During this period, however, the next match book B is fed directly on to the trap doors at the top of the chute 2 as shown in Fig. 3. After the holder has been rotated through 180 degrees, the cam surface acts upon the cam follower 14 to again force the holder downwardly until it comes to approximately the position of Figure 4 whereupon the plunger 23 which is during this period being depressed engages with and ejects the book A from the holder and deposits it in the chute 2. In so doing the trap doors are forced open to admit the match book into the chute. The holder continues to lower, while the connecting rod 22 passes over lower dead center until the parts come to the position of Figure 1, whereupon the operations described in connection with Figs. 1 to 4 are repeated, the book C being next fed into the holder.

In practice, the apparatus is found to operate very smoothly without appreciable vibration and may be operated at high speeds unfailingly to produce the results stated.

The foregoing detailed description and drawings illustrate the invention in its preferred practical form, but the invention is to be understood as commensurate with the appended claims.

Having thus fully described the invention, what I claim as new and desire to secure by Letters Patent is:

1. In a stacking mechanism for match books, a chute, a stacker head positioned in alined relation to the inlet end of the chute, a hollow spindle projecting from the head and mounted in a suitable bearing for rotation and longitudinal reciprocation, said head having a match book holder to receive and support match books in succession, means for feeding match books alternately into the holder and directly into the chute, a plunger extending through the hollow spindle, means reciprocating the spindle and head in timed relation to advance the holder into position to receive a book from the feeding means while the plunger is retracted and to thereupon retract the holder to permit a book to be fed directly into the chute and to thereupon return the holder to advanced position and reciprocate the plunger to discharge the book from the holder into the chute, and means to rotate the holder through approximately 180 degrees to reverse the book therein while the head is in retracted position.

2. In a stacking mechanism for match books, a chute, a stacker head positioned in alined relation to the inlet to the chute and mounted for longitudinal reciprocation and rotation, said head having a holder to receive and support match books in succession, means for feeding match books alternately into the holder and directly into the chute, means for reciprocating the head into position to periodically receive a book from the feeding means and to thereupon retract the head to permit a book to be fed directly into the chute, means to rotate the head while in retracted position to reverse the book carried thereby, and means for thereafter discharging said reversed book into the chute.

3. In a stacking mechanism for match books, a chute, a stacker head positioned in alinement with the inlet end of the chute and having a match book holder, means to feed match books alternately to the holder and directly into the chute, a hollow spindle secured to the head and mounted for rotation and reciprocation, said spindle having thereon a cam follower and a pinion, a plunger extending through said spindle to discharge the book held in the holder and force it into the chute, a rotatable disk having a cam shaped periphery coacting with the cam follower of the spindle to reciprocate the latter, a spring impelling said follower into engagement with said cam, a segmental gear on said disk to periodically rotate the spindle, and a connecting rod connecting the plunger to the disk off center of the latter.

4. In a stacking machine for match books, a chute, a feed table leading to the inlet end of the chute, a stacker head having a holder movable into and out of position at the end of the table, means to feed match books alternately into the holder and directly into the chute, means to move the holder into and out of such position and to rotate it through approximately 180 degrees while out of such position for the purpose of reversing the book supported by such holder, and means to discharge the book from the holder into the chute after such book has been reversed.

5. In a stacking machine for match books, a chute having an open upper end, a stacker head positioned above the upper end of the chute and in alinement therewith for vertical reciprocation and rotation, and having a holder to receive and support a match book, means for feeding match books into the holder when it is lowered and directly into the chute when the holder is raised, means to rotate the holder through approximately 180 degrees to reverse a match book held therein while the holder is raised, and means to eject said match book from the holder and deposit it in the chute after it has been reversed.

6. In a stacking machine for match books, a member having an opening through which match books are adapted to pass, means for feeding match books in succession into registration with said opening, an element movable toward said opening and adapted while there to receive a match book fed to the opening, means to periodically move said element toward the opening to receive alternate match books one at a time and to thereupon withdraw the element from the opening to permit the intermediate books to be fed one at a time directly into the opening, means to rotate the element to reverse the match book therein while retracted from the opening, and means to discharge reversed match books into the opening when the element is moved into juxtaposition with said opening.

In testimony whereof we have signed the foregoing specification.

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