Nov. 18, 1941. J. L. BRAY ET AL 2,263,286

TAB FOLDING MACHINE

Filed March 12, 1941

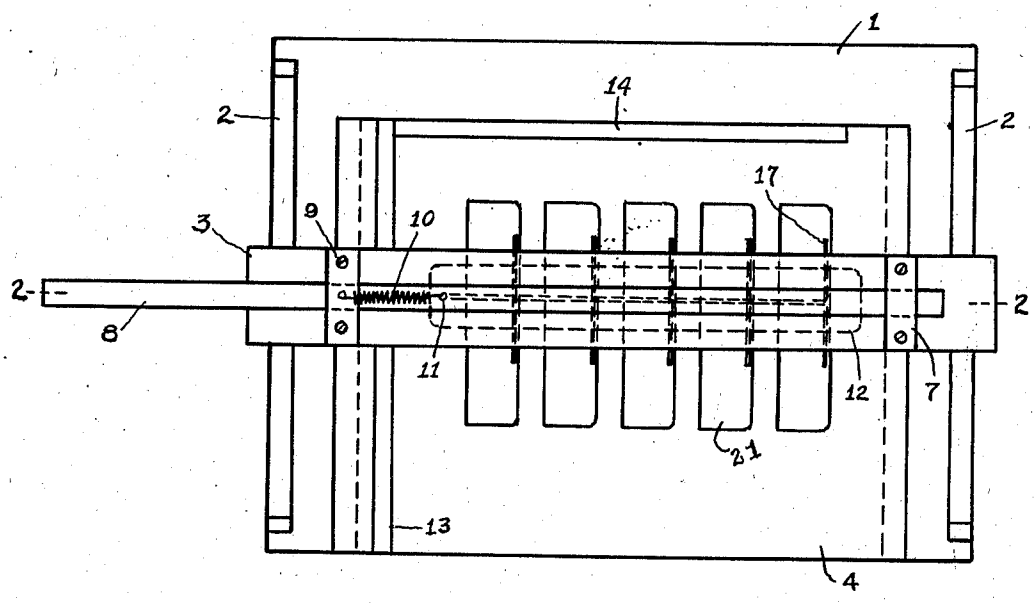


FIG. 1.

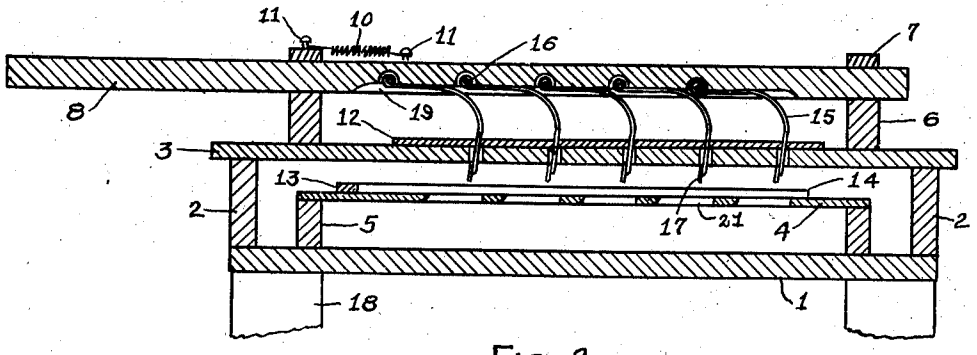


FIG. 2.

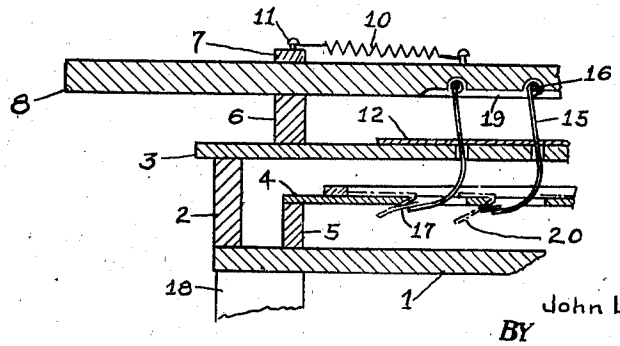


FIG. 3.

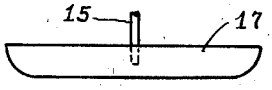


FIG. 4.

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TAB FOLDING MACHINE

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Application March 12, 1941, Serial No. 382,930

12 Claims. (Cl. 93—37)

Our invention relates to tab folding machines and more particularly to a machine for folding tabs in paper board or card board blanks beyond the right angle position so that such blanks may be nested in stacks for shipping or storage and is related to the copending application of Boh et al., Serial Number 382,929, filed March 12, 1941.

In preparing partition elements or dividers for the separation of bottles from blanks of material it is necessary to feed the blank to a die where it is scored to form crease lines and slitted to define tabs. In use the tabs extend out from the body of the blank at substantially right angles thereto providing subdividers. However, if these tabs are not first folded beyond their right angle positions with respect to the body of the blank, the resiliency of the material thereof will cause them to return to the plane of the blank or substantially so. Accordingly when the partition is applied it becomes necessary to manually swing each of these tabs to the right angle position and slows the packing procedure.

It has been found, however, that if these tabs are bent beyond the right angle position with respect to the blank, the tendency to return to the plane of the blank is substantially overcome and they will thereafter remain in a position which is substantially at right angles to the blank so that the articles and the partitions may be easily and quickly packed without attention to the individual tabs.

It is thus seen that the ordinary plunger and slot machines are entirely inadequate for positioning the tabs for while the tabs might be pressed downwardly into a slot in a base by a plunger to position them at right angles to the plane of the blank, they would not, due to their resiliency remain so positioned after the removal of the plunger. The problem, which was a difficult one, was to swing the tabs after they had entered the slot, on beyond the right angle position with respect to the blank to overcome the effects of such resiliency.

While it is clear that tab folding machines such as Bergstein, 2,228,943 exist in the prior art, it is not understood that they have been employed or are capable of being employed in the manner contemplated by applicants.

Applicants with a knowledge of the defects in and objections to the prior art have as an object of their invention the provision of a tab folding machine which will fold a tab beyond the perpendicular position with respect to the blank.

Applicants have as another object of their invention the provision of a tab folding machine which will on a single operation simultaneously fold a plurality of tabs in a blank to positions beyond the perpendicular position with respect to the blank.

Applicants have as a further object of their invention the provision of a machine for folding a plurality of tabs outwardly from a blank and pressing them through a series of slots or apertures in a base and folding them on beyond the right angle position, then releasing them.

Applicants have as a still further object of their invention the provision of a curved arm hingedly mounted for engaging and pressing a series of tabs down through openings in a supporting base and for thereafter swinging them to a position out of registration with said openings, and then releasing them.

Other objects and advantages of our invention will appear from the following specification and accompanying drawing and the novel features thereof will be particularly pointed out in the annexed claims.

In the drawing, Fig. 1 is a plan view of our improved machine. Fig. 2 is a cross section of the same machine taken along the line 2—2 of Fig. 1. Fig. 3 is a fragmental detail of a portion of the same machine showing the plungers in a lowered position. Fig. 4 is a detail tab folding foot or element used on the end of the plunger.

Referring to the drawing in detail, 1 designates a top or supporting surface being supported in position by legs or other similar supports 18. Extending upwardly from the surface of top 1 adjacent either end thereof are blocks 2, 2 bridged at the upper extremities and, resting upon them is a supporting plate 3 carrying a guide plate 12 thereon. Formed in the supporting plate 3 and guide plate 12 is a series of registering openings for the passage of the shanks of a series of curved arms or plungers 15. The openings in the guide plate 12 serve as bearings for the plungers 15 and also as guides for directing their movement. Positioned above the supporting plate 3 and carried in bearings in spaced standards 6, 6 is a reciprocating rod 8, being retained in position in the bearings by straps 7, 7 secured to the standards through screws 9, 9. Formed in the under side of the reciprocating rod 8 is an elongated recess 19 having a series of spaced transverse pins extending therethrough and hingedly mounting the upper curled ends of the plungers 15. Mounted on the lower extremities of the curved plungers 15 is

a series of transverse tab engaging elements or feet 17 shown in detail in Fig. 4. These feet are made of thin, flat elements for engagement with the tabs over a substantial portion thereof. Positioned beneath the supporting plate and supported by laterally or transversely extending blocks mounted on top 1 is a base 4 having a plurality of spaced openings 21 for the free passage of plungers 15 and transverse elements 17 mounted on the lower extremities thereof. The tab receiving openings 21 have their under edges beveled to permit folding of the blank about a single crease line and positioned upon the upper surface of the base 4 is a rearwardly or transversely extending stock positioning strip which engages an end of a similar longitudinally extending strip 14 positioned adjacent the rear edge of base 4 and mounted thereon.

The reciprocating rod 8 is yieldably maintained at the left extremity of its stroke and with the tab engaging elements 17 in raised position.

In its operation a blank of paper board material is positioned upon the upper surface of the base 4 and in contact with the stop positioning strips 13, 14 so that the tabs are in registration with the spaced openings 21 in the base 4. It will be understood that the creased line of junction between the tabs and the stock of material is on the left and permits the swinging of the tabs downwardly to the left as hereinafter described.

Force is applied to rod 8 to move it to the right and the movement of the rod 8 to the right causes the curved arms 15, 15 to swing about their pivots 16 and to slide in the guide openings in the guide plate 12, so that these arms or plungers 15 are moved downwardly and engage the feet or tab engaging elements 17 with the tabs of the blank so that continued movement of the rod 8 to the right causes the tabs to be pressed downwardly and to the left by the arcuate path of travel of the transverse feet 17 by reason of the travel of curved arms or plungers 15 through their respective openings in the guide plate 12. Finally the rod 8 reaches the extremity of its travel to the right and Fig. 3 shows the position of the tabs 20 after they have been acted upon by the feet or tab engaging elements 17. It will be noted that these tabs have been bent beyond the right angle position with respect to the blank. This is made possible by the beveling away of one side of the wall of the tab openings so that the tabs continue to bend around their crease lines rather than form two bends which are merely spaced by the thickness of the base 4.

The rod 8 is then released and is moved back to the left under the action of the spring 10. This causes the feet or tab engaging elements 17 on the ends of the plungers 15 to be swung back into registration with the openings 21 in the base 4 and to be drawn up out of those openings to the position shown in Fig. 1 by the movement of the plungers 15 back up through their guide openings in guide plate 12.

This completes the cycle and the stock of material is removed with the tabs properly bent. It will be understood that due to the resiliency of these tabs 20, they will not remain in the position shown in Fig. 2 after the plungers 15 have been withdrawn from the openings 21 in the base 4 but will return to a position which is at substantially right angles to the plane of the body of the partition element and will now be ready for nesting in a stack and for shipping. Another blank may be slipped in place on base 4 and the same cycle repeated. It will be understood, of course, that the rod 8 may be reciprocated either manually or from a source of mechanical or electrical power and that if desired the spring 10 may be removed and dispensed with and the movement of rod 8 controlled completely by positive movement from a source of power or manually.

It will be understood that this machine and this method is not restricted to the bending of tabs on a bottle partition element such as disclosed in the pending application above referred to but is sufficiently broad to cover the bending of tabs on any article where the problems involved are the same as those enumerated heretofore. It is also understood that this machine may be made of wood or metal, but if made of wood, it is preferable to make the guide plate 12 of metal. It will also be understood from an examination of Figs. 2 and 3 that the under sides of the walls of the openings and base 4 are beveled for the purpose hereinbefore described and that they taper up to substantially a knife edge adjacent the upper surface of the base 4.

Having thus described our invention, we claim:

1. A tab folding machine of the character described comprising a base having a series of tab receiving openings therein, a reciprocating rod positioned above said base, and a series of plungers carried by said rods for reciprocation through said openings to pass tabs beyond the right angle position with respect to the stock.

2. A tab folding machine of the character described comprising a substantially flat stock supporting base having a plurality of tab receiving apertures therein, a reciprocating rod positioned over said base, and a plurality of tab engaging plungers pivotally carried by said rod for reciprocation through said apertures to pass the tabs to a position beyond the perpendicular position with the stock.

3. A tab folding machine of the character described comprising a stock supporting base having a plurality of tab receiving openings therein, a reciprocating rod positioned above the base, a plurality of plungers having their ends in registration with said openings, said plungers being carried by said rod, and means for guiding the ends of said plungers through said openings and on out of registration therewith for passing tabs through the openings and on beyond the perpendicular with respect to the stock.

4. A tab folding machine of the character described comprising a stock supporting base having a plurality of tab receiving openings therein, a reciprocating rod positioned above the base, a plurality of plungers hingedly carried by said reciprocating rod and in registration with said openings and on beyond the perpendicular with respect to the stock.

5. A tab folding machine of the character described comprising a stock supporting base having a plurality of tab receiving openings therein, a reciprocating rod positioned above said base, a plurality of plungers hingedly carried by said rod and in registration with said openings, and a guide plate for guiding the ends of said plungers through said openings and on beyond the perpendicular with respect to the stock.

6. A tab folding machine of the character described comprising a stock supporting base having a plurality of spaced openings therein for the passage of tabs, a reciprocating rod positioned over

said base, a plurality of curved plungers carried by said rod and having ends for passing through said openings and on out of registration therewith for passing tabs down through said openings and bending them to a position beyond the perpendicular with respect to the stock.

7. A tab folding machine of the character described comprising a stock supporting base having a plurality of openings therein for the passage of tabs, a reciprocating rod positioned over said base, a plurality of curved plungers carried by said rod and having ends for passing through said openings and on out of registration therewith for passing tabs down through said openings and bending them to a position beyond the perpendicular with respect to the stock, and means for guiding said plungers.

8. A tab folding machine of the character described comprising a stock supporting base having a plurality of spaced tab receiving openings therein, a rod positioned above said base for reciprocation across said openings, a plurality of curved plungers carried by the rod and having tab engaging ends for passing down through said openings and on out of registration therewith, whereby to pass tabs down through said openings and bend them to a point on beyond the perpendicular with respect to the stock.

9. A tab folding machine of the character described comprising a stock supporting base having a plurality of spaced tab receiving openings therein, a rod positioned above said base for reciprocation across said openings, a plurality of curved plungers carried by the rod and having tab engaging ends for passing down through said openings and on out of registration therewith, whereby to pass tabs down through said openings and displace them to a point on beyond the perpendicular with respect to the stock, and a guide plate having openings therein for guiding said plungers.

10. A tab folding machine of the character described comprising a stock supporting base having a series of tab receiving openings therein, a rod positioned above said base for reciprocation across said openings, a plurality of curved plungers pivotally carried by said rod and having tab engaging ends for swinging through said openings and to points out of alinement with them, whereby to pass a plurality of tabs down through said openings and bend them beyond the perpendicular position with respect to the stock on said base.

11. A tab folding machine of the character described comprising a stock supporting base having a plurality of tab receiving openings therein, a reciprocating rod positioned above said base for movement across said openings, a plurality of curved plungers pivotally mounted adjacent their upper ends on said rod and having their lower tab engaging ends in vertical alinement with said openings, and means engageable with said plungers for directing their lower ends downwardly through said openings and on out of vertical alinement with said openings, whereby to pass tabs down through said openings and bend them beyond the perpendicular position with respect to the stock on said base.

12. A tab folding machine of the character described comprising a stock supporting base having a tab receiving opening therein, a rod mounted over said base for reciprocation across said openings, a swinging plunger having a curved shank carried by said rod and terminating at its lower end in a tab engaging foot, and a guide plate for directing the movement of the end of said plunger through said opening in an arcuate path to a position out of vertical alinement with said opening, whereby to pass a tab down through said opening and on beyond the perpendicular position with respect to the stock.

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