Oct. 28, 1952 A. PELIKAN 2,615,376

DEVICE FOR AUTOMATICALLY REMOVING WINDOW CUTOUTS FROM BLANKS

Filed June 9, 1949 2 SHEETS—SHEET 1

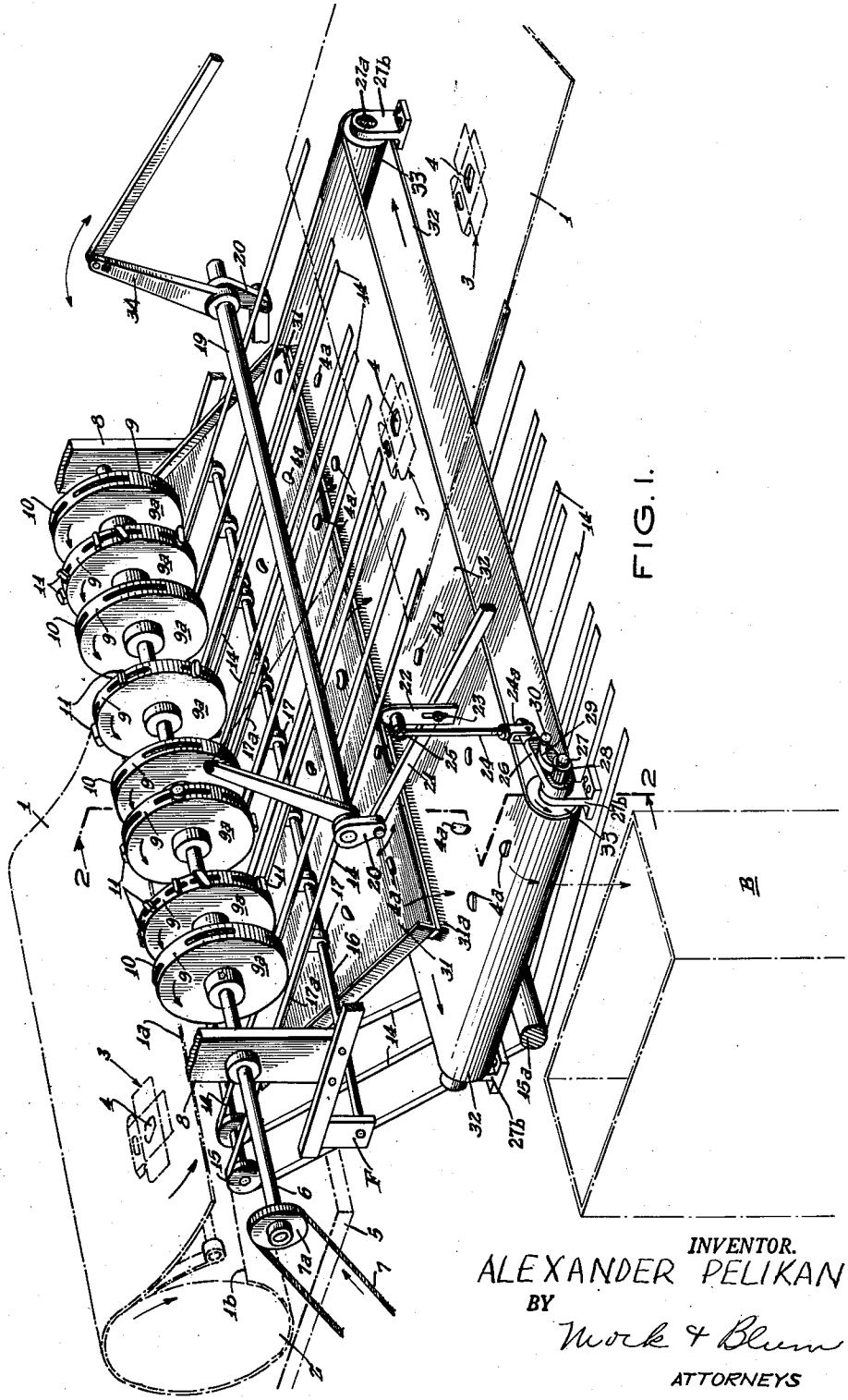

FIG. 1.

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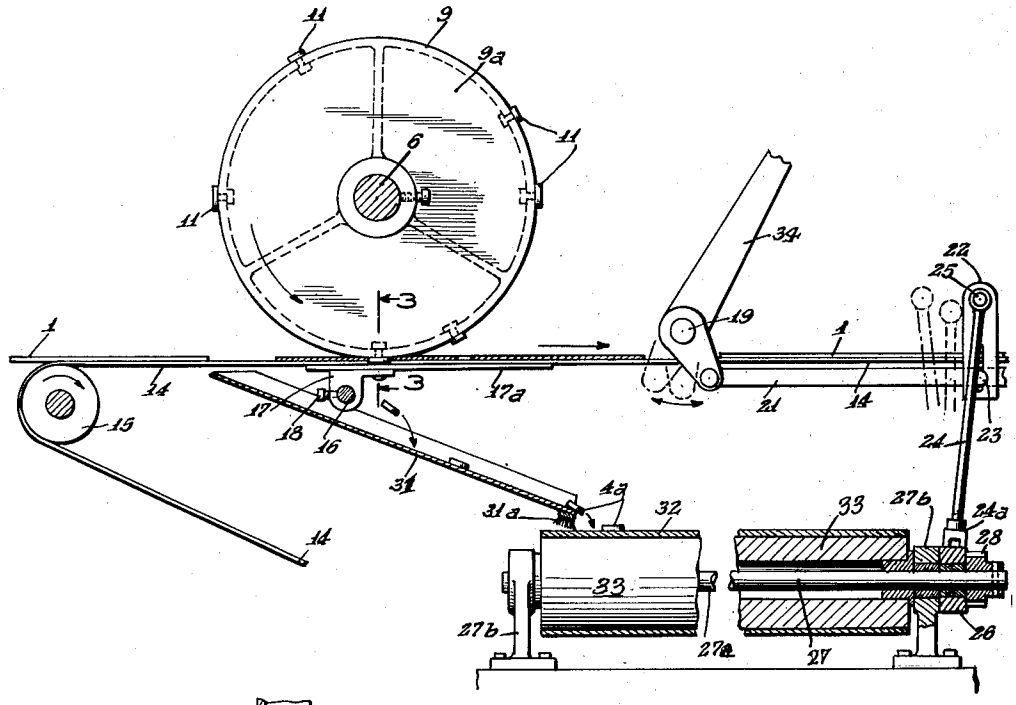

FIG. 2.

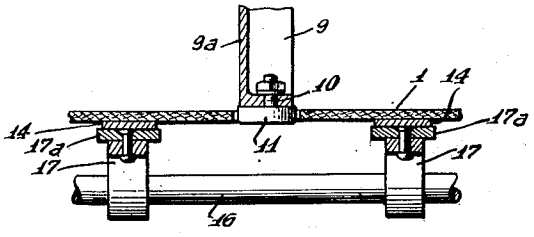

FIG. 3.

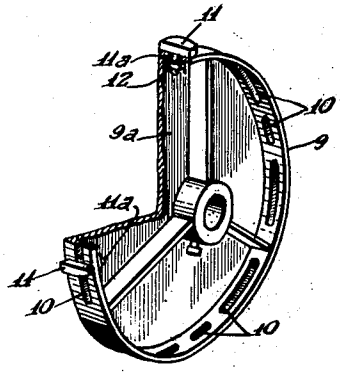

FIG. 4.

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DEVICE FOR AUTOMATICALLY REMOVING WINDOW CUTOUTS FROM BLANKS

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2 Claims. (Cl. 93—36)

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This invention relates to a device for automatically removing window cut-outs and the like from blanks formed in a sheet of material.

In making cardboard boxes it is common practice to deliver large sheets of cardboard, one by one, to a series of parallel feed tapes which are spaced laterally from each other. These feed tapes deliver each sheet of cardboard to a cylinder which is provided with gripping means for engaging the front or forward edge of the sheet. A die is disposed below the cylinder and is provided with a series of blades which slit and score each sheet, thereby providing a plurality of box blanks interconnected by waste areas. Each sheet is fed through an arc of 360° by the cylinder and the cut and scored sheet of cardboard is delivered to an auxiliary set of delivery tapes which are also spaced laterally from each other.

It is frequently necessary to provide one or more walls of the cardboard box with cut-outs in order to provide window openings. Heretofore, it has been the practice to remove the pieces of cardboard corresponding to the cut-outs by means of manually operated hammers or in a punch press. By either of these methods, it has been possible to strip a pile of superposed sheets.

Several attempts have been made to eliminate the expense of the stripping operation. For example, it has been attempted to remove the pieces of cardboard which correspond to the window cut-outs by means of air pressure.

It has also been attempted to use air pressure in the cutting and greasing press, together with stripping rods which remove the pieces of cardboard after they have been forced downwardly by means of air pressure. Neither of these attempts has proven practicable on a large scale commercial basis.

Accordingly, it is a primary object of the present invention to provide simple and efficient means for automatically stripping the cut-out areas of blanked sheets as the sheets are individually and successively fed from the die-cutting means in a continuous operation.

Another object of the invention is the provision of a stripping device of the character indicated which may be readily attached to standard types of machines for cutting and scoring sheets of material without substantial modification thereof.

According to the proposed idea, a series of wheels or drums may be disposed above the main sheet revolving cylinder of the machine, either directly above or, alternatively, above and forwardly of the cylinder. Each of these drums is

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provided with one or more radially extending projections or segments which correspond in contour to a respective cut-out formed in the blank and which serve to remove a piece of cardboard as the sheet is fed beneath the drums. The projections or segments may be made from sponge rubber or other yieldable, resilient material. Depending upon the particular design of the box in a given case, there may be one or more drums for each box blank. Below the drums, a rigid support is provided for the feeding tapes in order to provide an abutment for the pressure of the drum projections. The pieces of cardboard are forced out between the laterally spaced tapes and are collected upon a pan or chute which is disposed above the die-cutting means. Further protection for the die-cutting means is preferably provided in the form of an endless belt which discharges the waste pieces outside the machine.

The foregoing objects as well as additional objects and advantages of the invention will be readily apparent in the course of the following detailed description taken in connection with the accompanying drawings which illustrate a preferred embodiment of the invention, and wherein:

Fig. 1 is a perspective view of a device incorporating the features of the invention;

Fig. 2 is a sectional view taken on line 2—2 of Fig. 1;

Fig. 3 is a sectional detail view taken on line 3—3 of Fig. 2; and

Fig. 4 is a perspective view, partly broken away, of one of the drums illustrating the manner of mounting the radially extending stripping projections or knock-out heads thereupon.

Referring now to the drawings in greater detail, Fig. 1 illustrates a sheet 1 of the material which is employed for making the boxes, the sheet being of predetermined length and width. The sheets are picked up individually from a table (not shown). The sheet has a forward edge 1*a* and a rear edge 1*b*. The roll 2 is intermittently actuated in the conventional manner. Also, by suitable conventional means, each sheet 1 is applied to the roll 2 which feeds the sheet in the direction shown by the arrow. A plate 5 is moved up and down in intermittent strokes in synchronization with the intermittently actuated roll 2. Plate 5 is provided with the usual dies, which are not illustrated in the drawings, which cut and score the sheets 1 in order to form the box blanks 3, as shown in Fig. 1. The box blank has a portion 4 which must be removed in order to form the window cut-out.

Fig. 1 shows a shaft 6 which may be driven by

any suitable means, such as the belt 7 and pulley 7a, from the main drive of the machine. Shaft 6 is provided with bearings supported in bearing plates 8 which are fixed to the frame F of the machine. A plurality of drums 9 are fixed to shaft 6. Each drum makes one revolution for each revolution of the roll 2. As best shown in Fig. 4, each drum 9 is in the form of a disc-plate 9a carrying a laterally extending annular flange at the periphery of the plate, thus producing the effect of a disc supported ring.

Each drum 9 is further provided with a series of peripheral slots 10. The radially extending knock-out heads or projections 11 are provided with shanks 11a which may be adjustably secured in selected slots 10 by suitable clamping means, such as nuts 12, for which purpose shanks 11a are externally threaded. After the sheet 1 of material has been acted upon by the die-cutting means to form the blanks 3 therein, the sheet is fed between the drums 9 and the conveyor tapes 14. Said conveyor tapes are of the usual type. Said conveyor tapes are endless and are supported on pulleys 15, roller 15a and additional pulleys (not shown) which are provided at the front of the machine. As the sheet passes between the drums 9 and the conveyor tapes 14, the knock-out heads 11 strike the window portions 4a and eject said window portions from the blank 3. The window portions 4a fall between the spaced parallel tapes 14.

As indicated in Fig. 3, the knock-out heads 11 are unopposed by any die formation positioned under the sheet for cooperation with the heads in removing the cut-outs, thus differing from the usual practice. In the present structure, the sheet is unsupported directly below and in vertical alinement with the head, the support being provided by the adjacent tapes with their underlying extension plates 17a.

Means are provided for supporting the sheet 1 at each side of the knock-out head 11 in order to assure positive separation or stripping of the portions 4a from the blanks 3 as the sheet passes between the drums 9 and the conveyor tapes 14. As best shown in Figs. 1 and 3, the frame F of the machine is provided with a stationary support or rod 16, which is provided with lugs 17 adjustably mounted on said rod. Each conveyor tape 14 passes slidably over a respective lug 17. Each lug is preferably provided with a tapped bore and a clamping screw 18 for adjusting purposes, as shown in Fig. 2. Each lug 17 is also preferably provided with an extension plate 17a (see Fig. 2) along which each tape 14 slides below the respective drum 9. It will be readily understood upon referring to Fig. 3 that the knock-out heads cooperate with the sheet 1 to remove the window portions 4 and eject them between adjacent conveyor tapes 14 while said sheet is rigidly supported at each side of the knock-out head 11 by means of the supporting plate extensions 17a.

Fig. 1 shows a rocker shaft 19 which is oscillated from the main drive of the mechanism. For this purpose arms 20 are fixed to shaft 19. One of said arms is pivoted to a link 21. A plate 22 is adjustably fixed to link 21 by means of a clamping screw 23 whose shank extends through a slot in said plate. The plate 22 therefore has a slight back and forth movement due to the oscillation of link 21. A link 24 is pivotally connected at 25 to a fixed stud carried by plate 22. The plate 22 is also given a slight up and down movement in addition to its back and forth movement due to the oscillation of shaft 19 this vertical movement being imparted to link 24, which link has a forked end 24a, to cause oscillation of the arm 26. The arm is freely pivotally mounted on the shaft 27. A pawl 29 is pivotally connected at 30 to arm 26 and successively engages the teeth of a ratchet wheel 28 fixed to shaft 27. By reason of the described arrangement the rocking movement of the arm 26 is accompanied by intermittent rotation of the shaft 27.

Fig. 1 illustrates the cut-outs 4a which correspond to the window openings 4. These cut-outs 4a which are punched or stripped from the blanks 3 of sheet 1 fall onto and slide down an inclined chute 31 and onto an endless belt 32 which is mounted on a pulley 33 of shaft 27 and also on a companion pulley 33 of a companion shaft 27a. Shafts 27 and 27a are mounted in suitable bearings 27b. The waste material comprising cut-outs 4a is thus carried to the waste receptacle B and the completed blanks with their window openings 4 are carried to the front of the machine, as shown clearly in Fig. 1. The bottom of chute 31 is preferably provided with a brush 31a whose bristles bear lightly against the top run of the belt 32. The arms 34 operate the conventional conveyor mechanism in the well-known manner for carrying the finished blanks forwardly to a receiving station (not shown).

By reason of the described arrangement, it is apparent that the waste areas or window cut-outs 4a may be easily removed from the blanks 3 formed in the sheet 1 during the passage of each sheet from the roll 2 to the front of the machine. The operation may be carried out smoothly and automatically and eliminates the cost and inconvenience of a separate stripping process such as has been necessary heretofore in conventional practice. Moreover, the device of the present invention is constructed and arranged in such a manner that it may be readily attached to standard machines which cut and score sheets without substantial modification thereof.

While I have described a preferred embodiment of my invention, it will be understood that numerous changes, omissions and additions may be made without departing from its scope.

I claim:

1. Means for removing window areas from blanks wherein the outlines of the window areas had been previously scored, said means comprising at least a pair of conveyor tapes for the blanks and at least one drum member, said drum member being rotatively supported and positioned above and intermediate the pair of tapes, said tapes being widely laterally spaced from the drum, said drum being above the path of travel of a succession of window areas, window knock-out elements carried by and projecting radially outward from the periphery of said drum member, said knock-out elements being positioned to engage the window areas and force the same downwardly out of the blanks, and narrow supporting members abutting the lower surface of each of the tapes in the region beneath the axis of the drum and substantially of the width of the tapes, each supporting member lying to the side of the path of travel of said knock-out elements, the window areas being removed solely by the action of the knock-out elements and the resistance to downward displacement of the blanks afforded by the tapes and their underlying supporting members.

2. Means for removing window areas from blanks wherein the outlines of the window areas had been previously scored, said means comprising at least a pair of conveyor tapes for the blanks

and at least one drum member, said drum member being rotatively supported and positioned above and intermediate the pair of tapes, said tapes being widely laterally spaced from the drum, said drum being above the path of travel of a succession of window areas, window knock-out elements carried by and projecting radially outward from the periphery of said drum member, said knock-out elements being positioned to engage the window areas and force the same downwardly out of the blanks, and narrow supporting members abutting the lower surface of each of the tapes in the region beneath the axis of the drum and substantially of the width of the tapes, each supporing member lying to the side of the path of travel of said knock-out elements, and an inclined plate extending beneath the tapes and receiving the cut-outs from the blanks.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
704,472	Dear	July 8, 1902
948,710	Staude	Feb. 8, 1910
1,191,297	Gardner	July 18, 1916
1,742,335	Willsea	Jan. 7, 1930
1,956,228	Sidebotham	Apr. 24, 1934
1,958,694	Chandler	May 15, 1934
1,987,224	Bergstein	Jan. 8, 1935
2,047,472	Hotchkiss	July 14, 1936
2,367,609	Prins	Jan. 16, 1945
2,508,083	Winkler	May 16, 1950