Jan. 28, 1958 L. CLEMENS 2,821,383

DEVICE FOR A CONTINUOUS SHAPING OF SUPERPOSED SHEETS OF A PACKING MATERIAL

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Fig. 1

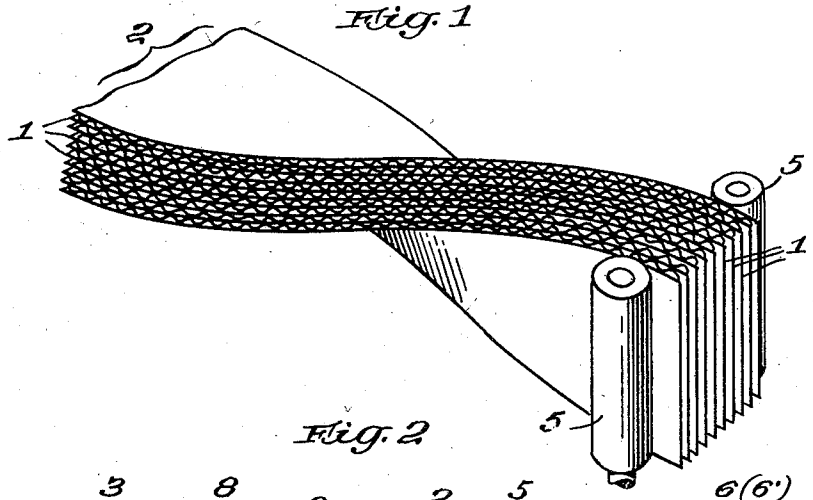


Fig. 2

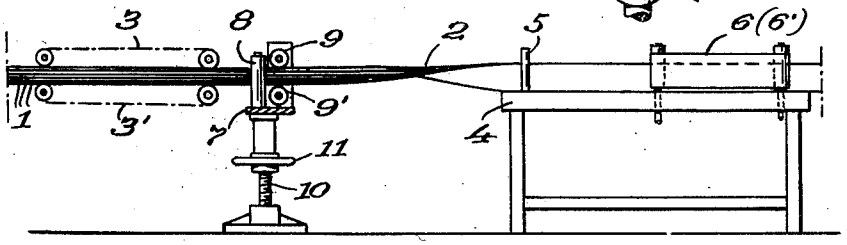
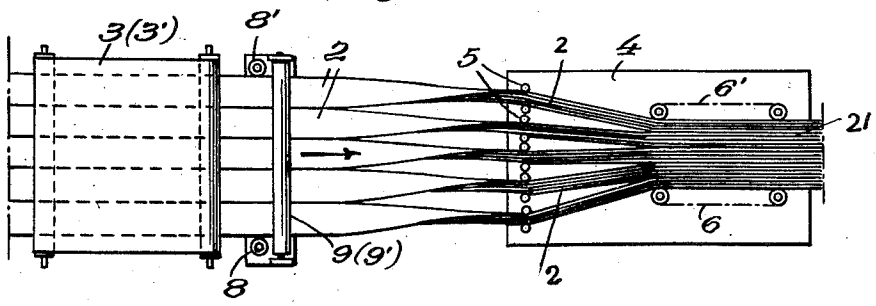


Fig. 3



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Fig. 4

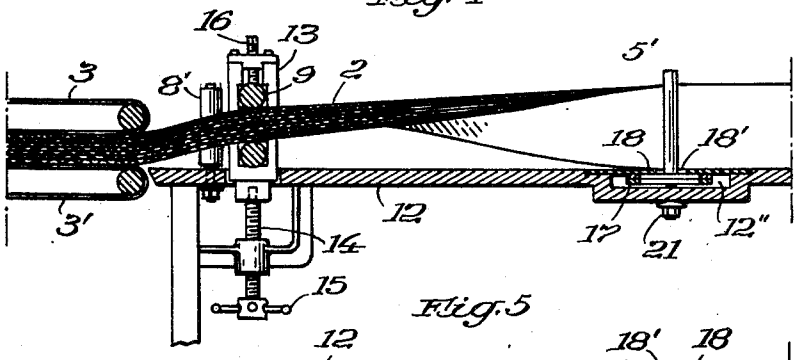
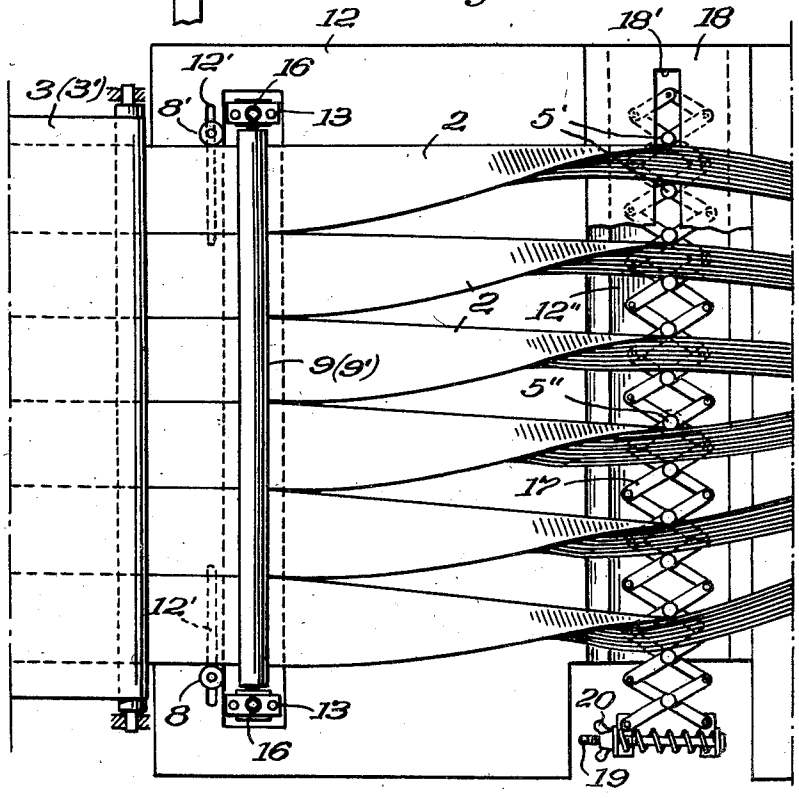


Fig. 5



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DEVICE FOR A CONTINUOUS SHAPING OF SUPERPOSED SHEETS OF A PACKING MATERIAL

Ludwig Clemens, Wiesbaden, Germany

Application May 18, 1954, Serial No. 430,627

Claims priority, application Germany, May 23, 1953

3 Claims. (Cl. 270—52)

This invention relates to a machine for the current treatment of superposed layers of packing materials, such as particularly undulated cardboard sheets.

The invention denotes an essential improvement of this type of machines whereby the treatment of the packing material is simplified and the costs of manufacture are reduced. The materials to be treated in conformity with the invention are mainly packing paper, cardboard and particularly corrugated cardboard sheets.

Corrugated cardboard is generally available as a long flat body or sheet, which may have a width of 100 centimeters and is wound into rolls. These rolls must be unwound for use and cut into parts of a suitable size. It is apparent that this treatment of the undulated cardboard is expensive; therefore many endeavors have been made to price-reduce the conversion of the corrugated cardboard rolls into properly usable flat shapes.

It is the main object of the invention to eliminate the difficulties arising from the conversion of the longitudinal cardboard packages into shorter bodies.

With this purpose in view, the adjacently located packages are turned or rotated at an angle of 90 degrees about their longitudinal axis and the thus obtained now vertical packages are converted into a single vertical body; this procedure enables the easy conversion of the horizontal packages into a vertical single package which can be easily bundled, packed and conducted into a transverse cutter, which cuts the body into parts of a desired length.

The main feature of the invention is the above referred-to rotation of the individual packages at an angle of 90 degrees about their longitudinal axes.

A further object of the invention is the means to carry out this rotation, while care is being taken of the fact that the strip-shaped packages leaving the longitudinal cutter may differ with regard to their height and number.

In order to comply with these conditions a series of adjacent guide means, such as pins or rollers and cross-size extending relative to the longitudinal extension of the packages is provided which after the rotation of the packages guide and secure the same; the guide means have a mutually variable distance. This variable distance of the package conducting pin is necessary in view of the possibility of the different thickness of the strip-shaped packages.

Moreover, it is essential to render the pins for the guidance of the individual packages during rotation individually variable in order to adjust the operation of the pins to the number of the packages. The mutual distance of the guide rollers, guide pins and similar guide means may be controlled by a common adjusting device, such as a lazy tongs.

The invention will now be described more in detail and with reference to the attached drawings.

In the drawings,

Fig. 1 is a side view of a strip-shaped cardboard package composed of a plurality of superposed corrugated

cardboard sheets during its rotation at 90 degrees from the horizontal into the vertical position;

Fig. 2 is a schematic side view of the device for use in the rotation of the packages and their union into a single body;

Fig. 3 is a top view of the device shown in Fig. 2;

Fig. 4 is a side view of a further embodiment of the device for the rotation of the packages; and

Fig. 5 is a top view of the device shown in Fig. 4.

Numeral **1** denotes onesidely covered corrugated superposed cardboard sheets which by a suitable, for instance, a longitudinal cutter are cut in parallel adjacent strip-shaped packages **2**, see Fig. 3. These strip-shaped adjacent packages **2** are conducted by means of transport bands **3**, **3'** to a guiding device adapted to turn the packages about their longitudinal axis, this device consisting of a row of rollers **5** located at a mutual distance upon a table **4**, the individual cardboard packages **2** being turned by said guiding device **5** at an angle of 90 degrees.

The rotated strip-shaped packages **2** are now conducted in an upright vertical position between a pair of laterally disposed vertical transport bands **6**, **6'** located in pressure contact with said packages **2**, whereby the same are assembled into a single uniform unit **21**. The rollers **5** are in conformity with the thickness, width and number of the strip-shaped packages **2** adjustably located upon the table **4**.

In order to secure the uniform progress of the torsional movement of the packages a height-adjustable guiding device is provided in front of the pins **5**, said guiding device being adaptable to the height and width of the strip-shaped packages; the device consists of lateral vertical guide rollers **8**, **8'** and horizontal rollers **9**, **9'** which are supported on table **7** located upon a screw spindle **10**; these rollers may be lifted and lowered by a hand-wheel **11** in order to move the horizontal middle axis of the flat strip-shaped packages into equal height with the center axis of the packages which are placed on-end.

Figures 4 and 5 illustrate a further embodiment of the invention.

A table **12** is provided for cooperation with the transport bands **3**, **3'**. The lateral guide rollers **8**, **8'** are adjustably supported in slots **12'** in a cross direction to the passage of the cardboard **2**. The horizontal guide rollers **9**, **9'** are carried by supports **13**, the latter projecting through recesses of the table and adapted to be lifted and lowered by a screw spindle **14** and hand-wheel **15**. For an adaption to the thickness of the packages **2** the upper roller **9** is by means of the screw spindle **15** adjustable in bearing bracket **13**.

The rotated and now vertical cardboard packages **2** are conducted along pins **5'**, which are supported by a lazy tongs **17**. This lazy tongs is located in a recess **12''** of the table and is covered by a plate **18**, which is provided with a slot **18'** for the passage of the pin **5'**.

The distance between the pins **5'** may be adjusted by a wing screw **20** located upon screw spindle **19**.

In order to secure the lazy tongs **17** upon the table in a central position the center pin **5''** is downwardly elongated and secured by the screw **21**, whereby the lazy tongs **17** may be uniformly elongated or shortened towards both sides of the table.

With the embodiment of the invention illustrated in Figs. 2 and 3 the height adjustment of the table may be effected by a vertical displacement together with that of the guide pins.

The practical application of the invention is extremely simple.

At the start of the device the strip-shaped packages **2** composed of the individual corrugated superposed card-

board layers 1 are conducted through the various above described guiding means and at the same time rotated through an angle of 90 degrees. If the thus rotated strip-shaped packages 2 have passed the various guide means they are assembled on table 4 by the transport bands 6, 6', whereby a united or single vertical cardboard package 21 results.

In order to achieve a friction-free rotation of the packages 2 at a possibly low energy consumption, the conducting of the packages should be performed in such a manner that the center axis of each package after rotation has about the same location as before. The observance of this principle is particularly important in view of the fact that the height and the width of the individual packages 2 upon leaving the machine may be different. If, for instance, only a few layers of corrugated cardboard are simultaneously entered into the longitudinal cutter and severed by the latter into four individual packages, four comparatively wide but thin packages leave the longitudinal cutter. Upon the rotation, however, the packages vertically extend for a considerable height, since the height of the turned or rotated packages is equal to their width. If, however, a large number of superposed cardboard layers is cut into a great number of packages their height prior to the rotation is greater than their width. Upon rotation the situation is reversed and the width of the packages is greater than their height.

This situation must be considered when constructing the guiding means.

Since these guide means are generally placed upon a table, care must be taken that during rotation disturbances caused by the table are avoided.

If a thin but wide package which is closely conducted on the table, is to be turned or rotated at 90 degrees, this rotation can only be performed after slightly lifting the package from the table. As previously mentioned the rotation should be so controlled that the center axis of the packages after the rotation has about the same position as before; in other words, the center axis of the package must have prior to the rotation the same height above the table as after the rotation. As a general rule the transport of the packages should be so controlled that their center axes prior to rotation have the same height above the table as after rotation for 90 degrees. This object may be reached, as before stated, by conducting the packages prior to rotation through guide means such as pins 5, which are vertically adjustable relative to the common plane of the adjacent packages and which by their adjustment displace the center axes of the packages in the same direction.

With this purpose in view the packages prior to rotation may be conducted through rollers 8, 8' which are common to all packages, the axes of these rollers being parallel and vertically displaceable to the common plane of the packages and to the plane of the working table.

Since certain changes may be made in the above article and different embodiments of the invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

Having thus described the invention, what I claim as new and desire to be secured by Letters Patent, is as follows:

1. In a device for the continuous converting of strip shaped side-by-side packages vertically superposed into a single stack containing all of the strips by guiding and turning each of the packages 90 degrees about their longitudinal axes while advancing them and bringing each rotated package into a common plane, means operable for guiding and rotating the packages comprising a series of guide rollers located along a line extending transversely across the advance direction of said packages, the distance between said rollers being adjustable in conformity with the width and thickness of said packages to conduct the same individually upon their rotation, and a pair of vertically superposed transport bands located in pressure contact with said packages to hold the same together.

2. In a device according to claim 1, commonly adjustable means to simultaneously vary the mutual distance between said guide rollers.

3. In a device according to claim 1, a pair of horizontal guide rollers located in advance of the place of rotation of said packages in a superposed position on top of and below said adjacent packages the axes of said two rollers being displaceable parallel to each other and perpendicular to a common plane of said packages.

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