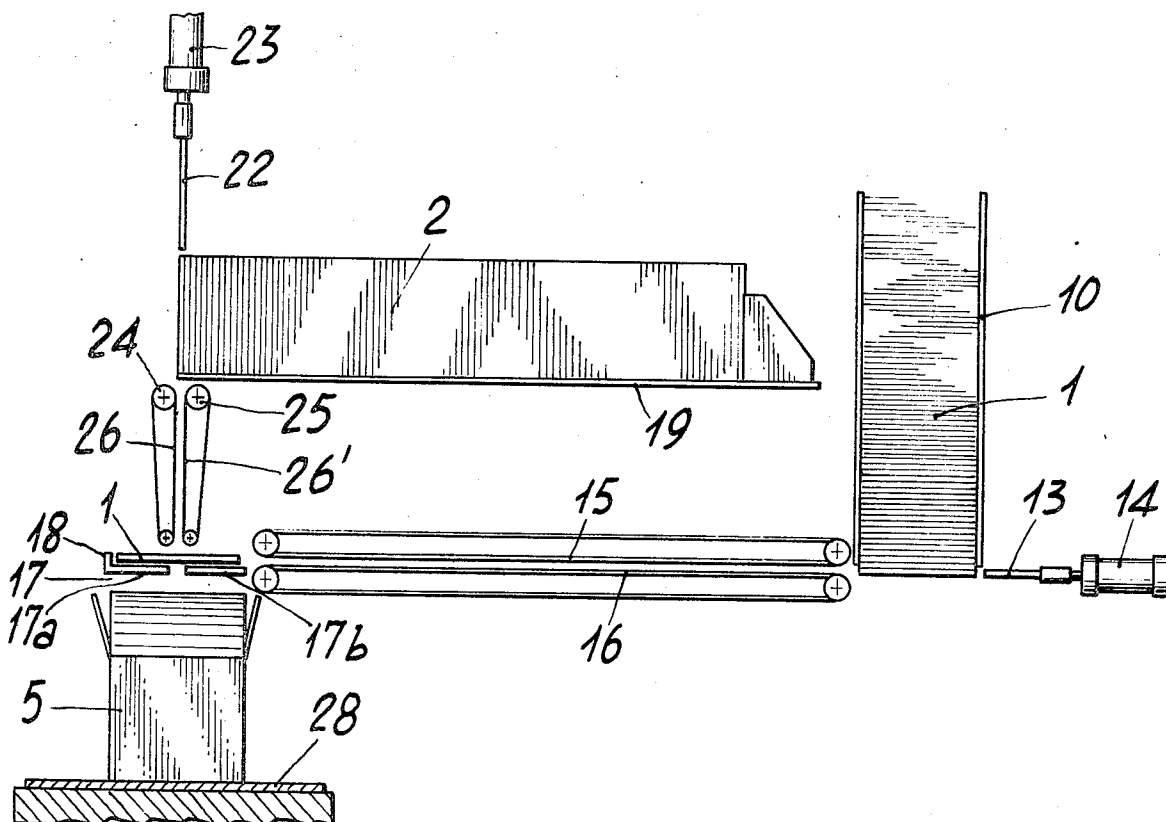




SHEET 1 OF 2

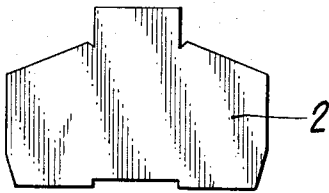


FIG. 2

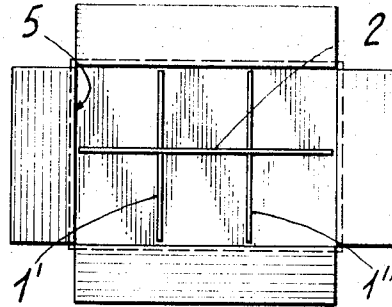


FIG. 5

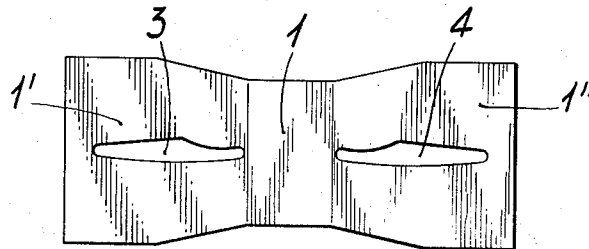


FIG. 1

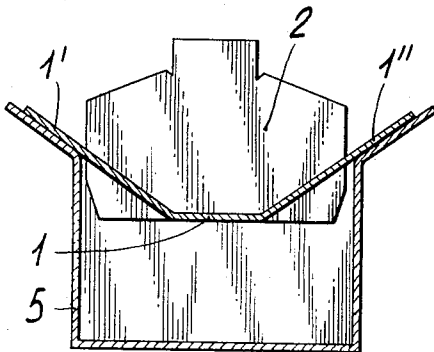


FIG. 3

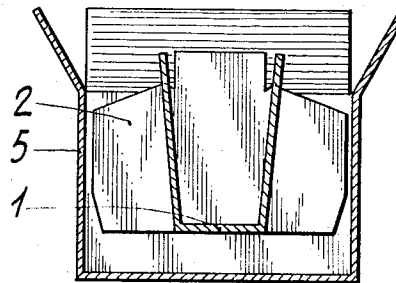
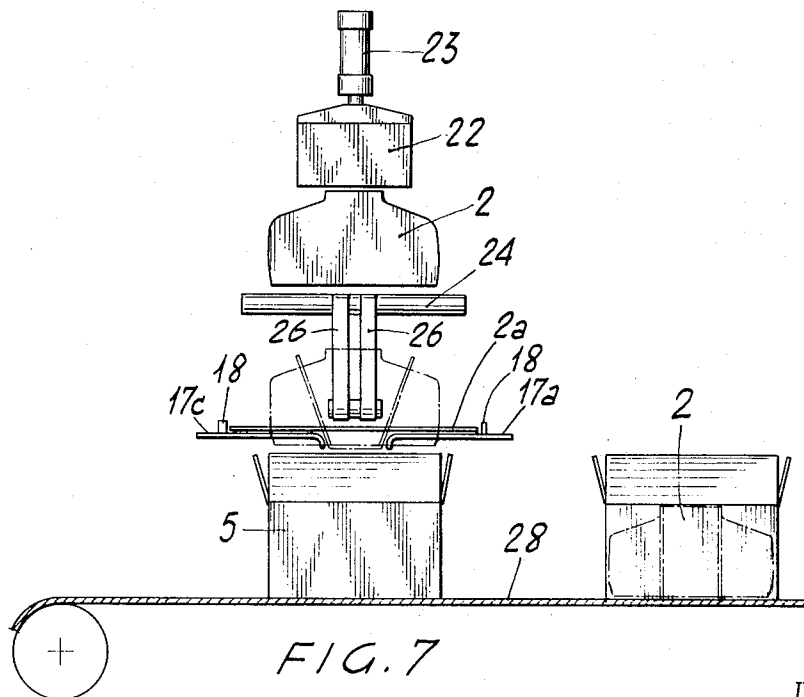
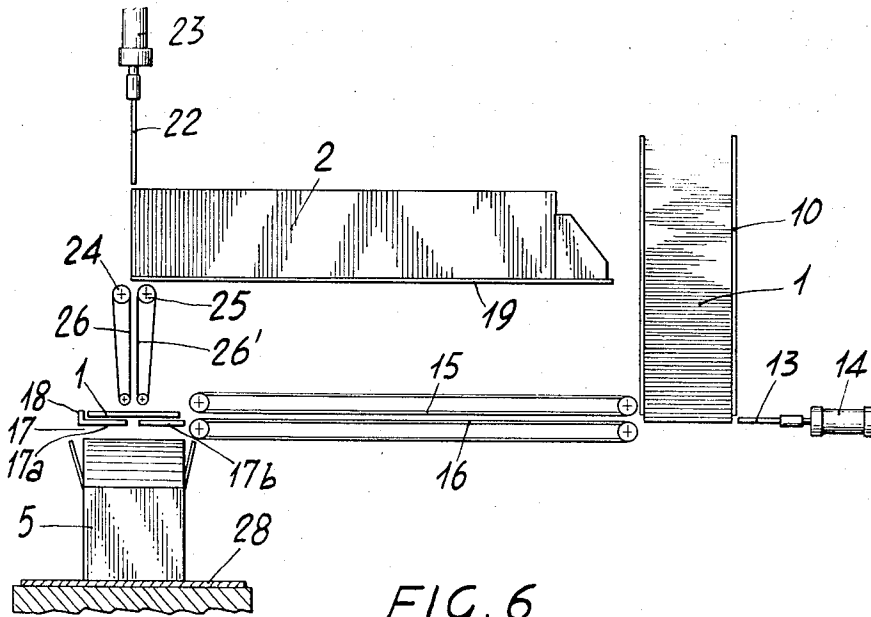


FIG. 4

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MACHINE FOR THE AUTOMATIC FORMATION AND INSERTION OF CONTAINER PARTITIONS

The present invention relates to a machine for automatically manufacturing partition baffles forming "beehive" bodies adapted to separate various articles contained within a box or container and for contemporaneously introducing said "beehive" bodies into the respective boxes or containers.

At present, in the packing industry, the "beehive" separation bodies (usually made of corrugated cardboard) used for separating various articles (in particular breakable ones such as bottles and the like) contained in a box, case or container are separately manufactured by special machines and then manually inserted into the corresponding boxes.

This manually performed operation requires considerable time, which results in an increase of the final packing costs.

The machine according to the present invention eliminates this inconvenience since it permits the manufacture of the "beehive" body with the simultaneous introduction of same into the respective box or case in a completely mechanized and automatic manner without any need for further manipulation.

The machine in question utilizes the "beehive" baffle bodies according to U.S. Pat. application Ser. No. 160,424 of the same applicant, said "beehive" bodies comprising each a horizontal element constituted by a flat elongated strip adapted bent in a U-shape and having at least one pair of longitudinal aligned and spaced slots and at least a vertical insert element adapted to be perpendicularly inserted into the pair slots of said first element.

The machine of the invention is characterized by:

- a. a first magazine having the strip elements stacked therein in horizontal alignment; a horizontal pushing means suited to push the lowest horizontal element of the pile into conveying members; a bending platform suited to receive said horizontal element conveyed by the above mentioned conveying members; and registering means forming part of the bending platform to exactly define the entering position of the horizontal element,
- b. at least a second magazine containing the vertical insert elements placed side by side, said magazine being placed above the bending platform; a vertical pusher associated with each second magazine and suited to push an insert element down into conveying and accelerating members which, while holding said vertical element in exact vertical position, throw it into the pair elongated slots of the horizontal strip located on the bending table, and
- c. conveying means suited to bring each empty box below said bending platform to hold the same stationary while the insertion of the "beehive" body takes place and to move it on, once the "beehive" body has been completely inserted, the motion of the various members being synchronized with each other.

In the accompanying drawings:

FIG. 1 is a view of the horizontal strip element adapted to be U-bent, thereby allowing to manufacture a "beehive" body with six compartments.

FIG. 2 is a view of the vertical element adapted to be inserted into the pair of elongated slots of the horizontal element.

FIG. 3 shows the beginning of the insertion phase of the two elements into the box.

FIG. 4 shows the end of the insertion phase of the two elements into the box to complete the "beehive" body.

FIG. 5 shows a plan view of the box completed with a "beehive" body placed thereinto.

FIG. 6 is a diagrammatic lateral view of the machine according to the invention for insertion of the "beehive" bodies obtained with the strips 1 and insert element 2 illustrated in the preceding figures.

FIG. 7 is a front view of the machine illustrated in FIG. 6.

With reference to FIGS. 1 to 5; each horizontal element illustrated in FIG. 1 is constituted by a flat elongated strip comprising a central portion 1 and the lateral wing portions 1' and 1'' adapted to be U-bent as indicated in FIGS. 3 and 4.

Said lateral wing portions are provided with a pair of coaxially elongated slots 3 and 4 adapted to receive the vertical element 2 illustrated in FIG. 2.

The insertion operation takes place by disposing the horizontal element 1, 1', 1'' on the bending Table 17 (FIG. 6) of the machine and by inserting the element 2 vertically into the slots 3, 4, thereby gradually determining the bending of the elements 1, 1', 1'' into a U-shape as indicated in the FIGS. 3 and 4, while it is being introduced into the box 5 below.

At the end of the operation, the box is completed with a "beehive" body as shown in the plan view of FIG. 5.

The machine permitting the automatic manufacture of the "beehive" body and the insertion of the same into the respective box or container comprises:

a first magazine 10 having the strip elements 1 piled therein in horizontal alignment; a horizontal pusher 13, 14 comprising a blade 13 pushed by piston, sliding within a pneumatic or hydraulic cylinder 14 and operable to push the lowest horizontal element of the pile into the conveying means. This conveying means is constituted by belts 15 and 16 which convey the unfolded strip element to the bending Table 17. Registering means 18 adapted to ensure the perfect positioning of the strip on the table.

Above the table, there is provided a second magazine 19 containing the vertical insert elements 2 and having mounted thereabove a pusher comprising the vertical blade 22 pushed downward by a piston sliding within the pneumatic cylinder 23. The blade is disposed so as to feed the vertical element emerging from the forwardmost end of the magazine into and between the pair of accelerating conveying belts 26, 26' actuated by rollers 24, 25. The insert element is thus subjected to acceleration in order to throw it with a certain impact against the strip element 1 so as to start, keep on and finally complete the formation of the "beehive" body into the box 5 below, as illustrated in FIGS. 3 and 4.

The bending table 17, in case of a "beehive" combination with six compartments, comprises 4 wings portions 17a, 17b, 17c, 17d (this last wing portion not being shown in the drawings). The front wing portion 17a, 17c and the back wing portion 17b, 17d (FIG. 7) are spaced from each other at a distance therebetween corresponding to at least the width of the central section 1 (FIG. 1) of the horizontal strip, while the lateral wing portion 17a, 17b (FIG. 6) are spaced at a distance corresponding at least to the thickness of the vertical strip 2.

The machine is completed by a conveying belt 28 (FIG. 7) adapted to transport each box 5, to keep it stationary below the bending table 17 during the time required for insertion of the "beehive" combination, and finally to move it on so that the successive box may take its place.

The belt 28 can also keep moving continuously while a stop element holds the box stationary during the insertion of the "beehive" combination, in this case there being a relative motion between the bottom of the box and the belt 28.

All the movements of the various members constituting the machine are synchronized with each other.

As it clearly appears from the above illustrations, the formation of the "beehive" body and its insertion into the box takes place completely automatically with a minimal working time, which favorably affects the production cycle and packing costs.

Should the horizontal strip 1 be provided with a plurality of slot pairs 3-4, to form "beehive" bodies having for instance nine, 12 or more compartments instead of the six illustrated, there will be obviously provided more vertical pushers 22, 23 and more accelerating conveying means 26-26', one for each insert element 1. In this case the bending table 17 is subdivided to a larger number of parts.

The shape of the horizontal and of the vertical elements constituting the "beehive" body as well as the shape of the various components of the specified machine may vary in compliance with the appending claims without departing from the spirit of the present invention.

What is claimed is:

1. A machine which automatically forms and simultaneously inserts partition baffles in a preformed box-like container which comprises

- a. a first magazine operable to receive a plurality of horizontally aligned unfolded baffle strip elements, each strip element being provided with at least one pair of coaxially aligned elongated slots;
- b. a bending platform operable to receive an unfolded strip element and having registry means operable to align an unfolded strip element so received, said platform further being operative to define the folded configuration of said strip element upon application of sufficient impact on said strip element to initiate a folding operation and to release the folded strip element during completion of the folding operation;
- c. conveying means operable to transport an unfolded strip element from said magazine to said bending platform;
- d. means operable to push the lower most unfolded

strip element in said magazine into engagement with said conveying means;

- e. a second magazine operable to receive a plurality of vertically aligned baffle insert elements, each of said insert elements being adapted to be engagingly inserted into a pair of slots in said baffle strip elements upon the folding of said strip elements;
- f. accelerating means disposed over said bending platform and operable to acceleratively convey a baffle insert element from said second magazine to said bending platform for foldable impact with a strip element aligned in said registry means so as to effect the folding of said strip element with engagement by said insert element;
- g. means associated with said second magazine operable to push the forwardmost of said baffle insert elements into engagement with said accelerating means; and
- h. conveying means operable to transport an empty box-like container under said bending platform for receipt of a folded strip element and engaged insert element released from said bending platform upon completion of the folding operation.

2. The machine according to claim 1 wherein said bending table includes two half-planes spaced from each other at a distance corresponding to at least the central portion of the baffle strip element between the pair of slots.

3. The machine according to claim 1 wherein said accelerating means comprises two conveying belts having parallel opposed conveying surfaces moving in the same direction and actuated by two rollers.

4. The machine according to claim 1 wherein said conveying means for the empty box-like container moves intermittently so that each container stops in a position aligned for receipt of the folded strip and engaged insert element.

5. The machine according to claim 1 wherein said conveying means for the empty box-like container moves continuously and further characterized by retaining elements operative to temporarily stop a container in a position aligned for receipt of the folded strip and engaged insert element.

6. The machine according to claim 1 wherein the bending table comprises four wing portions, the front wing portions and the back wing portions being spaced from each other at a distance corresponding to at least the width of the central portion of the strip element between said slots while the side wing portions are spaced from each other at a distance corresponding to the thickness of the insert strip.

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