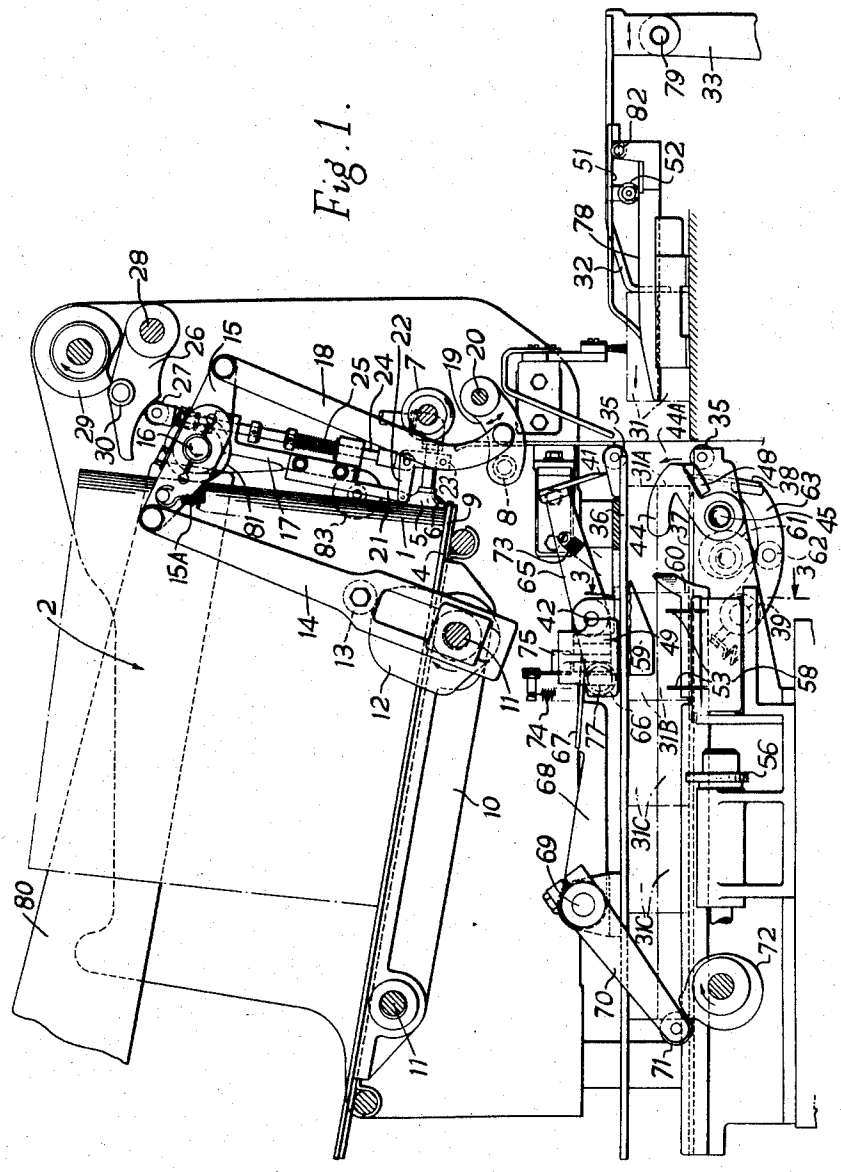
Dec. 22, 1959 D. R. P. JACKSON 2,918,279

APPARATUS FOR PACKING RECTANGULAR BLOCK-SHAPED ARTICLES IN CARTONS

Filed April 14, 1958 3 Sheets-Sheet 1

Fig. 1.



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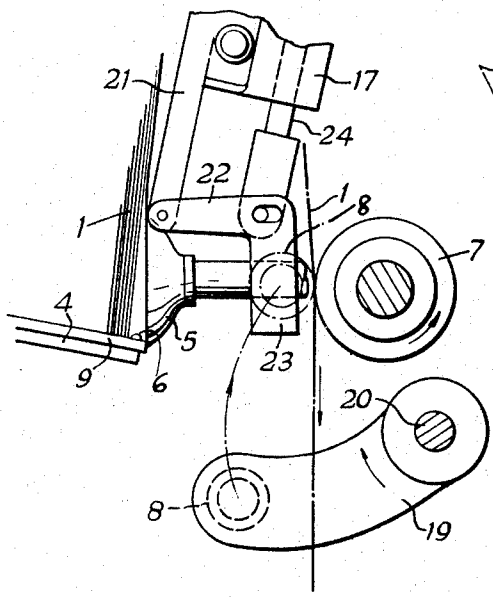
Watson, Cole, Grindle + Watson

ATTORNEY

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APPARATUS FOR PACKING RECTANGULAR BLOCK-SHAPED ARTICLES IN CARTONS

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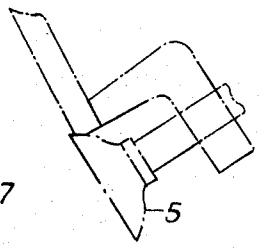
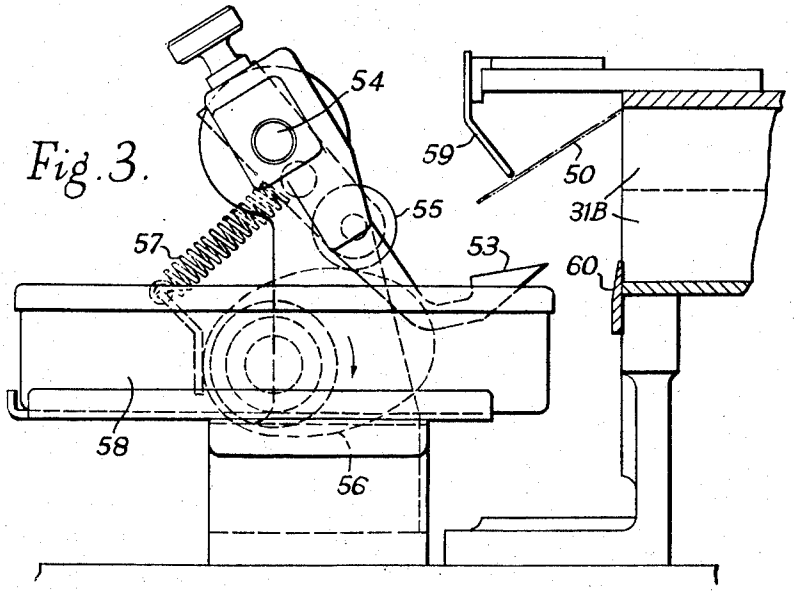


Fig. 2.

Fig. 3.



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Fig. 4.

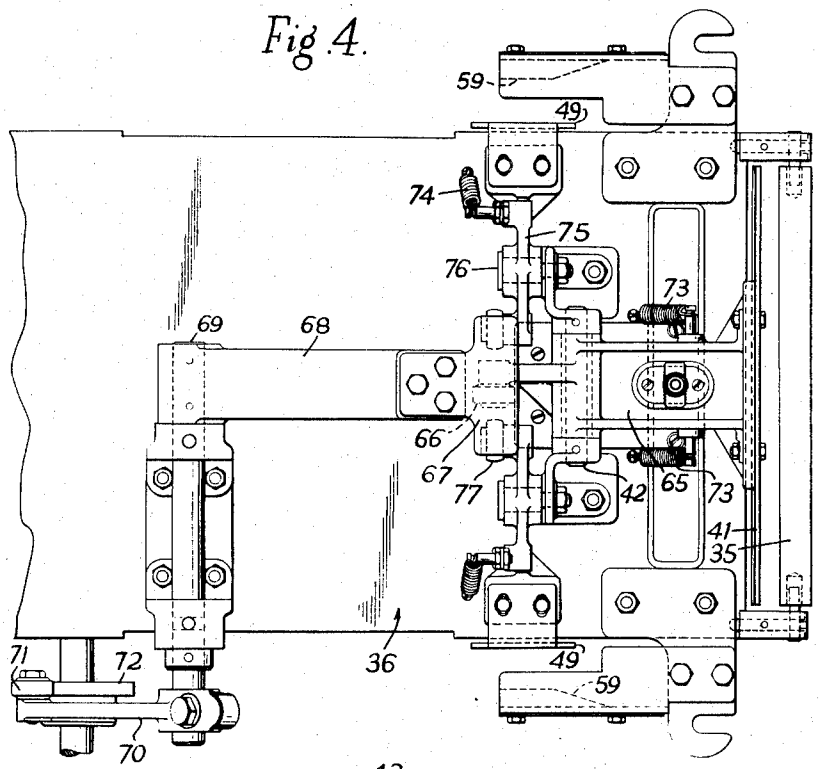
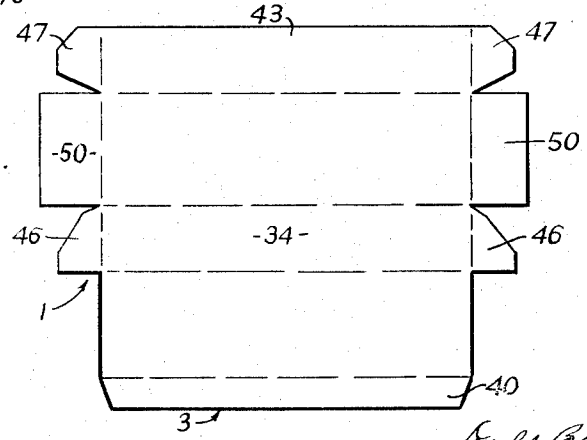


Fig. 5.



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United States Patent Office 2,918,279
Patented Dec. 22, 1959

2,918,279

APPARATUS FOR PACKING RECTANGULAR BLOCK-SHAPED ARTICLES IN CARTONS

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Application April 14, 1958, Serial No. 728,173

Claims priority, application Great Britain April 17, 1957

2 Claims. (Cl. 271—28)

This invention concerns improvements in apparatus for packing rectangular block-shaped articles in cartons and is primarily intended for packing numbers of cigarette packets in cartons, known in the trade as "outers." The packets in the example described later are stiff card packets of the kind known as the "hard box" type but the invention is not limited to the packing of these particular articles.

According to the invention there is provided apparatus for packing rectangular block-shaped articles in cartons comprising a magazine in which carton blanks are stacked on an edge and having a ledge which engages the leading blank near said edge, a sucker arranged to pull said blank to clear the edge and thereafter to swing the blank into contact with a feed roller, an oscillating roller movable into contact with said blank to co-operate with the feed roller and feed the blank downwards, folding devices for folding the carton blank around a group of packets and means for moving said group against the blank to fold the latter into a U about the group as the first stage of the folding operation.

The blank magazine may have a joggling device to cause the blanks to move freely towards the magazine outlet.

The invention will be more fully described with reference to the accompanying drawings in which:

Figure 1 is a sectional elevation of the apparatus, some parts being broken away or sectioned and some omitted for clarity.

Figure 2 is a fragment of Figure 1 with the parts in a different position;

Figure 3 is a section on line 3—3 Figure 1

Figure 4 is a plan of the tucking and folding devices shown in Figure 1

Figure 5 is a plan of an outer blank.

Referring to Figures 1, 2 and 5, blanks 1 are stacked in a magazine 2, each blank standing on the edge 3, Figure 5, with the inner surface of the blank, i.e. the surface which will ultimately be the interior surface of the outer, facing the outlet of the magazine. As will be seen from Figure 1 the blanks stand almost vertically, being supported by a pase plate 4 of the magazine and side guides 80 for controlling the sides of the blank. The upper part of the blank stack is supported by a roller 81 freely mounted on a shaft 16 referred to below. At the sides of the magazine are abutments 83 which engage the blanks near cut-out portions and past which the blanks need to be pulled during feeding.

A sucker 5 is arranged to engage the leading blank near to its lower edge and pull it to enable the edge 3 to move past a small ledge 6, whereafter the sucker swings outwards and upwards past a rotating feed roller 7 until it reaches the position shown in chain lines in Figure 2. The result of the sucker movement is to bring the front face of the blank into contact with the roller 7 whereupon a co-operating roller 8 moves into contact with the rear face of the blank and the latter is forthwith fed downwards in a vertical path.

In order to assist the necessary forward movement of the stack of blanks towards the feeding position and generally to loosen the blanks so that they feed easily, the bottom of the magazine is provided with a joggling device consisting of a pair of strip-like plates 9 supported on bearers 10 which are in turn supported by shafts 11 which are eccentrically mounted so that as they rotate they give the plates 9 a movement wherein any point on a plate moves through a circle corresponding to the eccentric throw. Thus the blanks are joggled up and down and urged forwards to the extent of this movement. The base plate 4 is slotted to permit the plates 9 to pass through it.

On the forward shaft 11 is a cam 12 which engages a follower 13 on a cam rod 14, the upper end of the rod being pivoted to a lever 15 which is pivoted on a shaft 16. The lever 15 is rocked by the action of the cam 12 in combination with that of a spring 15A. To the shaft 16 is attached another lever 17 which supports the sucker 5. The other end of the lever 15 is pivoted to a link 18 whose lower end is pivoted to a lever 19 which oscillates on a pivot 20. The free end of the lever 19 carries the co-operating feed roller 8.

The sucker motion briefly outlined above is obtained by the swinging movement due to the lever 17 in combination with movements derived from other mechanism now to be described. To the lever 17 is attached a bracket 21 to which is pivoted one arm 22 of a bellcrank lever to whose other arm 23 the sucker is fixed. At the bend of the bell-crank there is pivoted a rod 24 which is urged upwards by a spring 25 and downwards by a pivoted lever 26 which engages a roller 27 at the top of the rod 24. The lever 26 is pivoted at 28 and oscillated by a cam 29 which engages a follower 30 on the lever. The operative face of the lever 26 is curved as shown and may thus be regarded as a cam, the curvature permitting the lever to engage the roller 27 in the desired manner as the roller itself shares the swinging movement of the lever 17. In the beginning of the sucker action a rocking movement of the sucker is caused by the movement of the bellcrank lever 22—23. It causes the sucker to impart a fairly sharp bend to the bottom of the blank and thus enables air to pass in between said blank and the next which helps to ensure positive separation of the blanks. As the first blank is being removed from the magazine the joggling motion feeds the remaining blanks forward and the ledge 6 resists any tendency for the second blank to be pulled out by the suction on the first.

The blank is fed downwards in the manner indicated in Figure 2 across the path of a group of packets marked 31. As shown, the packets are superimposed in two rows and there are in the apparatus being described five packets to each row making ten packets in all. This is the usual number when packets each hold twenty cigarettes but, of course, the apparatus can be made to pack any number of packets in any reasonable number of rows.

A pusher 32 which is moved to and fro by a lever 33 pushes the group of packets against the blank, the leading face of the group contacting the panel 34, Figure 5, of the blank. The blank is thus bent into U form as it moves between a pair of rollers 35 and then between top and bottom plates 36 and 37 of the blank folding apparatus. During this movement the small flaps 46, Figure 5, are folded into contact with the end faces of the group but the method will be described later. As soon as the group has reached the position where the group is marked 31A an oscillating tucker 38 pivoted at 39 moves up and folds the flap 40, Figure 5, of the blank so that it lies in contact with the rear face of the group. Immediately afterwards a top tucker 41 pivoted at 42 moves down and folds the larger flap 43, Figure 5, so that it overlies the flap 40. In this particular example these flaps are

not sealed together though, of course, they could be by applying adhesive to either flap in any usual manner. However it has been found more expedient to seal the flaps in a separate machine.

While the top tucker is still holding the flap **43**, in folded position, that is, overlying the flap **40** a pair of folders, one of which is shown at **44**, and fixed on a shaft **45**, have moved in the direction of the arrow **44A** to the position shown in Figure 1 and have bent the small flaps **47**, Figure 5, so that each flap moves into contact with an end face of the group.

The folders **44** rotate with the shaft **45**. The motion is so timed that after they have performed the folding of the flaps **47** the edges **48** of the folders are in such position (i.e. substantially vertical) that as the next blank is fed and folded to the U form its flaps **46** are folded as they contact the edges **48**. The flaps **46** of the blank just described have, of course already been folded in this manner.

As the partly finished carton in engagement with the tuckers **38** and **41** is moved further to the left by the succeeding carton to the position where the packets are marked **31B**, the cover flaps **50**, Figure 5, encounter fixed folders **59** which bend the flaps to the position shown in Figure 3 and then adhesive is applied to the lower face of the flaps. Adhesive is applied by an oscillating foot **53** which is pivoted at **54** and has a roller **55** which engages a cam **56**. A spring **57** pulls the lever to hold the roller **55** against the cam and the combined effects of cam and spring cause the foot **53** to move into a gum pot **58** and then out and up into contact with the inner face of flap **50**. Then folder plates **49** are moved down to complete the folding of the flaps **50** and these fix the flaps **46** and **47** in position by adhering to them. Side plates mounted below the folders **60** prevent the folded flaps **46** and **47** from moving from their folded position during the carton movement from the position marked **31A** to the position marked **31B** beneath the folder plates **49**. The various moveable tuckers and folders are operated by the devices about to be described with reference also to Figure 4.

The tucker **38** is operated by a cam **61** engaging a roller **62** mounted on the tucker arms **63**, a spring **64** urging the roller **62** against the cam.

The tucker **41** is carried on an arm **65** and has a roller **66** at the end remote from the tucker. A plate **67** on an arm **68** pivoted at **69** presses on the roller **66** when the arm **68** is appropriately moved on its pivot **69** by a cam lever **70** having a roller **71** which engages a cam **72**. Springs **73** urge the tucker **41** downwards for the tucking operation.

The folder plates **49** are also operated by the plate **67** in conjunction with springs **74**. As seen in Figure 4 the plates **49** are fixed to levers **75** pivoted at **76** and having rollers **77** at the end remote from the plates. The rollers are pressed by the plate **67** in the same manner as roller **66**.

The pusher **32** is guided in its forward movement by a guide **78** over which rides a roller **52** attached to the pusher. The downward dip of the guide permits the pusher to pass between the rollers **35** and carry the group to the position **31A**. On the return movement the pusher roller **52** runs over a trap cam **51** to cause the pusher to be raised by movement about a pivot **79** to permit a new group to be fed into position in front of the folding devices. On the forward stroke the roller **52** runs beneath the trap cam which then swings on its pivot **82** in the usual way.

What I claim as my invention and desire to secure by Letters Patent is:

1. A carton blank feeding device comprising a magazine in which the blanks are stacked on an edge, a sucker adapted to engage a blank near said edge and movable to bend the blank outward from the magazine, feed rollers arranged to engage the bent blank and remove it from the magazine, and mechanism for supporting and operating the sucker comprising a first lever, a cam for oscillating said first lever on its pivot, a second lever pivoted to said first lever and to which the sucker is attached, a cam rod pivotally connected to the second lever and slidable in the first lever to rock the second lever on its pivot, a cam and spring for reciprocating said cam rod, and a pivoted cam follower interposed between said cam rod and its operating cam, the pivoted cam follower having a contoured surface engaging the cam rod whereby the sucker motion is determined by the combination of the oscillation of the first said lever and the reciprocatory movement of the cam rod, the nature of the last said movement being determined by the shape of the cam which operates the cam rod and the shape of the contoured follower which engages the cam rod as the latter swings with the first said lever.

2. A carton blank feeding device as claimed in claim 1 wherein the feed rollers comprise a roller rotating on a fixed axis and an oscillating roller movable into and out of contact with the first said roller, whereby the sucker may bend the blank into contact with the first said roller whereafter the oscillating roller may move into contact with the blank.

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