

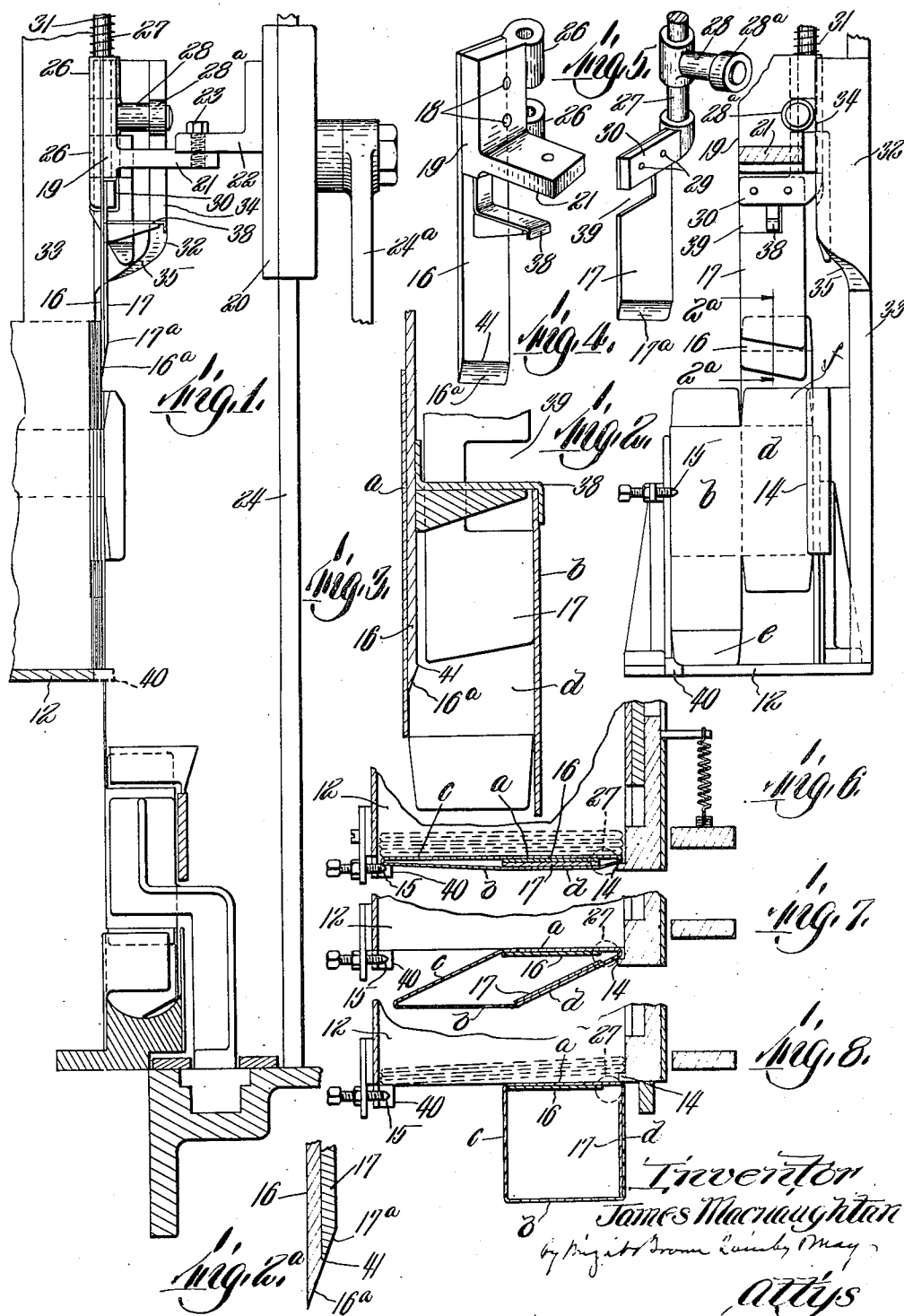
May 27 , 1924.

1,495,192

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CARTON OPENING MECHANISM FOR PACKAGING MACHINES

Filed Aug. 31, 1923



UNITED STATES PATENT OFFICE.

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CARTON-OPENING MECHANISM FOR PACKAGING MACHINES.

Application filed August 31, 1923. Serial No. 660,436.

To all whom it may concern:

Be it known that I, JAMES MACNAUGHTAN, a citizen of the United States, residing at Brookline, in the county of Norfolk and State of Massachusetts, have invented new and useful Improvements in Carton-Opening Mechanism for Packaging Machines, of which the following is a specification.

This invention is embodied in certain improvements hereinafter described and claimed in the carton-opening mechanism of a packaging machine of the type disclosed by the Lane and Macnaughtan Patent, No. 1,439,966, dated December 26, 1922. The carton-opening mechanism of said patented machine is adapted to open a flattened carton which, when opened, is oblong in cross section, and is not adapted to open a carton which, when opened, is square in cross section and has four sides of equal width.

The said patented opening mechanism is embodied in vertically reciprocating primary and secondary blades adapted to enter and partially open a flattened carton, the blades being in the same plane, or edge to edge, when entering the carton, and means for turning the secondary blade within the carton to press said blade against one of the carton sides, and thereby completely open the carton, the secondary blade being much narrower than the primary blade.

In accordance with the present invention the secondary blade is of substantially the same width as the primary blade, and is located beside and in contact with the primary blade, so that the vertical edges of the blades substantially register with each other, the secondary blade having a wide bearing on one of the sides of a square carton when the carton is opened.

Of the accompanying drawings forming a part of this specification,—

Figure 1 is an edge view, showing a carton-opening mechanism embodying my improvement.

Figure 2 is a side view of the same.

Figure 2^a is an enlarged section on line 2^a—2^a of Figure 2.

Figure 3 is a fragmentary sectional view, showing the carton fully opened.

Figures 4 and 5 are perspective views, showing the primary and secondary blades.

Figures 6, 7 and 8 are fragmentary sectional views illustrating the opening operation.

The same reference characters indicate the same parts in all the figures.

12 represents the delivering end portion of a raceway adapted to guide a column of collapsed cartons, forced forward through the raceway. The foremost carton is arrested by detents 14 and 15 (Figure 6), the side walls of the raceway contacting with and guiding two opposite vertical edges of the collapsed carton.

The carton has four sides, *a*, *b*, *c* and *d* of equal width, so that when opened it is square in cross section. The body of the foremost carton is opened and left in the condition shown by Figure 8, by opening blades including a primary blade 16, and a secondary blade 17, arranged and operated as next described.

The blade 16 is attached as by rivets 18, to a carrier 19, which is vertically movable by a vertically reciprocated slide 20, the carrier and slide being connected by means such as an arm 21, on the carrier, a bracket 22 on the slide, and a screw 23 securing the arm to the bracket. The slide 20 is reciprocated on a fixed vertical guide 24, by mechanism including a connecting rod 24 (Figure 1), and power-operated means (not shown) for reciprocating the connecting rod.

The path of movement of the primary blade 16 is such that when the blade is moved downward from the position shown by Figure 1, its lower end, which is reduced to a thin edge by a beveled face 16^a, is inserted in the foremost flattened carton and partially opens the same. The secondary blade 17 is beside and in contact with the primary blade when the blades are raised, and its lower end is reduced to a thin edge by a beveled face 17^a, and is somewhat higher than the lower end of the primary

blade. The lower end of the secondary blade, therefore, enters the foremost carton immediately after the entrance of the primary blade and additionally opens the carton.

The carrier 19 is provided with spaced apart bearings 26, in which is journaled a vertical rock shaft 27, having an arm 28 (Figure 5) projecting from the rock shaft between the bearings 26, and provided with a trundle roll 28^a. The rock shaft moves vertically with the carrier. The secondary blade 17 is fixed as by rivets 29 to a lower arm 30 on the rock shaft. A torsion spring 31, engaged at one end with the rock shaft and at its opposite end with the carrier 19, presses the trundle roll 28^a against a fixed cam-shaped block 32, secured to a fixed standard 33. Said block has a vertical upper face 34 and an inclined winding lower face 35.

The arrangement is such that when the carrier 19 is raised, the trundle roll 28^a bears on the vertical face 34, and the secondary blade 17 is held in contact with the primary blade 16, until the two blades, in moving down, have entered the foremost carton. When the trundle roll reaches the inclined face 35, the spring 31 turns the rock shaft and causes the trundle roll to follow the inclined face, and the secondary blade to swing outward, until it is at a right angle with the primary blade, as shown by Figures 3 and 8, and fully opens the carton.

The rock shaft 27 constitutes the axis on which the secondary blade swings and is offset from the carrier 19 and from the primary blade, as shown by Figure 4, and by dotted lines in Figures 6, 7, and 8. The blades are of substantially equal width, and the vertical edges of the secondary blade register with those of the primary blade, when the blades are raised.

When the blades enter the carton, the primary blade bears on the side *a* from its junction with the side *c*, nearly to its junction with the side *d*, and the secondary blade bears on the side *d* from its junction with the side *b*, nearly to its junction with the side *a*. When the secondary blade swings outward and completes the opening of the carton, its outer edge is in the angle formed by the junction of the sides *b* and *d*, and the outer edge of the primary blade is in the angle formed by the junction of the sides *a* and *c*. The secondary blade in moving outward to the position shown by Figure 7, disengages the carton from the detent 15, and in completing its outward movement, disengages the carton from the stop 14, as shown by Figure 8.

To the primary blade 16 is fixed an angular ear 38, arranged to bear on the upper end of the carton side *b*, when the carton is opened, and push the carton downward

to flap-closing and carton-carrying means below the blades, as in the above-mentioned patent. The secondary blade 17 is provided with a notch or recess 39, through which said ear projects, said recess permitting the described movements of the secondary blade.

The raceway bottom is provided at one edge with a stop finger 40, projecting from its outer end and adapted to support one corner of a lower end flap *e* of the foremost flattened carton, as shown by Figure 2, and by dotted lines in Figure 1, and prevent the carton from being forced downward by the blades when they first enter the carton and are located side by side. When the carton is opened the flap *e* swings outward and leaves the stop finger 40, so that the finger does not obstruct the downward movement of the opened carton by the ear 38. To ensure the entrance of the secondary blade into the carton without catching on the upper edge of the end flap *f* at the upper end of the carton side *d*, I slightly recess the outer side of the primary blade to form a shoulder 41, on which the lower end of the secondary blade bears when in contact with the primary blade, as best shown by Figure 2^a, so that the face 17^a of the secondary blade is flush with the face 16^a of the primary blade.

It is to be understood that the structure shown by the drawing, but not referred to in the appended claims, is or may be substantially the same as in the above-mentioned patent, and that the mechanism hereinafter claimed is characterized chiefly by the fact that the secondary blade is superimposed on the primary blade when the blades are raised, so that the blades are adapted to open a carton which is square in cross section, and has sides of equal width, instead of a carton which is oblong in cross section, and has two sides of major width and two of minor width, as shown by the above-mentioned patent.

I claim:

1. A packaging machine having a carton raceway, means for releasably confining a flattened carton therein, reciprocating primary and secondary blades of substantially equal width, means confining the secondary blade superimposed upon and in contact with the primary blade, with the edges of said blades substantially registering with each other when the blades are retracted, and means for swinging the secondary blade from a position beside the primary blade to a position at right angles therewith when the blades are projected, the primary blade being formed to bear on one side, and the secondary blade on an adjoining side of a carton which is square in cross section.

2. A packaging machine substantially as specified by claim 1, the said primary blade having an ear adapted to depress an opened

carton, and the said secondary blade a notch which receives said ear when the blades are in contact with each other.

5 3. A packaging machine substantially as specified by claim 1, said raceway having a stop finger adapted to support a flattened carton against downward movement when said blades are entering the carton.

4. A packaging machine substantially as specified by claim 1, said primary blade hav- 10 ing a shoulder on which the lower end of said secondary blade bears when the blades are entering a flattened carton.

In testimony whereof I have affixed my signature.

JAMES MACNAUGHTAN.