

[54] STRIPPING MACHINE

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[*] Notice: The portion of the term of this patent subsequent to June 20, 1989, has been disclaimed.

[22] Filed: July 2, 1971

[21] Appl. No.: 159,439

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 882,680, Dec. 5, 1969, Pat. No. 3,670,939.

[52] U.S. Cl..... 225/94, 93/36 A, 225/96, 225/99

[51] Int. Cl..... B26d 7/18

[58] Field of Search 225/99, 100, 94, 96, 96.5, 225/2; 93/58 R, 58 ST, 36 A; 271/DIG. 7

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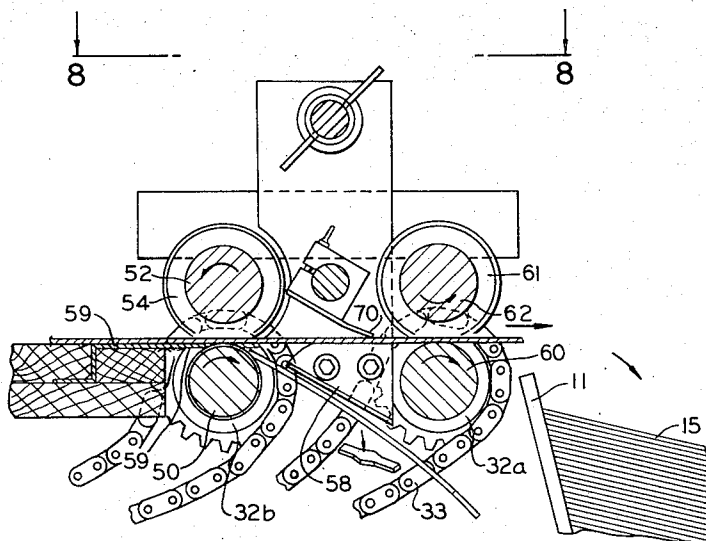
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[57] **ABSTRACT**

Disclosed is a machine for separating cards from the scrap of paperboard sheets from which they have been die cut except for small integral connecting tangs. The cards may include one or more interior cutouts for hanging the merchandise holding cards on display racks.

The machine of the invention includes a base having one side higher than its opposite side and spaced, driven parallel transverse feed shafts journaled in bearings mounted on the opposite sides. The feed shafts rotate in a single direction toward two pairs of shafts mounted on the end of the frame. The first pair of shafts has opposing rotating surfaces which engage the scrap areas of the sheets to drive the sheets forward. The second pair of opposing rotating surfaces receives the cards only and propels them forward to a bin into which they are stacked for ultimate removal from the machine. As the cards pass through the two pairs of rotating surfaces, a downwardly biased spring member is dragged over them to separate any internal cutouts from the cards. To separate the cards from the scrap a card support is provided intermediate the first pair of opposing rotating surfaces or, alternatively, the sheets may be driven by the first pair of opposing rotating surfaces against a card and scrap separating tool which also serves to support the card until it reaches the second pair of opposing rotating surfaces. The card support and the separating tool may be used together. The scrap from the sheet falls down to a collection area below the rotating members. The feed rolls have floating spheres which act as hold-down means to provide more positive forward drive to the cut sheets as they enter the first pair of vertically disposed rotating surfaces. The apparatus is designed to be automatically fed by means of a belt-type transfer conveyor which receives the die cut paperboard sheets from the die cutting machine. The entire system may be automated by conventional elevator and feeder means for providing printed paperboard to the cutter die. In the alternative, the separator machine may be hand fed. The tools and support members, if used, rotating surfaces and spring members may be adjusted for different shapes, numbers and dimensions of card, scrap and interior cutouts.

2 Claims, 11 Drawing Figures



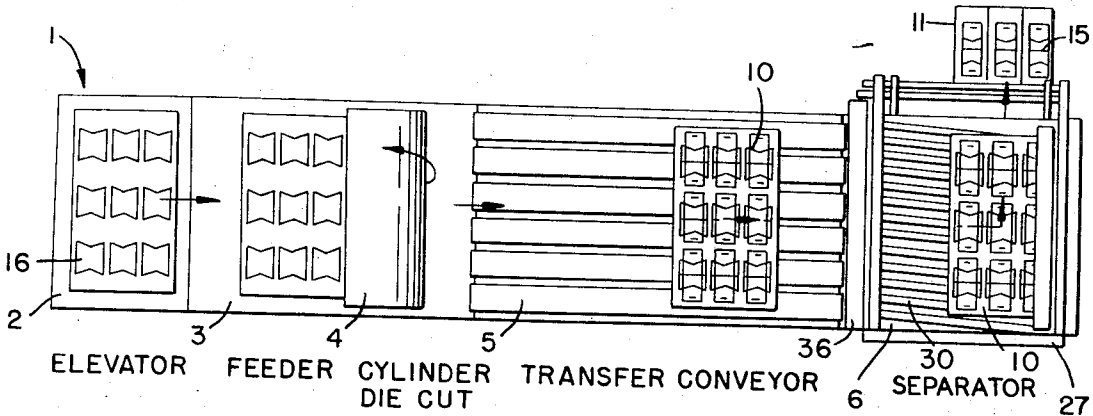


FIG. 1

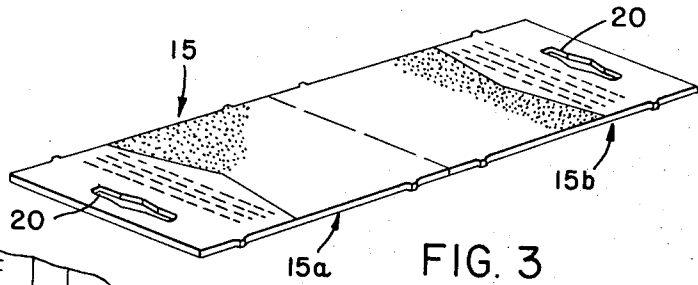


FIG. 3

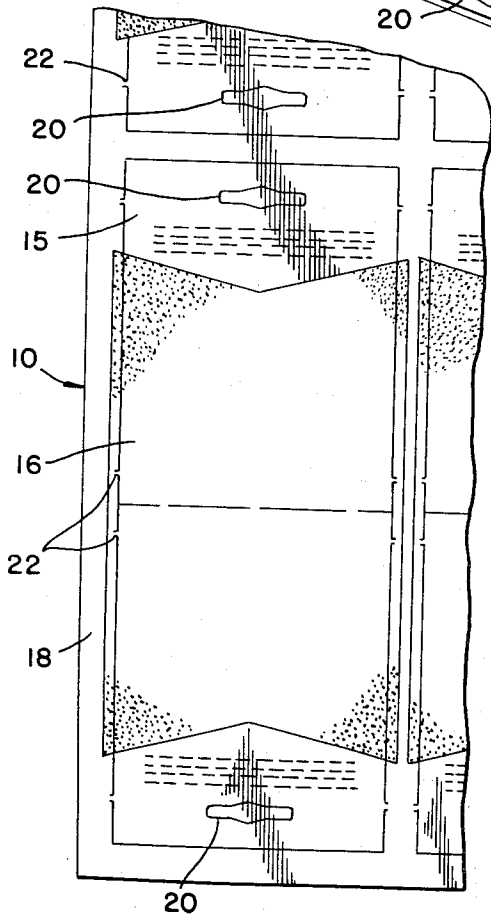


FIG. 2

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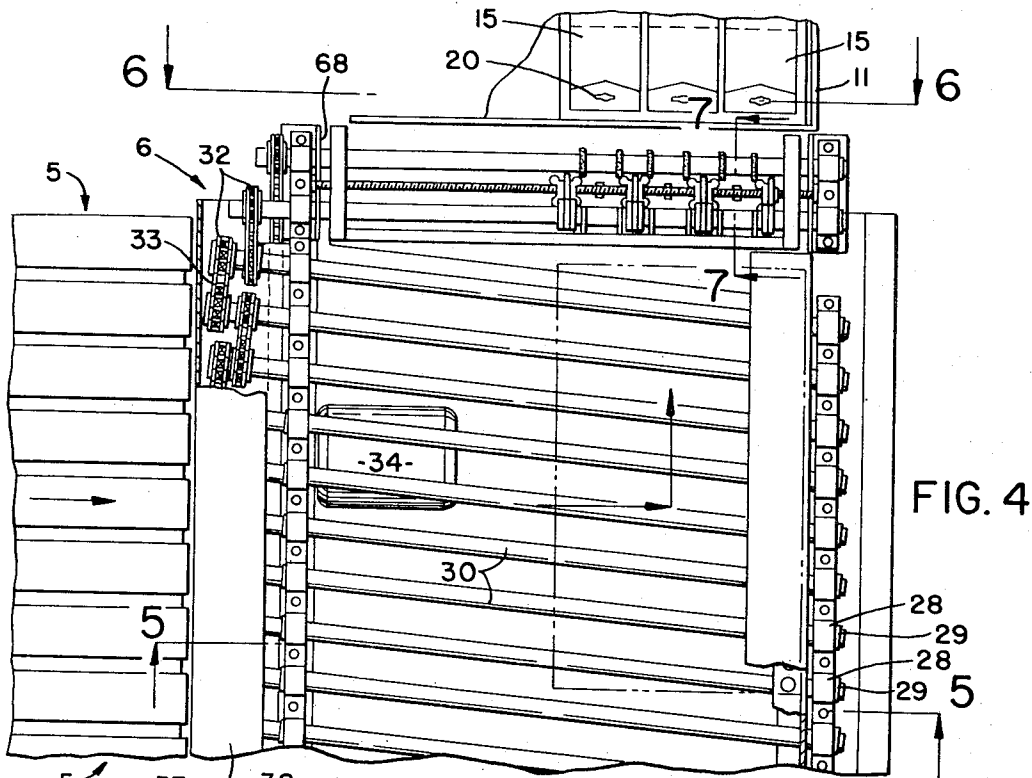


FIG. 4

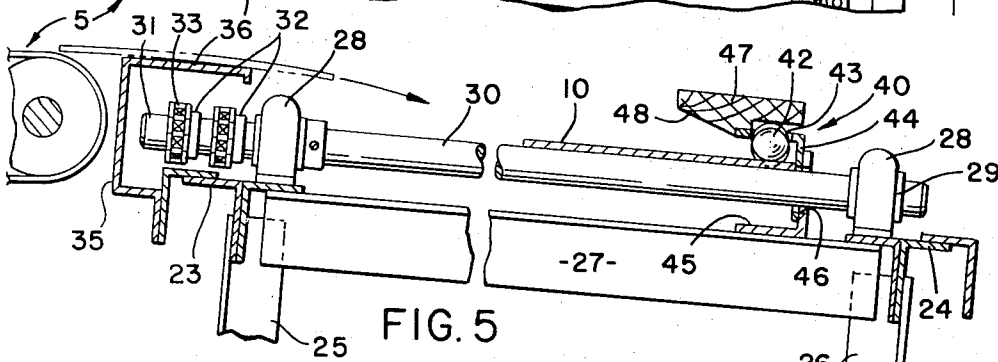


FIG. 5

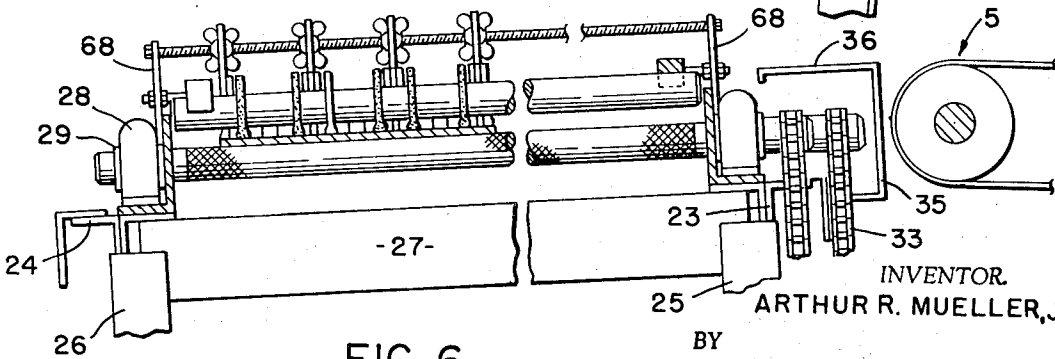


FIG. 6

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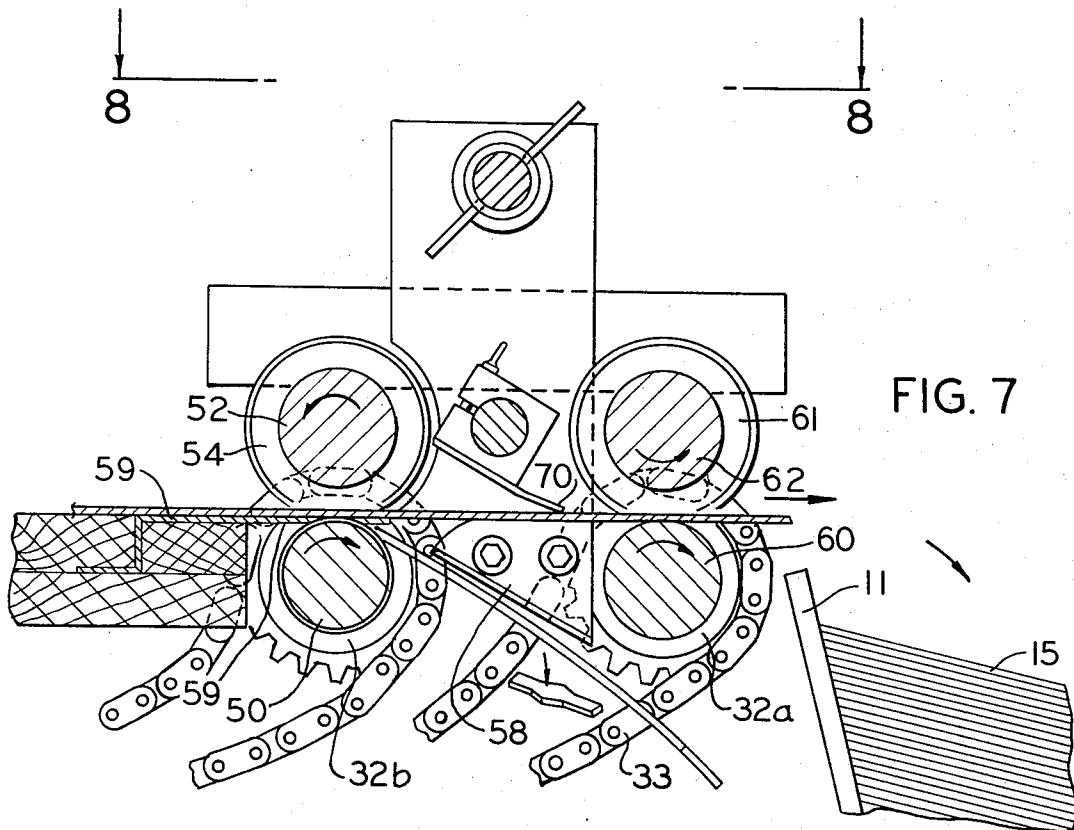


FIG. 7

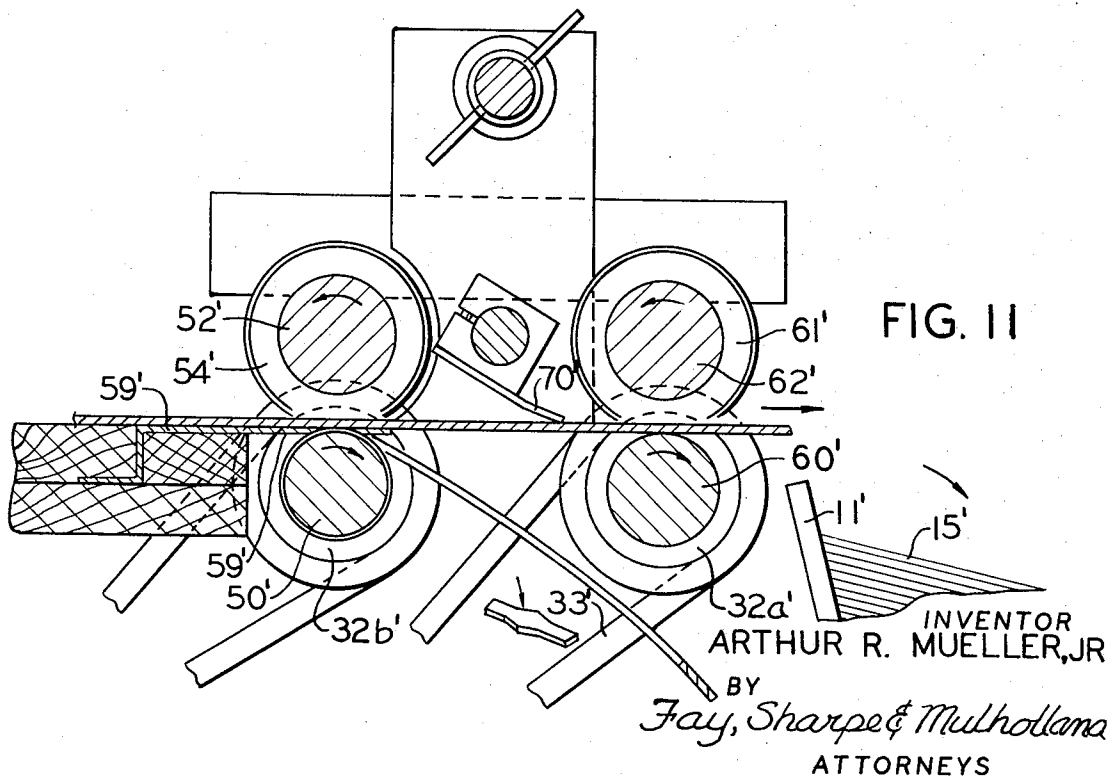
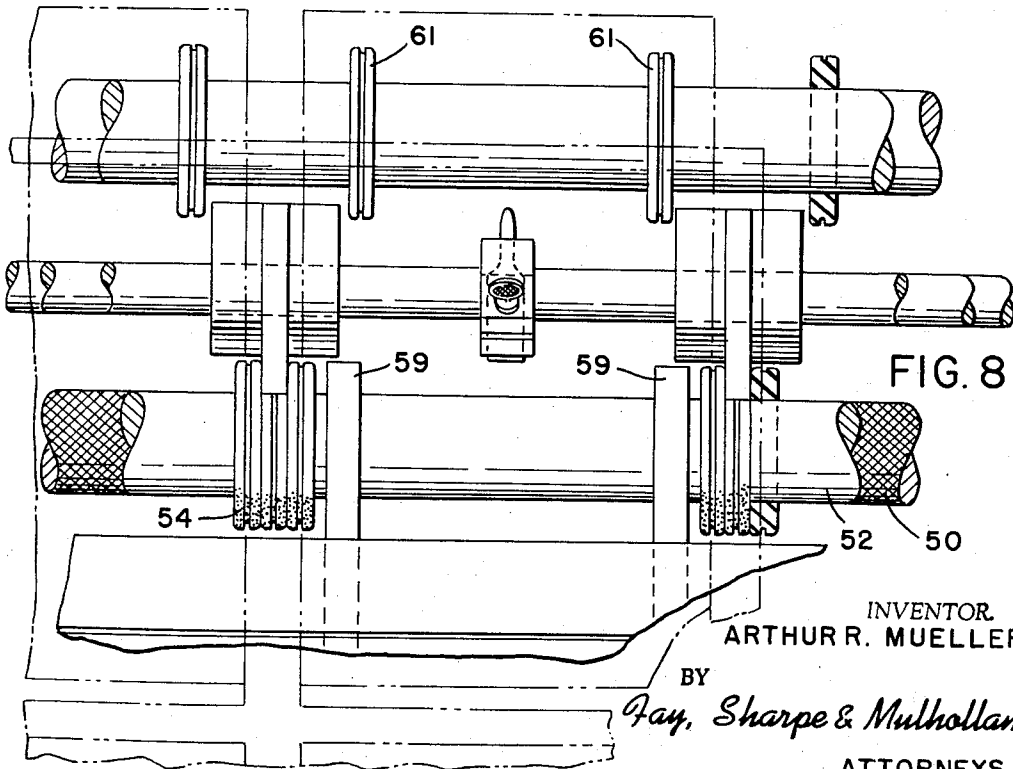


FIG. 11

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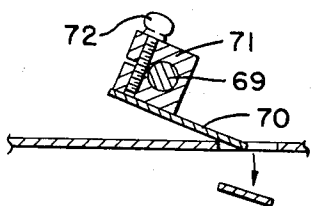


FIG. 9

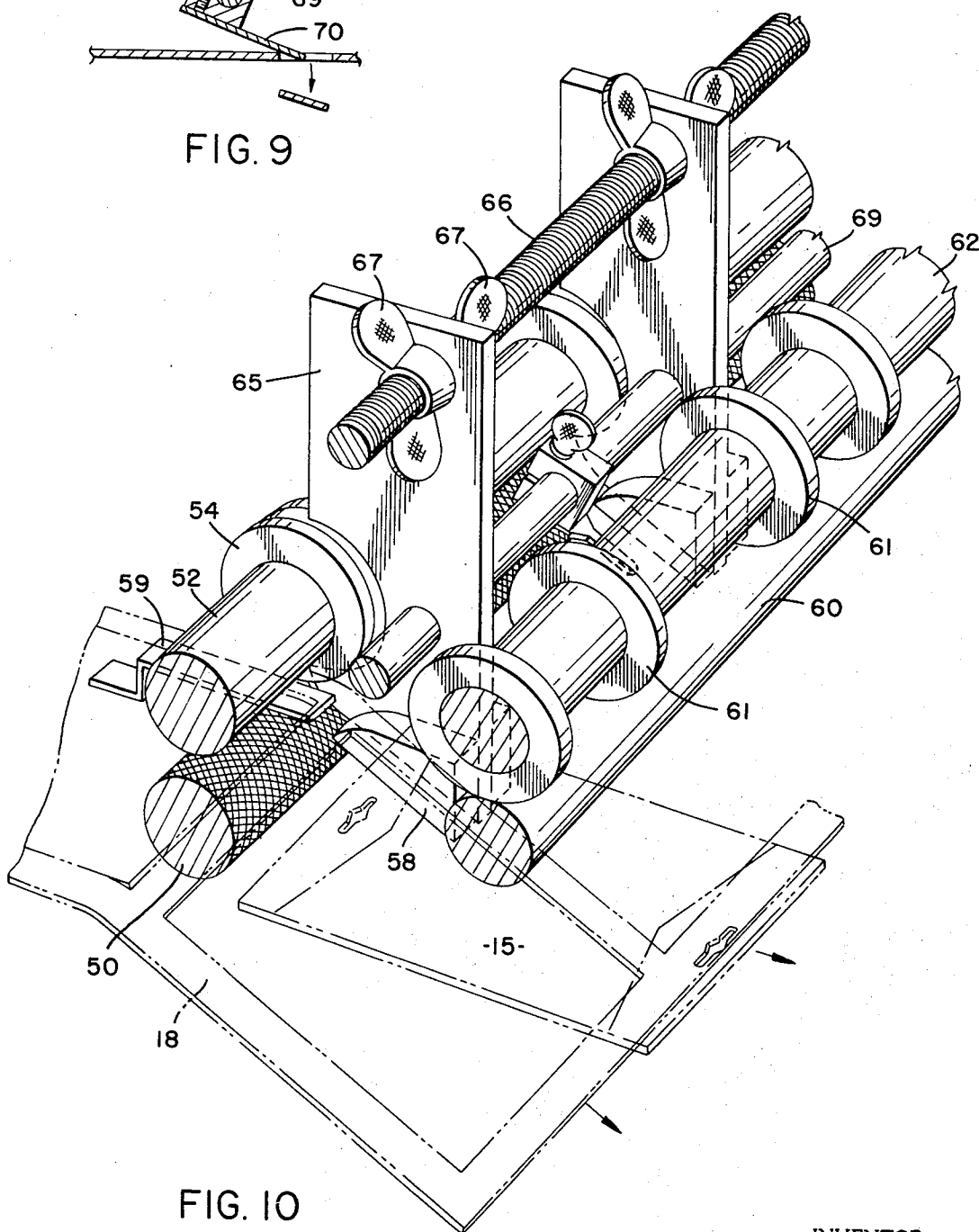


FIG. 10

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STRIPPING MACHINE

This application is a continuation-in-part of U.S. application, Ser. No. 882,680, filed Dec. 5, 1969, now U.S. Pat. No. 3,670,939.

BACKGROUND OF THE INVENTION

This invention relates to a machine for separating packaging cards from the scrap of die cut paperboard sheets. In producing cards for packaging purposes, paperboard blank sheets are first printed and then transported to an elevator and moved by elevator into a feeder and then into a die cutting machine. From the die cutting machine, they are transferred by means of a powered belt conveyor away from the machine and to a storage or separating station.

The separating operation of the prior art has been most widely performed by mechanically forcing the scrap from its position in the plane of the sheet. The problem with this operation is that it requires handling of the scrap and the cards manually with a subsequent operation to pop out any interior cutouts from the card. The interior cutout removal has generally been done by taking a small stack of cards and placing it in a jig with a projection which is forced through the precut area to remove the scrap. With the advent of mass produced packaging cards for wide distribution of consumer goods, a more rapid and economical manner of separating the cards from the sheet scrap and cutouts has been desirable.

Various stripping machines also have been developed, but they have not been effective or economical because of their propensity to jam when, on occasion, the integral tangs holding the partially severed cards and the blanks together did not fully tear and the cards flexed so as to not follow the correct path through the machine.

The present invention is the result of an analysis of the most efficient manual manner of tearing a supported card from the scrap of the paperboard blank surrounding it and reproducing this action mechanically such that the machine may be fed automatically to positively separate the cards from the scrap quickly and accurately. In this regard, it is noted that manually, to separate a card from a blank in the most efficient manner, the card and the scrap are initially separated at one end from each other and then progressively separated along the length of the card. While this progressive separating occurs, one hand and the card are moved away from the other hand holding the scrap.

BRIEF DESCRIPTION OF THE INVENTION

The novel machine of this invention relates to separating cards from the scrap of paperboard sheets from which they have been die cut except for small integral connecting tangs. The cards are of the type utilized for blister packaging of consumer goods, and they include one or more interior cutouts for hanging the merchandise holding cards on display racks.

The machine of the invention includes a base having one side higher than its opposite side and spaced driven parallel transverse feed shafts journaled in bearings mounted on opposite sides. The feed shafts rotate in a single direction toward two pairs of shafts mounted on the end of the frame. The first pair of shafts has opposing rotating surfaces which engage the scrap areas of the sheets to drive the sheets forward. The second pair

of vertically disposed opposing rotating surfaces receives the cards and propels them forward to a bin into which they are stacked for ultimate removal from the machine.

As the cards pass through the two pairs of vertically disposed rotating surfaces, a downwardly biased spring member is dragged over them to separate any internal cutouts from the card. The scrap from the sheet falls down to a collection area below the rotating surfaces. To avoid excessive bending of the cards, the cards travel in a substantially straight line from the time they leave the feed rolls, and as will be seen in one embodiment they are rigidly supported by the tool as the separation occurs. The feed rolls have floating spheres which act as hold-down means to provide more positive forward drive to the cut sheets as they enter the first pair of rotating surfaces. The apparatus is designed to be automatically fed by means of a belt-type transfer conveyor which receives the die cut paperboard sheets from a die cutting machine. The entire system may be automated by conventional elevator and feeder means for providing printed paperboard to the cutter die. In the alternative, the separator machine may be hand fed. The tools, rotating surfaces and spring members may be adjusted for different shapes, numbers and dimensions of card, scrap and interior cutouts.

BRIEF DESCRIPTION OF THE DRAWINGS

A more complete understanding of the invention can be had from the following drawings and specification.

In the drawings:

FIG. 1 is a schematic top plan view of a blister packaging card production line which includes, in series, an elevator for raising printed cards to a feeder, which feeds the paperboard sheets to a die cutting cylinder, from which a transfer conveyor moves them to the feed shafts of a separator which separates the cards from the scrap.

FIG. 2 is a fragmentary plan view of a portion of a paperboard sheet which has been printed and die cut.

FIG. 3 is a perspective view of a card which has been separated from the scrap of a paperboard sheet, the card being die cut for later division into two separate blister packaging cards.

FIG. 4 is a partial plan view of the card and scrap separator of the invention.

FIG. 5 is a cross-sectional elevational view taken along line 5—5 of FIG. 4.

FIG. 6 is an end elevational view taken along the line 6—6 of FIG. 4.

FIG. 7 is a fragmentary cross-sectional elevational view taken along the line 7—7 of FIG. 4.

FIG. 8 is a partial plan view taken along the line 8—8 of FIG. 7.

FIG. 9 is a detailed fragmentary view of the cutout and the operation of the cutout removing device of the invention.

FIG. 10 is a perspective partial view of the machine in operation separating a card and scrap.

FIG. 11 is a fragmentary cross-sectional elevational view as in FIG. 7 but showing an alternative embodiment.

PREFERRED EMBODIMENT

In the drawings, the numeral 1 generally designates the card producing line which includes, in series, an el-

evator 2, a feeder 3, a die cutter 4, a belt-type transfer conveyor 5 and a separator 6, or a machine for separating cards from the scrap of paperboard sheets from which they have been die cut.

The conveyor 5 and the separator 6 have die cut paperboard sheets 10 mounted thereon, and the end of the separator 6 includes bins 11 in which stacks of the punched out cards 15 await removal. The paperboard sheets 10, before being placed on the elevator 2, are printed with appropriate indicia 16 for product labeling and advertising as seen, for instance, in FIG. 2. The card 15 will ultimately become two cards; but, for purposes of description of the card producing line and separator of this invention, it will be called a single card. The reason for this is that, when the card 15 is ready to be loaded with a product for packaging, each of its halves 15a and 15b will become an individual card. The particular arrangement of the card, however, is a matter of design and may vary depending upon the product to be packaged as will be readily understood.

Surrounding the outline of the cards 15 after they have been die cut in the paperboard sheets 10, there is a marginal scrap portion 18 which retains the cards in place in the plane of the sheet by means of integral connecting tangs 22. Interior cutouts 20 for placing the cards on a display rack or for other purposes are also provided in the cards 15.

The illustrated embodiment of the machine 6 for separating the cards 15 from the scrap 18 of paperboard sheets 10 from which they have been die cut except for small integral connecting tangs 22 includes a base made up of two longitudinally extending side members 23 and 24, respectively. The side members 23 and 24 are T-shaped members made up from two angled members welded with a leg of each in face-to-face engagement. The side members 23 and 24 are supported by appropriate legs 25 and 26 on one end and their counterparts on the opposite end, the leg 26 and its counterpart being shorter than the leg 25 and its counterpart such that the side member 24 is located below side member 23. End members 27, of construction similar to the side members 23 and 24, complete the rectangular base of the machine 6.

Mounted along each of the side members 23 and 24 of the base are a series of pillow blocks 28 which are in offset pairs with one of the pair mounted on side member 23 being angularly oriented with respect to its mate on side member 24. Spherical bushings 29 are provided such that skewed shafts 30 may be rotationally journaled in the pillow blocks 28 at an end of each of the shafts 30 adjacent side member 24. The pillow blocks 28 on the side member 23 support the shaft 30 at a location spaced inwardly from the end adjacent thereto. The projecting portion 31 of the shafts 30 have received thereon drive sprockets 32 which are positively driven by chains 33. An appropriate prime mover 34 drives the chains 33 to provide uniform speed and direction of rotation for each of the shafts 30. A chain guard housing structure 35 surrounds the chains 33 and provides a building surface 36 for receiving the sheets 10 from the conveyor 5 to the top surface of the feed shafts 30.

The sheets 10 are held firmly in contact with the feed shafts 30 by means of a hold-down device generally designated by the numeral 40. The hold-down device 40 includes a heavy sphere 42 which floats within an opening 43 in a horizontal leg of an angular member

44. The angular member 44 is supported by the upstanding leg of an angular member 45 which spans the length of the base between the end members 27. Suitable holes 46 are provided along the length of the joined legs 44 and 45 to provide clearance for passage of the shafts 30. The sphere 42 is retained within the opening 43 by means of an elongated wooden member 47 which, together with the angular member 44, creates a cavity of sufficient depth to accommodate vertical movement of the sphere 42 as the individual sheets 10 are positioned against the angular member 44 under the sphere. A tapered camming surface 48 is provided on the outer corner of the member 47 to cam the sheets 10 downwardly adjacent the spheres 42 as they move from the guiding surface 36 to the feed rollers 30.

From the feed rollers 30, the sheets 10 progress between a pair of shafts in vertical alignment on either side of the path of the sheets. The lower shaft 50 is a driven shaft with a knurled surface. The upper shaft 52 has rotating slotted rubber disks 54 mounted at spaced intervals thereon. The disks 54 are affixed to the shaft 52 for rotation therewith. The shaft 52 is an idler shaft which provides the reaction force to create positive pressure between the knurled surface of the shaft 54 and the marginal scrap portion 18 of the sheet 10.

At the same time, the scrap portion 18 is directed downwardly and engages the underside of the tool 58 while the card portion 15 of the sheet 10 engages the upper surface of the tool 58. The card is thus separated from the scrap. Guide and support means 59 direct the card portion 15 along a straightforward path to the top side of the tool 58 until it is engaged by a second pair of vertically oriented shafts, the lower shaft 60 being a driven shaft which is provided with a reaction force by means of rubber disks 61 on the upper shaft 62. The disks 61 are spaced between the disks 54 of the shaft 52 such that they will engage the cards 15 as they are fed therebetween. The shaft 62 and the rotating surfaces of the disk 61 provide the positive reaction force to insure forward motion of the card pinched therebetween in the same manner that the shaft 52 and its rollers 54 serve the knurled shaft 50. The shafts 60 and 62 are driven by sprockets 32a and 32b, respectively.

The knives 58 are mounted on knife support plates 65 which hang from a threaded shaft 66. The knives are positioned by adjusting the relative position of wing nuts 67 on the shaft 66. In like manner, the rubber disks 54 and 61 may be moved on their respective shafts to adjust for different widths and numbers of cards.

The two pairs of shafts described extend substantially parallel to the path of travel of the sheet 10 with drive shafts 50 and 60 of each of the pairs being supported in pillow blocks mounted on the side members 23 and 24 in similar manner to the mounting of shafts 30. Appropriate upstanding brackets 68 at either end of the idler shafts 52 and 62 have journals to receive and support the shafts in proper relation to their respective shafts 50 and 60. The threaded shaft 66 is also supported by the upstanding brackets 68. As will be seen in FIGS. 9 and 10, the tool support plates 65 are held in parallel alignment at their lower ends by a rod 69 which extends between them.

Downwardly biased fingers 70 are mounted on the shaft 69 by means of a clamping block 71 which may be tightened or loosened relative to the shaft 69 by means of a thumb screw 72. The downwardly biased finger 70 drags across the surface of each of the cards

15 to pop out the scrap from the interior cutouts 20 as they pass thereunder into stacks of completely separated cards within the bins 11. The scrap from the cutouts 20, together with the scrap 18, falls or is conveyed through to the scrap collection receptacle below the machine.

An alternative embodiment of this invention is shown in FIG. 11 which is very similar to FIG. 7, however, it will be noticed that the knives 58 which are mounted on knife support plates 65 have been omitted. It will also be noticed that the chains 33 have been replaced by belts 33' which engage pulleys shown at 32a' and 32b'. It will be appreciated that sheet support member 59' is so situated between the shafts 50' and 52' to engage and support the portion of the card which is to be used while the scrap portion of the card remains unsupported by this member and is driven by disk 54'. Because the scrap portion of the card is unsupported by member 59', it tends to follow the direction of rotation of shaft 50' for a longer angular distance than the card itself is permitted to follow such direction. The result is that the card and the scrap are separated and only the card is then picked up by rollers 60' and 62'. When the card emerges from between rollers 60' and 62', the latter of which is, of course, supplied with rubber disks 61', they fall into bin 11' as previously described. When tool 58 is not used and the cards are thin, it may be desirable to lessen the pressure supplied by finger 70' or to lengthen the extension of member 59' so that the card will not be drastically deflected and may still be taken up on the surface of roller 60' which may be supplied with a knurled surface to facilitate the take up. If the card is quite flimsy it is evident that it may be desirable to lower the position of roller 60' and 62' with respect to the position of rollers 50' and 52'.

For ease of description, the principles of the invention have been set forth in connection with but a few illustrated embodiments. It is not my intention that the illustrated embodiments or the terminology employed in describing them be limited inasmuch as variations in these may be made without departing from the spirit of the invention, but rather, it is my desire to be restricted only by the scope of the appended claims.

What is claimed is:

1. An apparatus for separating cards from the scrap of paperboard sheets from which they have been die cut except for small integral connecting tangs which includes in combination:

- a base;
- sheet feed means on said base;
- said sheet feed means moving said sheets in a direction toward two pairs of opposing rotating members;
- each of said pairs of members being rotatably mounted and including at least one driven member

and having rotating surfaces thereon in opposed relationship such that one of said pairs will receive and drive the cut paperboard sheets advanced by said feed means to propel said sheets against a card and scrap separating tool as the sheets are received from said sheet feed means;

a sheet support member extending between the one of said pairs of rotatably mounted members to support the card along at least part of its travel through the one of said pairs of rotatably mounted members such that the scrap follows the direction of rotation of one member of the one of said pairs of rotatably mounted members for a greater angular distance than the card follows said circumference;

the rotating surfaces of the other of said pairs of members engaging said card as it passes over one surface of said tool, thereby completing the separation of the card from the scrap.

2. In an automatic card production line having an elevator for raising a stack of uncut paperboard sheets, a feeder which receives the uncut sheets from the elevator, a die cutter into which the uncut sheets are fed by the feeder and which die cutter incompletely severs a card of desired shape from the sheets and leaves a scrap portion, a transfer conveyor to convey the incompletely severed cards and scrap portion from the die cutter, the improvement comprising in combination therewith a separator which includes:

- a base;
- sheet feed means on said base;
- said sheet feed means receiving said sheets and moving said sheets in a direction toward two pairs of opposing rotating members;
- each of said pairs of members being rotatably mounted and including at least one driven member and having rotating surfaces thereon in opposed relationship such that one of said pairs will receive and drive the cut paperboard sheets advanced by said feed means to propel said sheets against a card and scrap separating tool as the sheets are received from said sheet feed means;

a sheet support member extending between the one of said pairs of rotatably mounted members to support the card along at least part of its travel through the one of said pairs of rotatably mounted members such that the scrap follows the direction of rotation of one member of the one of said pairs of rotatably mounted members for a greater angular distance than the card follows said circumference;

the rotating surfaces of the other of said pairs of members engaging said card as it passes over one surface of said tool, thereby completing the separation of the card from the scrap.

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