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CONTINUOUS PRODUCTION OF PACKAGES CONTAINING A ZIG-ZAG FOLDED STRIP OF WADDING OR COTTON WOOL MATERIAL

Original Filed Dec. 10, 1957

Fig. 1.

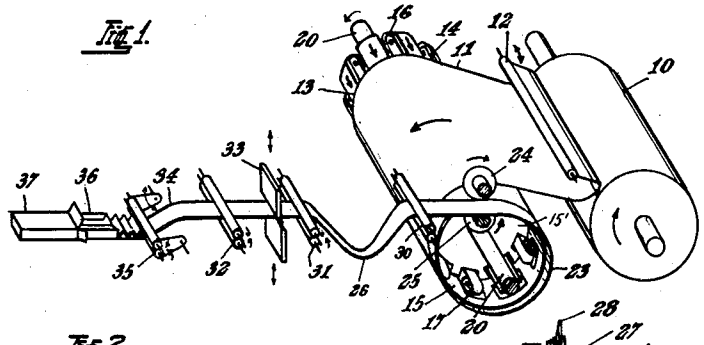


Fig. 2.

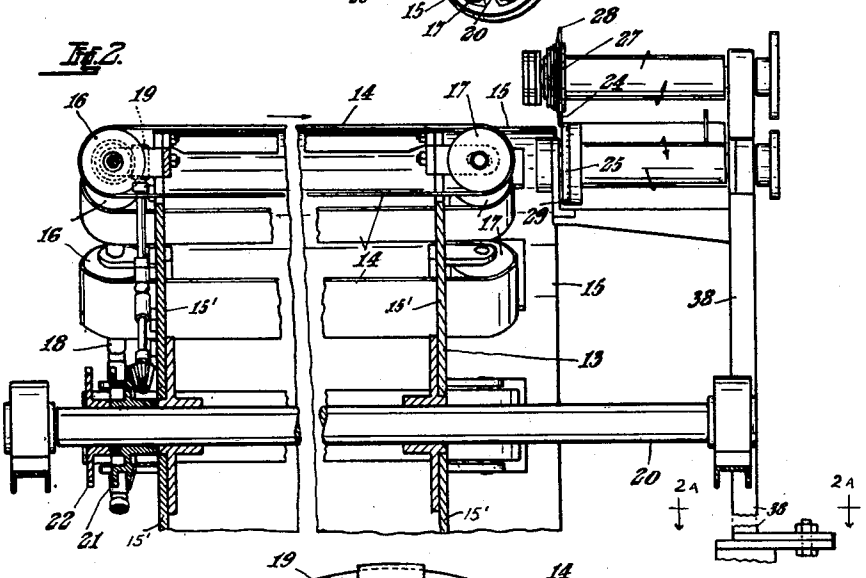
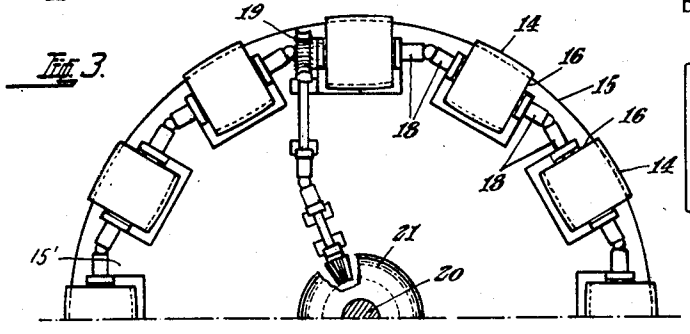


Fig. 3.



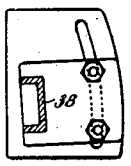


FIG. 2A

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CONTINUOUS PRODUCTION OF PACKAGES CONTAINING A ZIG-ZAG FOLDED STRIP OF WADDING OR COTTON WOOL MATERIAL

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Original application Dec. 10, 1957, Ser. No. 701,825, now Patent No. 3,081,658, dated Mar. 19, 1963. Divided and this application Sept. 26, 1962, Ser. No. 233,168

6 Claims. (Cl. 28—72)

This invention relates to a method for continuously producing packages each containing a strip of wadding or cotton wool material folded zig-zag fashion inside the package.

This application is a division of my copending application Serial No. 701,825, filed on December 10, 1957, now Patent No. 3,081,658, issued on March 19, 1963.

According to the invention a strip of wadding or cotton wool material from which the desired lengths can be cut is obtained directly from a web leaving a carding machine by continuously winding the web into a multiple lap whilst simultaneously axially advancing the lap and continuously longitudinally cutting a strip containing the thickness of the lap from the leading edge of the lap at a distance therefrom which corresponds to the desired width of the strip, and then longitudinally drawing the strip away.

The method may be performed, for example, by means of a revolving winding mandrel which is arranged with its axis of rotation extending across the delivery end of the card. For the purpose of axially advancing the lap on the mandrel, feed means are arranged on the mandrel in such a manner as to permit the mandrel and the multiple layer lap to revolve as a unit.

The method of the invention may be practiced by means of apparatus such as that shown in the accompanying drawing and described in detail in the specification which follows.

Referring to the drawing:

FIG. 1 is a diagrammatic perspective view of the principal elements of the apparatus.

FIG. 2 is an axial section of the lap winding drum and the circular cutters comprised in the apparatus.

FIG. 2A is a horizontal sectional view taken on line 2A—2A of FIG. 2, of a support column for cutters in the apparatus.

FIG. 3 is a cross section through part of the lapwinding drum.

In FIG. 1, 10 is the doffer of the carding machine from which by means of a stripper comb 12 the web is detached in the conventional manner and taken on to a revolving drum 13. Distributed equidistantly over the peripheral surface 15 of the drum are several endless conveyor belts 14 so arranged that the outer belt sections are parallel with the drum axis, and each belt runs over a drive roller 16 at one end of the drum and over a return roller 17 at the other. The drive rollers 16 drive all the conveyor belts 14 in the same direction of travel and at the same speed, the return rollers 17 being individually adjustable on the drum in the axial direction to control the tension of each individual belt. The shafts 18 of the drive rollers 16 are articulated together, as shown in FIGS. 2 and 3, and they are driven through a common worm gearing 19 by a sprocket wheel 21, loosely mounted on the shaft 20 of the drum and adjustably rotated through the drum shaft 20 via a sprocket wheel 22 secured thereto and a variable speed gear not specially shown.

The web 11 is wound by means of the revolving drum into a multiple lap 23 which is simultaneously continuously traversed by the conveyor belts 14 in the axial direction

towards the return rollers 17. The web is therefore wound on the drum into continuous helically lapped layers of wadding or cotton wool material. Two cooperating revolving circular cutters 24 and 25 continuously cut a strip 26 of wadding or cotton wool material containing the thickness of the lap longitudinally from that edge of the lap which travels outwards beyond the return rollers, the cut being performed at a distance from the momentary leading edge of the advancing lap which will depend upon the amount by which the lap is advanced per revolution of the drum, and this strip is continuously drawn away from the lap.

The cut performed by the circular cutting knives will run along a helix determined by the outside edge of that layer which has advanced as far as the cutter knife 24. The two parallel axes of rotation of the two circular cutters 24 and 25, must therefore, be set at an angle to the direction of traverse of the lap, and this angle will depend upon the pitch of the helix, that is to say, upon the distance through which the web is axially advanced in the course of each revolution of the drum. For setting and adjusting this angle in conformity with the speed of advance, the two circular cutters and their common frame are pivotally mounted for adjustment about a vertical axis, as shown in FIG. 2A, which contains the point at which the cutters bite into the material and intersects the axis of the lap, and which is located in the column 38.

The circular cutter 24 on the outside of the lap is a thin, slightly cone shaped annular ring resembling the edge of a dinner plate of which the inner rim is clamped into a hub 27, whereas the outer rim has a bevelled cutting edge 28. The other circular cutter 25 is a recessed disc with an outer cylindrical flange of which the narrow edge has a hollow, conical profile to form the cooperative cutting edge 29. The circular cutter 24 radially only slightly overlaps the edge of the cooperating cutter 25 and is elastically urged into contact therewith so that the two cutters are selfgrinding as they rotate.

The speed of the cutters depends upon the speed of the drum, the circular cutter 25 on the inside of the lap preferably being driven at a slightly higher speed than the circular cutter 24.

The strip 26 of wadding or cotton wool material 26 is drawn off in conformity with the speed of rotation of the drum 13 by a pair of drawing-off rollers 30 which compress the strip and deliver it to a second pair of drawing-off rollers 31. Between this second and a third pair of drawing-off rollers 32 is an electrically controlled cross-cutting device 33 which cuts sections of the desired length or pre-determined weight off the wadding or cotton wool strip in the conventional manner while the pairs of rollers 31 and 32 are arrested. Meanwhile the first pair of drawing-off rollers 30 continues to feed and causes the creation of a loop in the material between itself and the next following pair of rollers 31. When the arrested pair of rollers 31, 32 again start revolving their slightly higher speed over the first pair of rollers just takes up this loop during the interval until they are arrested again. The severed section 34 is fed from the third pair of rollers 32 to a pair of pleating rollers 35 adapted to rise and fall transversely across the flat side of the severed strip 34 immediately in front of a stationary guide 36 intended for the reception of the package of wadding or cotton wool material, for the purpose of folding into regular zig-zag pleats the strip of wadding or cotton wool material as it enters the guide. The wrapper 37 is pushed on to the guide 36 and retracted after having been filled with the strip of wadding or cotton wool material 26, and the packing 37 can then be closed.

Since, on the one hand, the feed of the conveyor belts per revolution of the drum can be adjusted to vary the width of the strip, the guide, on the other hand, can be

adapted or exchanged to fit the resultant width of the strip.

It will be apparent to those skilled in the art that various changes and modifications may be made in the method herein shown and described without departing from the spirit and scope of the invention as defined in the appended claims.

What I claim is:

1. A method of continuously producing packages each containing a length of wadding material in strip form folded zig-zag fashion inside the package, said method comprising the steps of: winding a carded web of fibrous material of uniform thickness cylindrically with respect to a fixed axis to form a plurality of superposed layers having a total thickness which constitutes the thickness of said material in strip form; advancing said carded web longitudinally of said axis at a speed which bears a fixed ratio to the speed of said winding step, said advancing step being performed simultaneously with said winding step; continuously cutting an end portion of the cylinder formed by said winding and advancing steps to obtain said material in strip form; severing said material in strip form to provide a series of separate strips of uniform length; folding each of said separate strips in zig-zag fashion to form a packageable unit; and separately packaging each of said strips after said folding step.

2. The method of forming a multiple layer strip from the output web of a carding engine which comprises the steps of: continuously winding said web into the form of a cylinder the wall of which consists of a plurality of layers of said web; continuously displacing said cylinder wall axially during the winding of the web by which said wall is formed, the speed of said axial displacement being at a velocity which bears a fixed predetermined ratio to the delivery velocity of said web; continuously forming a helical cut in said hollow cylinder commencing at its leading edge to sever a continuous strip of uniform width therefrom, said strip consisting of a plurality of superposed portions of said web, and forwarding said continuous strip.

3. The method according to claim 2 which comprises the further step of cutting said continuous strip into a series of separate strips of predetermined lengths.

4. The method according to claim 2 which comprises the further steps of cutting said continuous strip into a series of separate strips and individually packaging each of said separate strips.

5. The method according to claim 2 which comprises the further steps of cutting said continuous strip into a series of separate strips, and folding said separate strips along uniformly spaced transversely extending crease lines.

6. The method according to claim 5 comprising the further step of individually packaging each of said folded strips.

References Cited in the file of this patent

UNITED STATES PATENTS

1,422,581	Laurency et al.	July 11, 1922
1,756,171	Bommer	Apr. 29, 1930
2,388,591	Andreas	Nov. 6, 1945
2,421,750	Gannett	June 10, 1947
2,439,903	O'Connell	Apr. 20, 1948
2,641,317	Pasold	June 9, 1953