United States Patent

Hammerle

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[54] APPARATUS FOR REMOVAL FROM A PILE OF THE LOWERMOST CARDBOARD BLANK

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[51] **Int. Cl.** **B65g 59/06**

[58] **Field of Search** ..... 214/8.5 A, 8.5 K; 221/221

[56] **References Cited**

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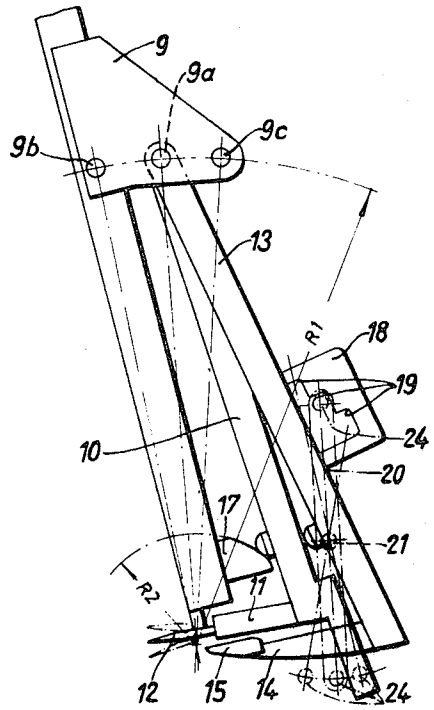
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[57] **ABSTRACT**

An apparatus for removal from a pile of cardboard blanks the lowermost of the blanks, which comprises two separating members supporting and releasing forwardly the lower edge of the pile of cardboard blanks and thereby gripping the blank next to the lowermost of the blanks. A slide removes the blank released from the blank column out of the pile. The separating members comprise an engaging ledge supporting the blank column and a row of needles fixing by piercing the blank column next to the lowermost of the blanks at the end face, both of the separating members are suspended by means of angle members on different carrying rods with the same pivot point and swing in and out alternately by means of a common driving means.

3 Claims, 4 Drawing Figures



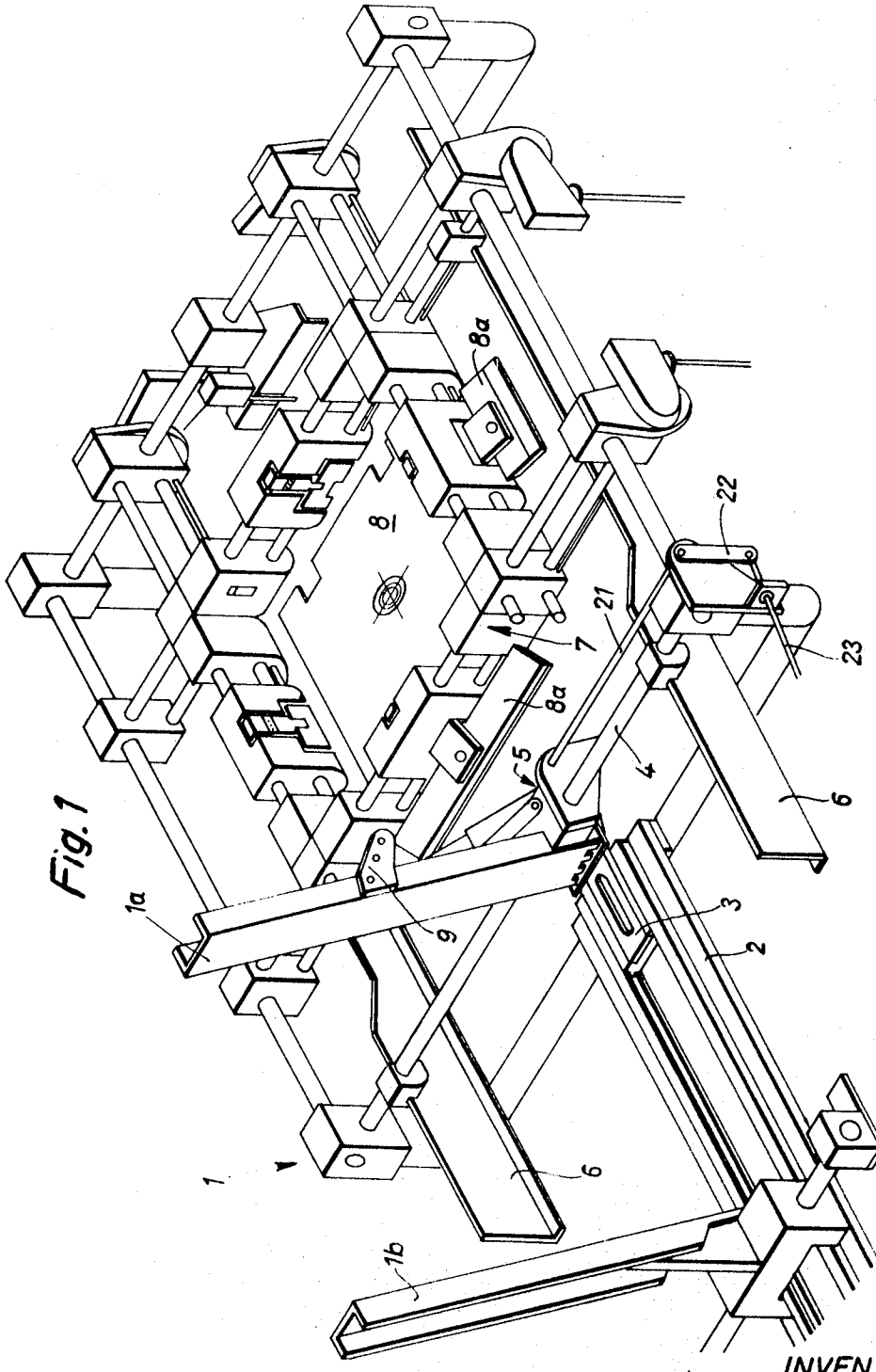


Fig. 1

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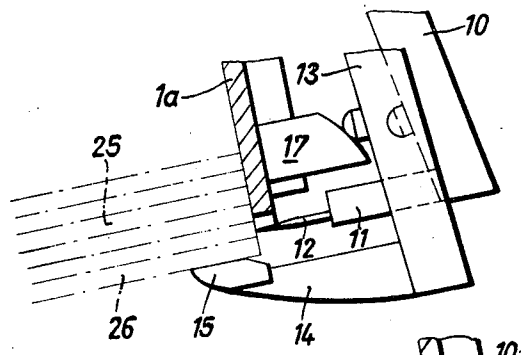


Fig. 2

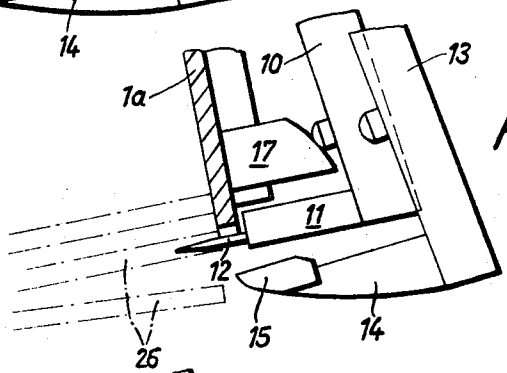


Fig. 3

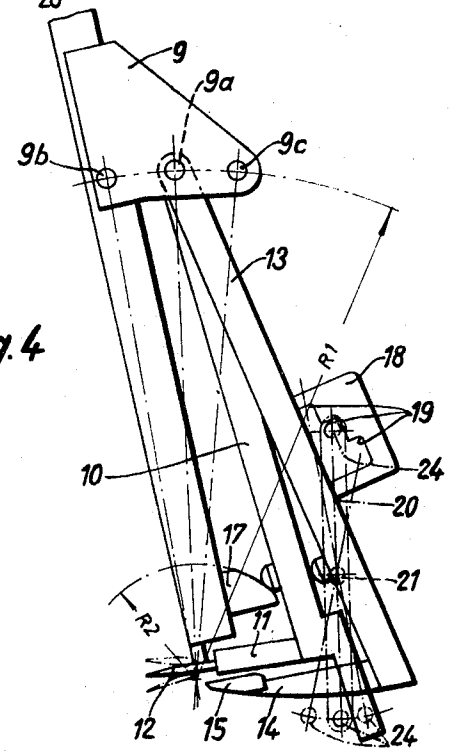


Fig. 4

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APPARATUS FOR REMOVAL FROM A PILE OF THE LOWERMOST CARDBOARD BLANK

The present invention relates to an apparatus for removal from a pile of the lowermost of a plurality of superposed cardboard blanks, comprising two separating members which support and release alternately in the front the pile lower edge in the blank-feeding direction and thereby securing temporarily the second of the lowermost blanks.

The removal of the lowermost blank from a pile has always the presumption that from the moment of the separation to the complete removal of the blank, the latter is to a great extent released from the weight of the pile. For this purpose it is known to arrange more or less obliquely in case of a horizontal removal from a pile itself, so that the lowermost blank is freed in feeding direction and turned into the horizontal position, when the next following pile lower edge is secured and can be then removed by means of a slide.

The separation of the lowermost blanks from the remaining blank column is preformed mostly by knives which ride in between the lowermost and the second lowermost blank and simultaneously support the blank column. The separating knives can perform their task only completely, when the blanks are produced of stiff cardboard material of equal wall thickness.

The separation output of such removal devices equipped with a separating knife is of necessity low, since they have to be inserted deeply, in order to be capable of carrying, by increasing fortification of the cross section. The long knife stroke exercises thereby a decisive influence on the output. On the other hand, just the length of the knife brings about disadvantages, which are less directed to the exact separation, rather to the characteristics of the cardboard blank itself.

Depending upon the manufacturing process or a predetermined surface treatment in cardboard blanks, the inclination to an inner tension exists, which makes itself recognized by more or less visible deviations from the plane face. If now the separating knife penetrates between the joints of such concave or convex cardboard blanks resting in the pile, the danger exists that with the length of the separating knife the blanks are damaged or even rendered unusable.

It is one object of the present invention, to provide an apparatus for removal from a pile of the lowermost cardboard blank, wherein the separating members comprise a carrying-ledge supporting the blank column and a needle-ledge gripping the next to the lowermost blank at the end face, both of which, namely the carrying-ledge and the needle-ledge, are suspended by the same rotary point at different carrying rods and which are alternately swingable in and out by means of a joint driving member.

The separating members, which consist of a carrying- and needle-ledge, are equipped to perform a possibly short stroke. In spite of the comparatively short needle length which cannot lead to a visible damage of the cardboard blank already for a reason, since the needles penetrate neither from below in upward direction nor from above in lower direction, rather exclusively from the end face into the cardboard, the carrying capacity of the needle-ledge is dimensioned such that it is capable of carrying a high blank column.

As a driving member for both carrying rods is provided a sweep swingable about a constant rotary point, rollers of the sweep projecting laterally on both sides of the rotary point are in operative connection with the carrying rods. Thus merely a minimum amplitude of the sweep is required, thereby both rods and thus the carrying- and needle-ledges secured thereto can start the operation.

A further advantage obtained by the present invention resides in the fact, that the needle-ledge can adjust itself to the particular conditions given by the position of the blank column in the pile. Without the invention, when the blanks rest slightly curved downwardly or upwardly in the pile, the needle-ledge, adjusted exactly to the even plane of the blanks, would grip during insertion into the blank not only the latter, but also the adjacent blank, so that a non-objectionable separation is no more assured.

In accordance with the present invention, the needle-ledge can be set obliquely upwardly or downwardly, so that the needles can adjust themselves always to the blank direction.

All these variations can be performed within the apparatus itself, that means the driving members, as the sweep with the rollers affecting the carrying rods remain untouched therefrom.

With these and other objects in view, which will become apparent in the following detailed description, the present invention will be clearly understood in connection with the accompanying drawings, in which:

FIG. 1 is a perspective view of an apparatus for a pile removal with following cardboard upright device;

FIGS. 2 and 3 are elevations to indicate the separation of the lowermost blank in several phases; and

FIG. 4 is a side elevation of the separating device.

Referring now to the drawing, the pile 1 is formed by a forward and rearward pile beam 1*a* and 1*b*, of which the rearward beam 1*b* is displaceably and securably provided in adjustment to the prevailing size of the blanks 26 on a base plate 2. The base plate 2 is equipped in longitudinal direction with a slide guide for the reception of a slide 3, which is controlled for movement by suitable means (not shown). Following the separating device 5 sitting on a carrying rod 4 with the pile beam 1*a*, the blank 26 is moved between lateral guide sheets 6 below a folding shaft 7, whereby it is pushed by a ram 8 movable from below in upward direction through the folding shaft 7. In addition to the turned over wall parts by particular folding members 8*a*, which are folded over on two oppositely disposed turning ledges or on such turning ledges arranged on four sides, whereby the wall parts are connected together. The furnished cardboard serves as a coop for reception of fruit or of dairy products filled in cup-shaped containers. As cardboard material preferably a stiff corrugated board is used.

At half the height of the forward pile beam 1*a* on both sides thereof are provided two cantilever-like carrying ledges 9 with a median and two outer rotary points 9*a*, 9*b*, and 9*c*. The two carrying rods 10 and 13 are suspended on a joint axis about one of these three rotary points, of which the carrying rod 10 carries at its forward end, by means of an angular member 11, a row of needles 12 and the carrying rod 13 likewise by means of an angular member 14, an engaging ledge 15. As is recognized from FIG. 2, the vertical distance between the row of needles 12 and the upper edge of the engaging ledge 15 is about one and one-half times of a cardboard thickness of the blank 26.

The length of the carrying rods 10 and 13 and the circular-shaped arrangement of the rotary points 9*a*, 9*b* and 9*c* on the carrying ledge 9, makes it possible that independently from the fact, on which rotary point the carrying rods 10 and 13 are suspended, the needle row 12 has always the same penetration point 16. The center point of the circular arc disposed between the row of needles 12 and the engaging ledge 15 indicates by the radius R_1, that this applies not only for the row of needles 12, but exactly also for the engaging ledge 15.

Above the penetration points 16 sits on the pile beam 1 *a* curved member 17, the surface of which, describing a circular arc having the radius R_2, serves for both carrying rods 10 and 13 as left limit.

On the back of the carrying rod 13 is provided a gauge 18 with three resting positions 19.

Between the two carrying rods 10 and 13 sits as actual driving member a sweep 20, on the rotary point of which disposed in about the center a rotary axis 21 engages, which is outwardly mounted and which is connected by means of a swinging ledge 22 with a bendable pressure- and pull-rod 23 (FIG. 1). At their free ends, the sweep 20 is equipped with a laterally projecting roller 24, of which the upper roller engages one of the resting positions 19 of the carrying rod 13 and the lower roller 24 engages the carrying rod 10. By alternate operation of the sweep 20 successively the carrying rod 10 and then again the carrying rod 13 is moved forwardly, so that either the engaging rod 15 supports the blank column 25 and the row of needles 12 is withdrawn (FIG. 2) or, the row of needles 12

penetrate into the now next to the lowermost blank **26** and the engaging ledge **12** is removed, in order to permit freedom in downward direction for the lowermost blank **26** (FIG. 3). The lower edge of the angular member **14** is designed such, that after the freeing of the lowermost blank **26**, this lower edge is applied for the blank **26**, transforming the blank **26** from the slide **3** in the direction towards the folding shaft.

It is as a matter of course recognized, that the blank column **25** can not be left to itself. Thus the row of needles **12** is removed only then from the blank **26**, after the engaging ledge **15** has reached already the position for support below the blank column **25**.

The lower edge of the pile beam **1a** is equipped with a plurality of recesses for reception of the row of needles **12**. If now instead of even planed blanks **26** such as are employed, which are moved from one pile beam to another and are bent either downwardly or upwardly, then the row of needles **12** can be set in an oblique direction upwardly or downwardly by suspension of the carrying ledge **10** and **13** on the rotary point **9*b*** or **9*c*** and by variation of the resting position for the upper roller **24**. By this arrangement, it is assured that the row of needles **12** grips only one blank **26**.

While I have disclosed several embodiments of the present invention, it is to be understood that these embodiments are given by example only and not in a limiting sense.

I claim:

1. An apparatus for removal from a pile of cardboard blanks the lowermost of the blanks, comprising

two separating members supporting and releasing forwardly the lower edge of the pile of cardboard blanks and thereby gripping the blank next to the lowermost of said blanks,

a slide removing said blank released from the blank column out of said pile,

said separating members comprising an engaging ledge supporting said blank column and a row of needles fixing by piercing said blank column next to the lowermost of said blanks at the end face,

both of said separating members being suspended by means of angle members on different carrying rods with the same pivot point and swing in and out alternately by means of a common driving means,

a front pile beam,

a carrying ledge being secured to said front pile beam, and having a plurality of rotary points, and wherein

said carrying rods being pivoted selectively on one of said rotary points, and

said rotary points being disposed on a circular line having a radius such that the center point being arranged vertically below the penetration point of said needles and above said engaging ledge.

2. The apparatus, as set forth in claim **1**, which includes

a curve member secured above said penetration point on said pile beam,

the surface of said curve member is disposed on a circular line having a second radius and serves as a stroke limit for both of said carrying rods.

3. The apparatus, as set forth in claim **1**, which includes

a plurality of resting places on at least one of said carrying rods corresponding in numbers with that of said rotary points.

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