SYSTEM FOR ERECTING THE BOTTOM FLAPS OF FOLDING-BOX BLANKS

In an apparatus for erecting the bottom flaps of folding-box blanks fed to an erecting station by a conveyor and including a pivotable erecting lever with a blank-contacting surface which causes said blank flap to be deflected relative to the balance of said blank, said erecting lever thereafter being pivoted under the force of said blank, a bell crank lever is pivoted to said erecting lever, one arm of said bell crank lever serving as a latch and locking said bell crank lever and said erecting lever against pivoting, the other arm of said bell crank lever including an abutment engaged by the leading edge of said box blank and functioning as a latch release, whereby pivoting of said erecting lever is permitted only after said blank has advanced to the location where its leading edge engages said abutment.

FOREIGN PATENTS OR APPLICATIONS

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6 Claims, 4 Drawing Figures
Fig. 3

Fig. 4
SYSTEM FOR ERECTING THE BOTTOM FLAPS OF FOLDING-BOX BLANKS

The invention relates to a system for use in folding-box gluing machines to erect the bottom flaps or the like which are on the foremost portion of box blanks moving on conveyor belts, by means of a lever extending into the path of movement of the blanks.

In the manufacture of so-called folding-bottom boxes, i.e., folding boxes having bottom flaps which automatically form the bottom of the box when the cross section of the box is opened, special devices are needed in the folding-box gluing machine to erect the bottom parts of the folding boxes and bend them over. It is known to use levers or folding claws extending from above or below into the plane of movement of the blanks for the purpose of erecting the bottom parts which are at the leading edge of the blank.

The upward and downward movement of folding claws has to be synchronized with the processing work, so that they will drop into the gap between successive blanks and be able to seize the leading edge of the next blank. Owing to different feed speeds and to changes in blank sizes, a positive, synchronous control of movement of folding claws requires an expensive drive and control system, which is made all the more costly by the need for the system to be adjustable to various types and sizes of box blanks and to different operating speeds.

When the less expensive lever system is used, it has been found that the lever is prematurely deflected by folding-box blanks of heavy cardboard or the like in such a manner that it fails properly to lift the part of the blank that has to be erected.

Latching is accordingly an object of the invention to provide means for securing the less expensive lifting lever against premature deflection, without great cost.

These and other objects and advantages are realized by the invention in accordance with which the lever extending into the path of movement of the box blanks is provided with a latch that can be tripped by the leading edge of the box blank. With this lever, which is latched in its active position, there is associated a catch which can be deflected by the leading edge of the box blank to release the latch, and which is provided on the free extremity of the lever which is deflectable from the path of movement of the blanks.

The advantages achieved by the invention consist especially in the fact that the latching lever makes it possible to handle folding boxes of many different types of cardboard. The non-latching lever hitherto employed assured perfect operation only with light to medium-heavy types of cardboard, and the machine speed had to be reduced in the case of heavy types, since the stiff folding-box blanks would otherwise prematurely deflect the non-latching lever into its inactive position. In the present invention, the lever cannot be deflected until the leading edge of the blank has reached the catch and, in its continued movement, has depressed it, i.e., the leading edge of the blank must pass over the entire effective length of the lever with the lever in its active position before the path is cleared for the completion of the initiating folding process. Since the force required for the deflection of the catch is very slight, both light and heavy types of cardboard can be handled without difficulty.

Another advantage is that the system is not linked to any timing system and thus requires no adjustment when a change is made in the box blank size.

The invention will now be described more fully with reference to the accompanying drawings, wherein FIGS. 1 to 4 are schematic side views of the apparatus at successive stages of an erecting cycle.

Referring now more particularly to the drawings and first to FIG. 1, a folding-box blank 1, coming from a feeding station which is not shown, is carried by belts 2 and 3 against an erecting lever 4. As the portion of the folding-box blank carried between belts 2 and 3 continues its movement in the same plane, the bottom flap 1′ is lifted by the ascending surface 5 of lever 4 and, as the forward movement continues, is carried into engagement with the catch 6 on latch 7.

Latch 7 is a bell crank lever pivoted about axis 8 which is carried by erecting lever 4. The lower arm of the bell crank lever serves the latching function, described more fully below. The upper arm is provided with the catch or abutment 6 which serves to release the latch. The force that is produced by the contact between the leading edge of the box bottom flap 1′ and the catch 6 (FIG. 2) pivots the latch 7 about its pivot 8 disposed on lever 4, thereby compressing spring 9 and pivoting latch 7 out of the reach of stationary catch 14. After catch 6 of latch 7 has been deflected by the leading edge of the bottom flap 1′, this leading edge is able to advance to the hold-down member 10 (FIG. 3), while at the same time the crease 1″ in the folding-box blank 1 engages and rides along the surface 5 of lever 4. The continuous rectilinear movement of the folding-box blank 1 causes the crease apex 1″′ to pivot the lever 4 about the pivot 11 out of the path of movement, in a known manner. This clears the path beneath the hold-down member, and the process of bending up the bottom flap 1′, which was initiated by lever 4, can be continued by the continued movement of the folding-box blank 1 by belts 2 and 3.

The bottom flap 1′, which has been raised by lever 4 and brought by hold-down member 10 into its preliminary final position, is then delivered by belts and guides, which are not shown, to a glue applying device while still in the same position.

When the trailing edge of the folding-box blank 1 has passed out of reach of lever 4, a tension spring 12 pivots this lever 4 about pivot 11 back into the gap between two successive box blanks, stop 13 determining the position of the lever and the spring-biased latch 7 locking it in that position. The system has thus returned to its initial position to operate on the next box blank.

In the absence of said catch, a heavy blank or a fast-moving blank might weigh upon or smartly rap lever 4 causing it to prematurely pivot before the leading edge of the box blank is able properly to cooperate with hold-down member 10. The instant latch precludes such premature pivoting of lever 4. While the bell crank lever 7 could be pivoted on the machine base, by being carried on lever 4 more trouble-free operation is achieved even with different blanks.

It will be appreciated that the instant specification and examples are set forth by way of illustration and not limitation and that various modifications and changes may be made without departing from the spirit and scope of the present invention.

What is claimed is:

1. An apparatus for erecting folding-box blanks including means for advancing a blank to an erecting station, and an erecting lever contacted by said blank in its advance, said erecting lever causing the portion of said blank first contacting it to be deflected relative to the balance of said blank, said erecting lever ultimately being pivoted about its fulcrum to permit a later portion of said blank to pass thereover without deflection, the improvement which comprises a latch securing said erecting lever against pivoting, and latch releasing means positioned downstream of said erecting lever so as to be actuated by the leading edge of the blank only after the blank has reached a predetermined location, whereby premature pivoting of said erecting lever and inadequate deflection of said blank are precluded.

2. An apparatus according to claim 1, wherein said latch includes a bell crank lever and a first spring urging one leg thereof into latching position whereby it is prevented from pivoting and prevents said erecting lever from pivoting, the other leg of said bell crank lever projecting into the path of said blank and constituting the latch releasing means.

3. An apparatus according to claim 2, wherein said other leg of said bell crank lever includes an abutment in its face contacted by said leading edge of said blank, said leading edge reaching said abutment and causing said bell crank lever to pivot against the urging of its spring to release said catch.

4. An apparatus according to claim 2, including a second spring for restoring said erecting lever to its initial position after passage of a box blank, said first spring then being able to be re-set said latch.
5. An apparatus according to claim 2, wherein the pivot of said bell crank lever is carried by said erecting lever.

6. An apparatus according to claim 3, the pivot of said bell crank lever being carried by said erecting lever, said apparatus including a second spring for restoring said erecting lever to its initial position after passage of a box blank, said first spring then being able to re-set said latch.