

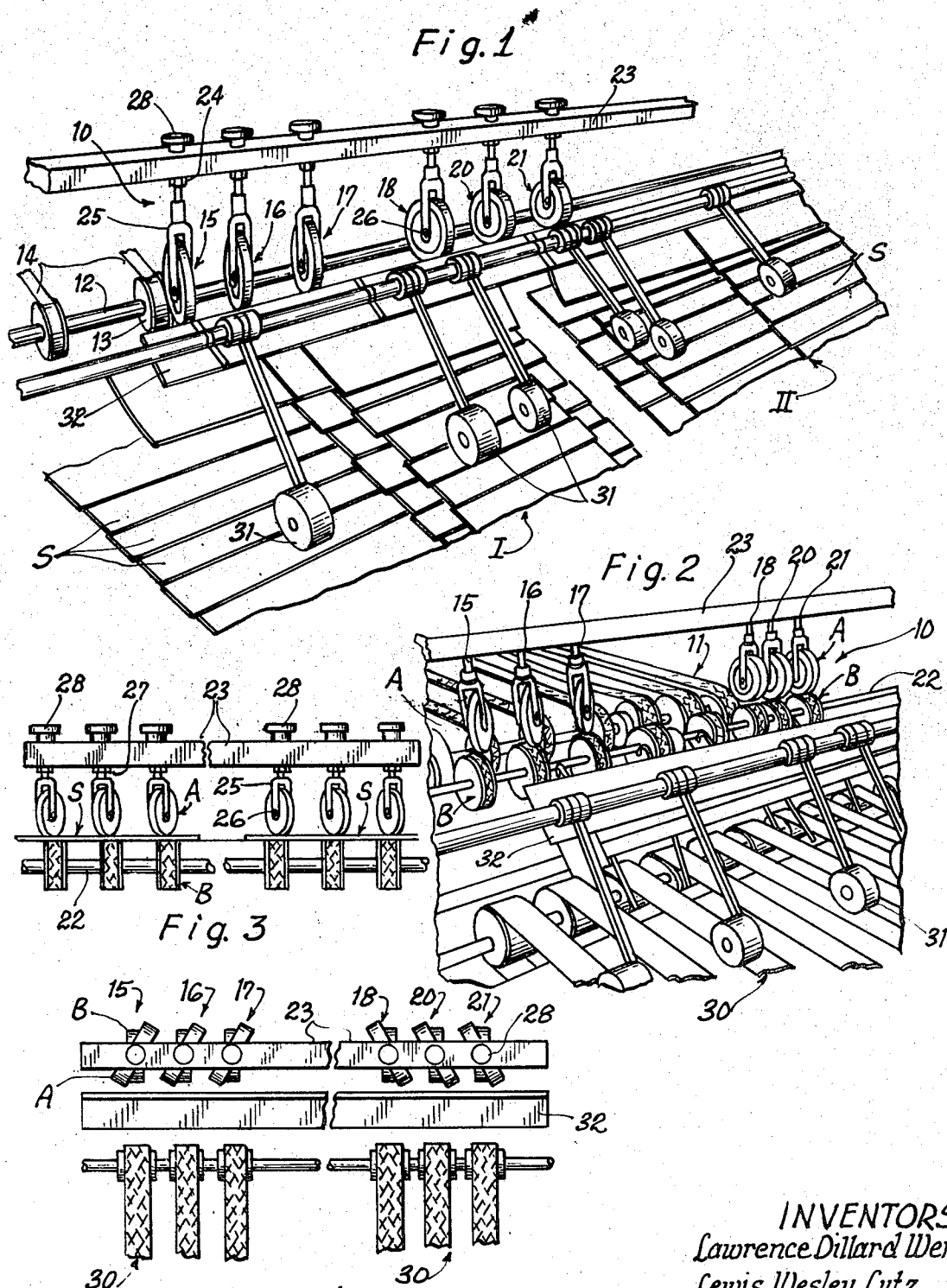
Jan. 5, 1971

L. D. WERTZ ET AL

3,552,744

DEVICE FOR SEPARATING MULTIPLE OUT SHEETS

Filed Feb. 5, 1968



INVENTORS
 Lawrence Dillard Wertz
 Lewis Wesley Lutz
 by Pendleton, Neuman,
 Seibold and Williams
 Attorneys

1

3,552,744

DEVICE FOR SEPARATING MULTIPLE OUT SHEETS

Lawrence Dillard Wertz, Rittman, and Lewis Wesley Lutz,
Wadsworth, Ohio, assignors to Packaging Corporation
of America, Evanston, Ill., a corporation of Delaware
Filed Feb. 5, 1968, Ser. No. 703,000
Int. Cl. B65h 29/20

U.S. Cl. 271—80

3 Claims

ABSTRACT OF THE DISCLOSURE

A pair of roller means are provided between which multiple out sheets are caused to pass upon being discharged from high speed printer slotters, rotary die cutters or the like. The sheets while passing between the roller means are frictionally engaged thereby and diverted sidewise from their intended forward movement causing separation between the adjacent discharged sheets.

BACKGROUND OF THE INVENTION

Heretofore, in high speed printing-slotting and/or die cutting operations, the handling of the multiple out sheets had always presented problems. These problems arose from the fact that as the sheets were discharged from the slotter or die cutter they were immediately adjacent one another and various sheets would skew slightly from their forward direction of movement and cause several sheets to overlap one another and become interlocked or stuck together. Thus, when a predetermined number of sheets were to be manually removed simultaneously at a predetermined station of travel, extreme difficulty was encountered in removing the desired number of sheets in an expeditious and facile manner. Attempts at alleviating these problems required either increasing the labor force engaged in the sheet-removing operation, which in turn increased the overall cost of the operation, or reducing the speed and thus the capacity of the slotter and/or die cutter.

SUMMARY OF THE INVENTION

Thus, it is an object of this invention to provide a sheet separating device which eliminates the problems of adjacent multiple out sheets from becoming interlocked or stuck to one another upon being discharged from a printer-slotter, die cutter, or the like.

It is a further object of this invention to provide a sheet-separating device which may be readily adjusted to vary the amount of separation between adjacent sheets.

It is a further object of this invention to provide a sheet-separating device which is of simple yet sturdy construction, requires but a minimum of maintenance, and may be readily installed for use with existing machinery such as printer-slotters, die cutters, or the like.

It is a further object of this invention to provide a sheet-separating device which is capable of accommodating sheets which vary over a wide range of sizes and thicknesses.

It is a still further object of this invention to provide a sheet-separating device which is compact and does not in any way impede the speed and operation of associated apparatus.

Further and additional objects will appear from the description, accompanying drawings and appended claims.

In accordance with one embodiment of this invention a pair of vertically aligned roller means is provided between which multiple out sheets are caused to pass upon being discharged from a printer-slotter, or the like. The passing sheets are frictionally engaged by the pair of roller means. The rotary axes of the roller means are in angular relation

2

with respect to one another. Drive means is provided for one of the roller means. The rotary axis of the driven roller means is disposed substantially normal to the direction of movement of the discharged sheets as they pass between the roller means.

DESCRIPTION

For a more complete understanding of the invention reference should be made to the drawings wherein:

FIG. 1 is a fragmentary perspective view taken from the down-stream side of the improved device shown in combination with associated machinery;

FIG. 2 is a fragmentary perspective enlarged view of the improved device shown in FIG. 1 and taken from above;

FIG. 3 is a fragmentary front elevational view of the down-stream side of the improved device; and

FIG. 4 is a top plan view of the device shown in FIG. 3.

Referring now to the drawings and more particularly to FIGS. 1 and 2, the improved separator device 10 is shown disposed adjacent the discharge end 11 of a printer-slotter or the like, not shown. The discharge end 11 of the printer-slotter is represented in FIGS. 1 and 2 by a conveyor which comprises a drive shaft 12. Keyed to the shaft 12 are a plurality of longitudinally spaced pulleys 13 which accommodate a like number of endless belts 14.

Device 10, as shown in the drawing, includes six pairs of rollers 15, 16, 17, 18, 20 and 21. The rollers A and B of each pair are disposed in vertical relation to one another, see FIG. 3. The lower roller B of each pair is keyed to a common drive shaft 22, the axis of which is substantially parallel to shaft 12. The upper roller A of each pair is suspended from horizontally disposed supporting bar 23 which is substantially parallel to drive shaft 22. Depending from bar 23 is a vertical stud 24 for each roller A. The lower distal end of each stud is bifurcated at 25 to accommodate the roller A therebetween and receive the axle pin 26 for the roller. Mounted on stud 24 is a collar 27 which contacts the underside of bar 23, see FIG. 3. Mounted on the upper end of the stud 24 is a knob 28 which cooperates with collar 27 and clamps bar 23 therebetween. Once knob 28 effects clamping of the bar, the rotary axis of the roller A is held in a predetermined angular position with respect to the axis of shaft 22. The number of pairs of rollers 15-18, 20 and 21 to be utilized in device 10 will depend upon the size of the sheets S and the number of streams of sheets I and II being discharged from the associated printer-slotter, die cutter, or the like. In FIG. 1 two streams I and II of sheets are shown whereby pairs of rollers 15-17 are utilized for stream I and pairs of rollers 18, 20 and 21 are utilized for stream II. Each stream of sheets is formed by the individual sheets partially overlapping one another. Unless the device 10 is utilized, the sheets forming the stream overlap one another to such an extent that adjacent sheets in the stream become interlocked with one another or jammed together and thus seriously complicate subsequent manual removal of a predetermined number of sheets at a take-off station, not shown.

It will be noted in FIGS. 3 and 4 that the upper rollers A of pairs 15-17 are angularly offset to the left and the upper rollers A of pairs 18, 20 and 21 are angularly offset the same amount to the right. By reason of this angular offsetting of the upper rollers A with respect to the lower rollers B, the sheets S, as they pass between the upper and lower rollers A and B, are offset sidewise a slight amount with respect to their normal forward movement with the result that the desired spacing between adjacent sheets of a stream is obtained. The greater the angularity between the rotary axis of the upper roller A with respect to the lower roller B of a pair the greater the amount of spacing

3

between adjacent sheets S is produced. The stud 24 for each upper roller A is mounted so that it is free to move vertically with respect to the bar 23 notwithstanding the clamping action between collar 27 and the knob 28. Various well-known mechanical arrangements for permitting the vertical movement of the individual studs 24 may be utilized. The effect of the clamping action is to fix the angular relation between the rotary axes of the upper and lower rollers of a pair. Thus, the upper roller A is free to self-adjust to the thickness of the sheets as they pass between the rollers.

Subsequent to the sheets passing between the pairs of rollers, they are deposited on a suitable conveyor 30 whereupon they are conveyed to the aforesaid take-off station, not shown. To maintain the sheets S in proper contact with the conveyor 30, a plurality of spring-loaded idlers 31 are provided which contact the top exposed surfaces of the sheet streams I and II.

To be assured that the sheets S, subsequent to passing between rollers A and B, properly engage conveyor 30, a deflector plate 32 is provided, see FIGS. 1 and 2.

Thus, it will be seen that a sheet separator device has been provided which is of simple construction, free of maintenance, self-adjusting to variations in the thicknesses of the sheets, and is readily capable of being installed with existing equipment such as printer-slotter, die cutters and the like.

We claim:

1. A sheet-separating device for use in controlling the amount of overlap of multiple out sheets from a slotter or die cutting machine subsequent to the sheets being discharged from said device, and conveyed therefrom in overlapped relation, said device comprising a plurality of pairs of roller means, one of said means of each pair being elevated relative to the other means of the pair and between which each sheet is adapted to pass prior to overlapping the preceding discharged sheet, the peripheries of each pair of roller means being adapted to frictionally

4

engage opposite surfaces of each passing sheet, the rotary axes of the roller means comprising each pair being angularly disposed relative to one another and the rotary axis of the lowermost roller means of each pair being disposed substantially normal to the direction of movement of the overlapped discharged sheets, and an elongated transversely extending support on which the uppermost roller means of each pair is mounted; the longitudinal axis of said support being substantially parallel to and spaced from the rotary axis of the lowermost roller means.

2. The device of claim 1 including means operatively connected to the uppermost roller means of each pair of roller means and cooperating with said support for selectively adjusting the angular relation of the rotary axis of each uppermost roller means with respect to the rotary axis of the corresponding lowermost roller means.

3. The device of claim 2 wherein a predetermined number of adjacent pairs of roller means comprise a first set of roller means and a second predetermined number of the remaining adjacent pairs of roller means comprise a second set of roller means; the uppermost roller means of the first set having parallel rotary axes, and the uppermost roller means of the second set having parallel rotary axes, the rotary axes of the first set of uppermost roller means being angularly disposed relative to the rotary axes of said second set of uppermost roller means.

References Cited

UNITED STATES PATENTS

2,995,364	8/1961	Frederick	271—52
3,107,089	10/1963	Lockey	271—59X
3,176,980	4/1965	Mitchell	271—52

FOREIGN PATENTS

29,653	8/1964	Germany	271—64
--------	--------	---------	--------

EDWARD A. SROKA, Primary Examiner