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CONTINUOUS PRODUCTION OF PACKAGES CONTAINING
A ZIG-ZAG FOLDED STRIP OF WADDING
OR COTTON WOOL MATERIAL
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Fig. 1.

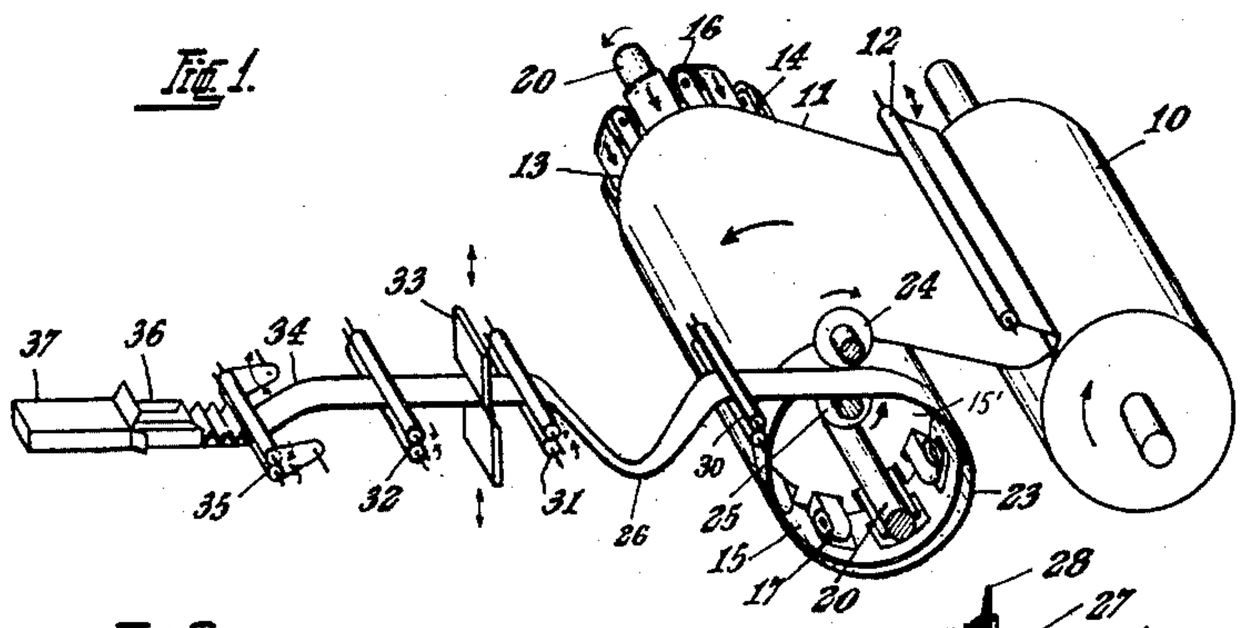

Fig. 2.

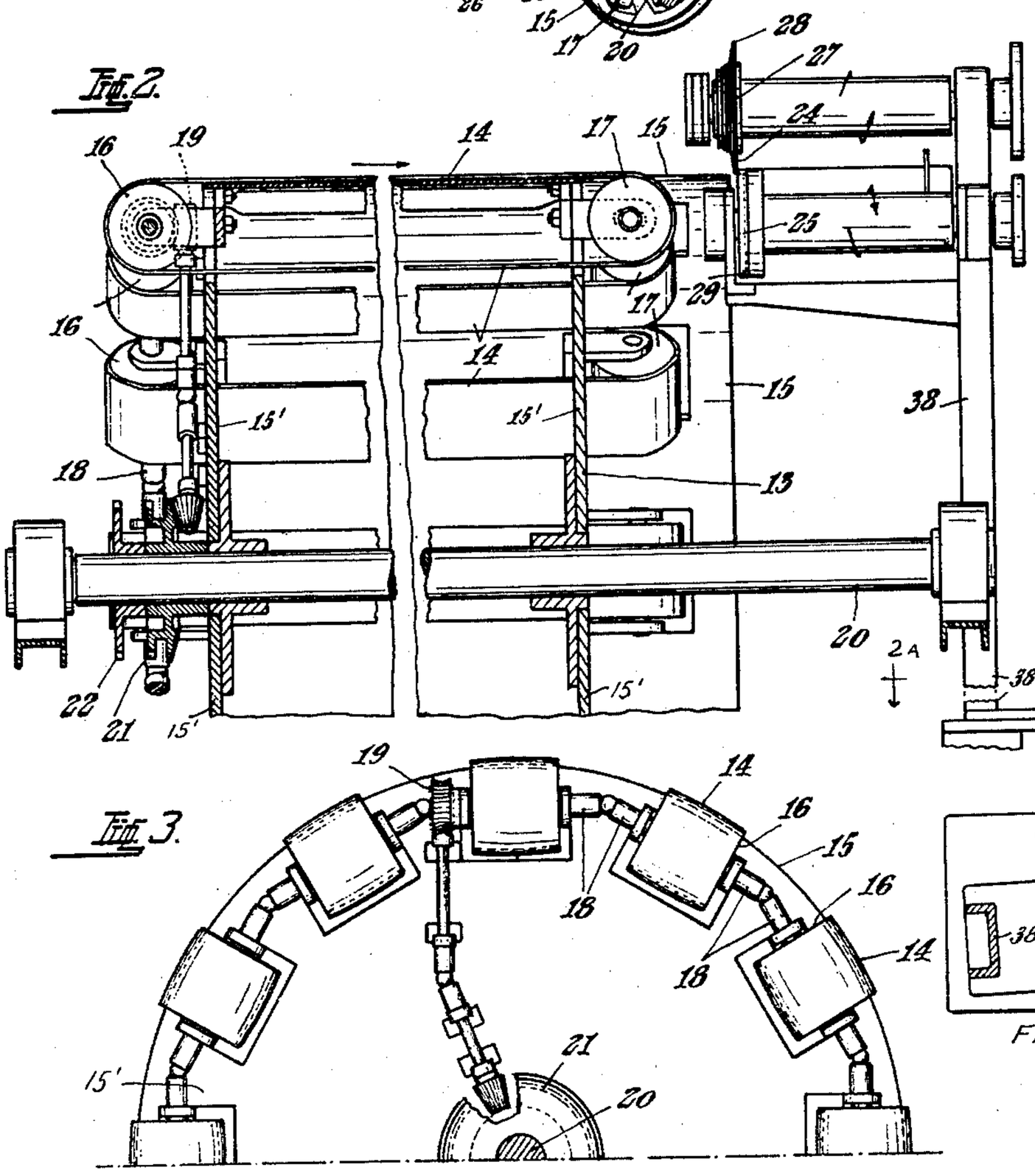

Fig. 3.

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

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 while 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 with the desired width of the strip, and then drawing the strip away in the longitudinal direction.

The apparatus for performing the method consists in that, for the purpose of forming the multiple lap from the web delivered by the carding machine, a revolving winding core is arranged with its axis of rotation across the delivery end of the card, and in that, for the purpose of axially advancing the lap on the winding core, feed means are disposed in the axial direction of the core in such a manner as to permit the core and the lap to revolve.

The method proposed by the present invention will be described more particularly hereinafter with reference to an illustrative form of apparatus shown in the drawings in which

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 a conventional manner and taken on to a revolving drum 13. The drum has opposing substantially circular end plates 15'. 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, 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, therefore, is wound on the drum in continuous, helically lapped layers of wadding or cotton wool material. Two cooperating re-

volving 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, therefore, must 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 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 conical 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 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 these second pair of rollers 31 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 30 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 36. The wrapper 37 is pushed onto the guide 36 and retracted after having been filled with the strip of wadding or cotton wool material 32, and the packing 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 36, on the other hand, can be adapted or exchanged to fit the resultant width of the strip.

By means of several longitudinal cutting devices several strips of wadding or cotton wool material could be cut off the lap at the same time, and each such strip fed to a separate guide. In view of the increase in the speed of advance of the web that would then be required the drum could be fed with a web delivered by a two-set carding machine or by several single carding machines arranged in tandem to ensure that the web had the desired thickness.

To advance the lap **23** axially on the drum, the conveyor belts **14** mounted on the drum might be replaced by conveyor means arranged on the outside of the lap which could be wound on to a revolving core instead of on to a drum, in such manner as to axially advance the lap without impeding the rotation of the drum and the lap. Such conveyor means might consist for instance of several endless trains of articulated feed rollers, each train revolving along the outer surface of the lap in the direction of the axis of revolution of the winding core, whereas the feed rollers themselves rotated about the axis of the train.

What I claim is:

1. An apparatus for cutting a strip from a continuously moving web comprising a rotatable substantially cylindrical winding core having an axis of rotation, a first feeding means feeding said web substantially tangentially to said core to wrap said web around the peripheral surface of said core, a second feed means disposed substantially on the peripheral surface portion of said winding core to support the wrapped web and to advance the lap of said

web in an axial direction of the core, and cutting means positioned adjacent the end of said rotatable core towards which said second feed means feeds said wrapped web to sever the strip from said axially advancing wrapped web.

2. An apparatus as defined in claim 1 wherein said feed means comprises a plurality of circumferentially spaced belts extending in a direction parallel to the axis of said core, and wherein means is provided for moving said belts in the same direction and speed.

3. An apparatus as defined in claim 1 wherein said cutting means include cooperating circular cutter knives and wherein the axes of rotation of said knives are angularly adjustable about an axis which substantially passes through the point where the cutters bite into the material of the web and which intersects the axis of the lap.

4. An apparatus as defined in claim 3 wherein the plane containing the axes of rotation of said knives makes an angle with the axis of the lap which angle is at least approximately equal to the pitch of the helix formed by lapped layers as a result of their axial advance per revolution of the lap.

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