Nov. 19, 1935. H. K. DICKERMANN ET AL 2,021,648

BLANK FEEDING AND DELIVERING MECHANISM

Original Filed July 7, 1927

Fig. 1.

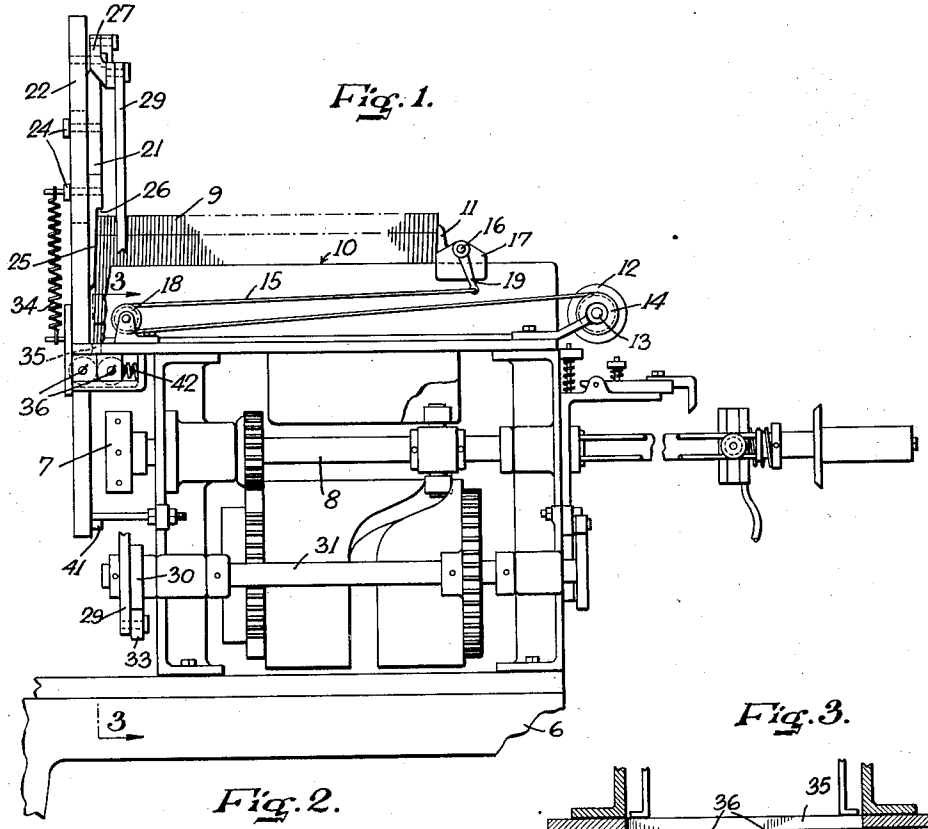


Fig. 2.

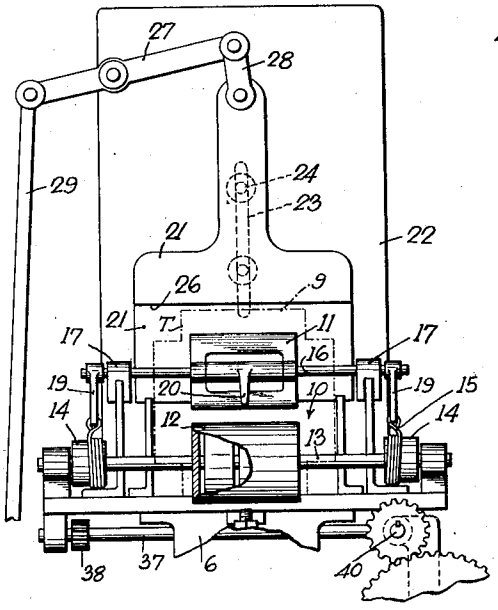
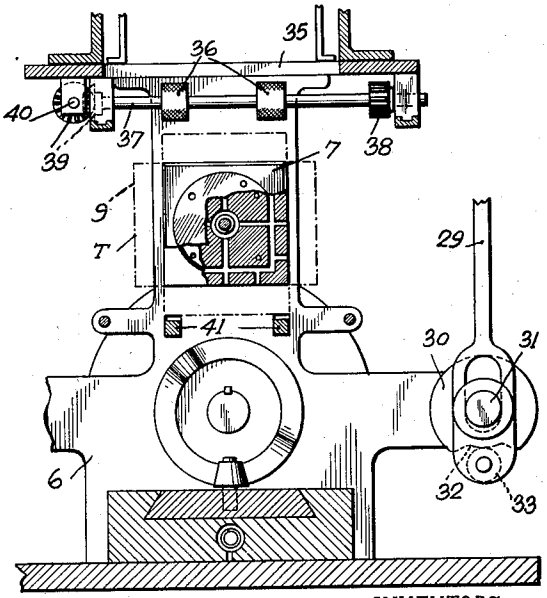


Fig. 3.



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BLANK FEEDING AND DELIVERING MECHANISM

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Original application July 7, 1927, Serial No. 203,881. Divided and this application January 14, 1933, Serial No. 651,769

9 Claims. (Cl. 271—43)

This invention relates to improvements in sheet feeding mechanism and with reference to particular features thereof, it relates to improvements in such mechanism particularly adapted for the feeding of blanks of sheet material, such as may be utilized in the manufacture of various articles such as paper boxes and the like.

It is a general object of the invention to provide a feeding mechanism of the class mentioned of simple and improved construction and operating in an improved manner for feeding blanks of sheet material successively or one at a time from a supply stack, in such a manner as to avoid injury to the blanks and to avoid failure to feed a blank at each successive predetermined period.

Another object of the invention is to provide a blank feeding and delivering mechanism for delivering blanks of sheet material into position for performing a formative operation thereon, and including an improved reciprocating plunger in the nature of a plate and having an improved and advantageous formation for cooperating with the sheet blanks one at a time for feeding them from a stack.

A further object of the invention is to provide in a sheet feeding mechanism of the class mentioned, an improved arrangement for feeding the stack of sheet blanks into a cooperative relation with the reciprocating feeding plunger whereby the blanks are delivered successively without interruption and with little probability of failure in the desired feeding succession.

Other objects of the invention will be in part pointed out in the following detailed description of an illustrative but preferred embodiment of the invention and will be in part obvious in connection therewith.

The invention accordingly comprises the features of construction, combinations of elements, and arrangement of parts, which will be exemplified in the construction hereinafter set forth and the scope of the application of which will be indicated in the claims.

For a more complete understanding of the nature and objects of the invention, reference is had to the following detailed description and to the accompanying drawing in which:

Fig. 1 is a fragmentary side elevation of a box making machine equipped with the improved blank feeding mechanism;

Fig. 2 is a fragmentary end elevation thereof, and

Fig. 3 is a fragmentary detailed view.

The invention of this application is disclosed in applicants' co-pending prior application for "Box machine", Serial No. 203,881, filed July 7, 1927. This application, therefore, is a division of the prior one.

While the sheet feeding and delivering mechanism of this invention may be employed for different purposes and in different relation to other mechanisms, it is herein disclosed as applied for feeding blanks in the form of sheets of paper or cardboard, or the like, which are utilized in the formation of boxes or box parts. This blank feeding mechanism is mounted upon the frame 6, a fragment only of which is shown in the drawing. Some of the other mechanism of the box machine is shown in Fig. 1 and includes a die-head 7 adapted to receive the box blanks T one at a time and in conjunction with other mechanism this die-head is adapted to shape each blank to form a box or box part. This die-head 7 is mounted for rotary movement upon the rotary supporting spindle 8 which is longitudinally reciprocable to move the die-head into different stages for different formative operations upon the blanks. This mechanism is not described in detail herein, inasmuch as it is fully set forth in the prior co-pending application mentioned and is not a part of the invention except in the general combination. As mentioned, the blanks T are of sheet formation, and may be of different shapes or sizes being herein shown as substantially rectangular with notches cut at the corners.

The blanks T are stored face to face in a stack 9 within a magazine 10. The stack may assume a substantially horizontal position and is constantly urged forwardly in the magazine by a follower or follower plate 11, mounted in the magazine 10 and extending along the rear end of the stack. This follower plate is mounted in the magazine for movement longitudinally thereof so as to press against the rear end of the stack.

Mechanism is provided for urging the follower plate constantly forwardly in the magazine, including a coil spring or spring motor 12 mounted upon a transverse rotary shaft 13 carrying a pair of spaced winding drums 14. Flexible connectors or cords 15 are wound upon the drums 14 and connected to opposite ends of the follower plate 11, as shown. The follower plate, as shown is mounted upon a transverse bar 16 having connected thereto supporting blocks 17 slidably mounted upon the magazine walls. One of the flexible cords 15 is connected to each end of the shaft 16. Each cord 15 passes from its drum 14 over an idler 18 near the forward end of the magazine, extending backwardly to be connected

to the adjacent end of the follower shaft 16. Each cord 15 is connected to the end of the shaft 16 through a crank arm 19 mounted upon the shaft 16 and extending downwardly therefrom. Since the shaft 16 is rotatably mounted in the supporting blocks 17, there is a tendency to rotate the shaft and with it the follower plate 11, the rotative effort being transmitted to the follower plate through a lug 20 fixed upon the shaft 16. It is obvious that the construction described enables the follower plate 11 to rock or rotate upon the supporting shaft 16 whereby said plate is automatically adjustable into position corresponding to the face of the stack of blanks. The tendency to rotate the shaft 16 and follower plate 11 due to this connection tends to maintain the blanks T in their correct position within the magazine as they are urged forwardly during the feeding of the blanks successively one by one from the magazine.

All of the blanks of the stack 9 are positioned substantially in vertical edgewise position, whereby the leading or forward blank is positioned in engagement with a reciprocating feeder plunger 21 mounted for vertical reciprocation in guideway 22. While this guideway may be of different formations, it is herein shown in the form of a slot 23 formed in the supporting plate through which pins 24, attached to the feeder plunger, extend.

This feeder plunger 21 is provided with a forwardly extending plate 25 at the lower extremity of the plunger and positioned to contact with the adjacent blank of the stack. This extension plate 25 is backed up by a shoulder or lug 26 positioned for engagement with the upper edge of the adjacent blank when the plunger is fully retracted. This shoulder is just high enough to engage a single blank when the plunger is moved downwardly so that only one blank is thus engaged and fed forwardly or downwardly with each forward movement of the plunger.

A rock arm 27 is pivotally mounted upon the support or guideway 22, being connected at one end by a link 28 to the plunger 21 and at its outer end it is connected by an operating link or pitman 29 to an operating cam 30, carried by an operating shaft 31, which may be driven in any appropriate manner. The cam 30 has a peripherally cut-away portion forming a seat 32 for cooperation with a cam roller 33 mounted on the lower end of the pitman 29. A spring 34 is connected to the feed plunger 21 and normally stressed to urge the plunger downwardly in blank feeding direction. The plunger is positively retracted at the end of a forward feeding stroke under operation of the spring 34 by engagement of the cam with the cam roller 33.

At the bottom of the forward end of the blank magazine is a slot 35 providing an exit opening through which the blanks are fed downwardly one at a time by operation of the plunger 21 into the grip of a pair of cooperating feed rolls 36 mounted directly below the forward end of the blank magazine. These feed rolls are mounted upon parallel shafts 37 connected together by intermeshing toothed gears 38, while one shaft 37 is driven through a pair of intermeshing bevel gears 39, one of which is mounted upon one of the roll shafts 37, while the companion gear is mounted upon a driving shaft 40 driven by any appropriate driving connections. It will be seen that the blanks will be started one by one by operation of the plunger to deliver them individually into the bite of the feed rolls 36 which are rotated in a direction to feed the blanks downwardly to deliver them upon supports or lugs 41 positioned to hold the blank directly in front of the die-head which may then cooperate with the blank for forming or shaping it. It will be noted that the spring motor 12 is constantly tensioned irrespective of the size of the stack of blanks so that said stack is constantly urged forwardly into cooperative relation with the reciprocating plunger 21. The feeding plunger 21 is resiliently moved downwardly by action of the spring 34, bringing the plunger shoulder 26 into engagement with the upper edge of a blank, while the forward extension plate 25 functions as a guide and support for the blank in its downward movement. It will be seen that the plunger 21 successively supplies the sheets or blanks in supported position in front of the die-head so as to be in position for cooperation with the latter. The feed rolls 36 may be yieldingly urged together in blank gripping position by means of coil spring 42.

Since certain changes may be made in the above construction and different embodiments of the invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawing, shall be interpreted as illustrative and not in a limiting sense.

Having described our invention, what we claim as new and desire to secure by Letters Patent is:

1. In a blank feeding mechanism, in combination, a blank magazine, means for starting blanks successively from a stack of sheet blanks in the magazine, a follower behind said stack, means yieldingly urging said follower to feed said stack to said starting means, and means cooperating with said yielding means tending to rotate said follower against the stack.

2. In a blank feeding mechanism, in combination, a blank magazine, means for starting blanks successively from a stack of sheet blanks in the magazine, a follower behind said stack, means yieldingly urging said follower to feed with stack to said starting means, and means cooperating with said yielding means tending to rotate the lower edge of the follower against the lower part of the stack so as to maintain the blanks in proper feeding alignment.

3. In a blank feeding mechanism, in combination, a blank magazine, a reciprocating plunger for starting blanks from the magazine one by one, said plunger having a part adapted to contact with a side face of a blank and having a shoulder positioned to the rear of said contact part and adapted to engage an edge of a blank, a follower plate for engagement with a stack of blanks in the magazine, flexible connections with the opposite ends of said follower plate, a rotary winding drum for each of said flexible connections upon which the respective connection is wound, a spring motor connected to drive said winding drums, means mounting said follower plate for rotation, and means whereby said flexible connections tend to rotate said follower plate against the stack of blanks.

4. In a blank feeding mechanism, in combination, a blank magazine, a reciprocating plunger for starting blanks from the magazine one by one, said plunger having a part adapted to contact with the side face of a blank and having a shoulder positioned to the rear of said contact part and adapted to engage an edge of a blank, a fol-

lower plate for engagement with a stack of blanks in the magazine, means mounting said follower plate for rotation, and means urging said follower plate forwardly against the stack with a rotary tendency.

5. In a blank feeding mechanism, in combination, a blank magazine, a reciprocating plunger for starting blanks from the magazine one by one, said plunger having a part adapted to contact with the side face of a blank and having a shoulder positioned to the rear of said contact part and adapted to engage an edge of a blank, a follower plate for engagement with a stack of blanks in the magazine, flexible connections with the opposite ends of said follower plate, a rotary winding drum for each of said flexible connections upon which the respective connection is wound, a spring motor connected to drive said winding drums, a shaft slidably and rotatably mounted adjacent to the magazine, a follower plate carried by said shaft and positioned for engagement with the rear of the stack, and means tending to rotate and slide said shaft to impart similar movements to said follower plate for positioning the stack.

6. In a blank feeding mechanism, in combination, a blank magazine, a reciprocating plunger for starting blanks from the magazine one by one, said plunger having a part adapted to contact with the side face of a blank and having a shoulder positioned to the rear of said contact part and adapted to engage an edge of a blank, a follower plate for engagement with a stack of blanks in the magazine, flexible connections with the opposite ends of said follower plate, a rotary winding drum for each of said flexible connections upon which the respective connection is wound, a spring motor connected to drive said winding drums, a shaft slidably and rotatably mounted adjacent to the magazine, a follower plate carried by said shaft and positioned for engagement with the rear of the stack, and means including flexible cords connected to opposite ends of said shaft so as to tend to rotate and slide said shaft, to impart similar movements to said follower plate for positioning said stack.

7. In a blank feeding mechanism, in combination, a blank magazine, means for feeding blanks from a stack in said magazine, a shaft slidably and rotatably mounted adjacent said magazine, a follower plate carried by said shaft and positioned for engagement with the rear of the stack, and means tending to rotate and slide said shaft to impart similar movements to said follower plate for positioning said stack.

8. In a blank feeding mechanism, in combination, a blank magazine, means for feeding blanks from a stack in said magazine, a shaft slidably and rotatably mounted adjacent said magazine, a follower plate carried by said shaft and positioned for engagement with the rear of the stack, and means including flexible cords connected to opposite ends of said shaft so as to tend to rotate and slide said shaft to impart similar movements to said follower plate for positioning said stack.

9. In a blank feeding mechanism, in combination, a blank magazine, a reciprocating plunger for starting blanks from the magzine one by one, a follower plate for engagement with a stack of blanks in the magazine, a bodily movable mounting shaft extending transversely of the magazine and mounting said follower plate for angular adjustment against the stack, a flexible member connected with each of the opposite ends of said shaft, and means whereby operation of said flexible members tends to move said follower plate bodily and angularly against the stack.

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