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Brandenburg

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[54] **GLUE-APPLYING APPARATUS FOR CORRUGATED PAPERBOARD MACHINE**

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[52] **U.S. Cl.** **118/262**

[51] **Int. Cl.** **B05c 1/08**

[58] **Field of Search** 118/211, 261, 262

[56] **References Cited**

UNITED STATES PATENTS

2,714,365	8/1955	Rowlands	118/262
3,383,234	5/1968	Nikkel	118/262 X

Primary Examiner—Louis K. Rimrodt

Attorney, Agent, or Firm—Thomas H. Murray et al.

[57] **ABSTRACT**

A smooth surface applicator roll dips into glue in a vat and applies the glue to the crests of the corrugations of a corrugated paper web traveling around a support roll above the vat. A doctor roll is located beside the applicator roll above the glue level in the vat and is pressed against the side of the applicator roll that carries glue upwardly. The doctor roll is rotated in the same direction as the applicator roll to remove glue from it. The doctor roll is provided with grooves extending around it so that laterally spaced strips of glue are left on the applicator roll between the areas of the latter from which glue is removed by the doctor roll. As a result, longitudinally spaced areas of glue are applied to the crest of each paper corrugation by the smooth surface applicator roll.

3 Claims, 3 Drawing Figures

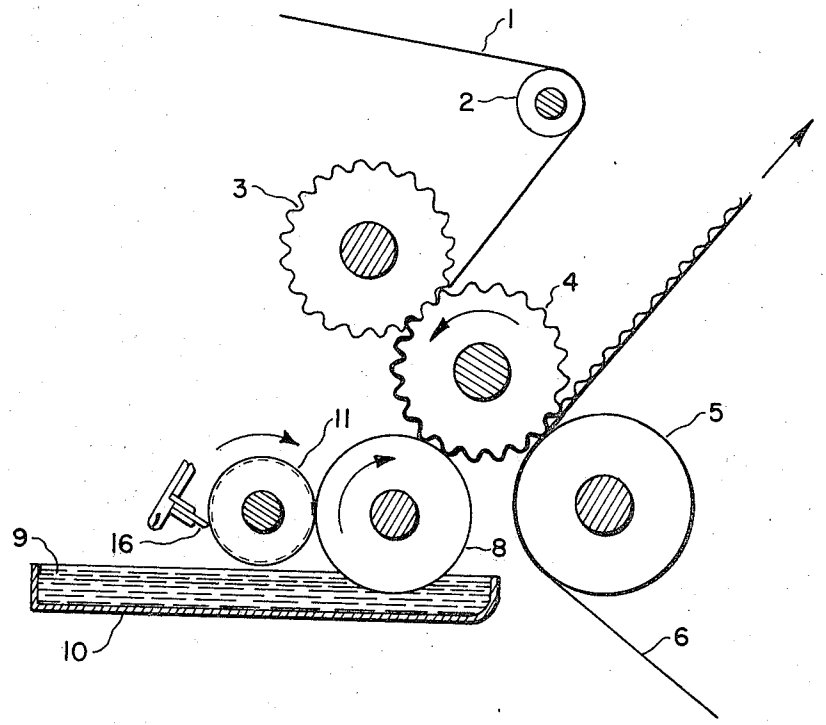


Fig. 1

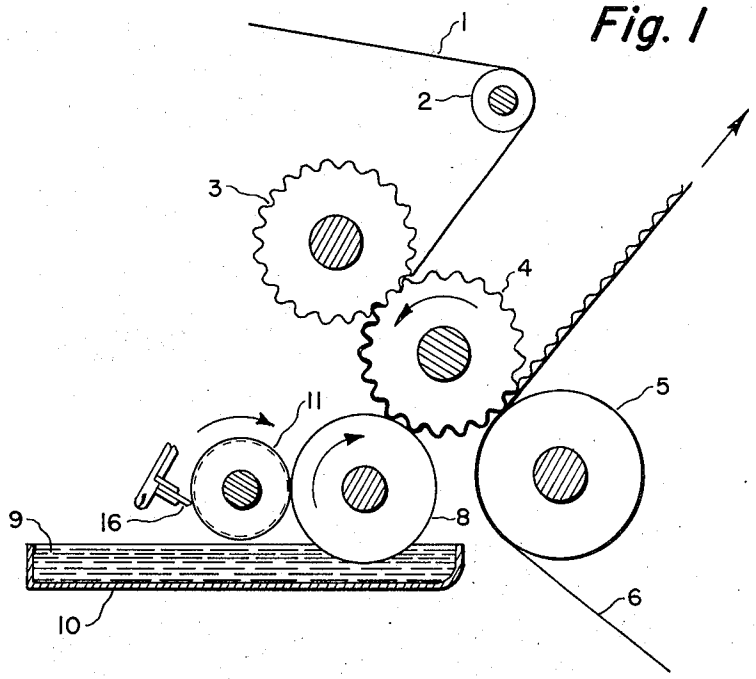


Fig. 2

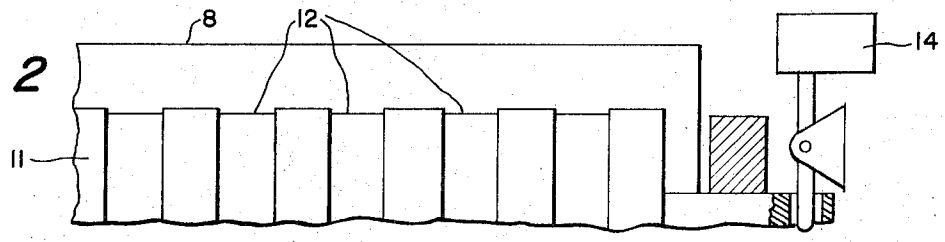
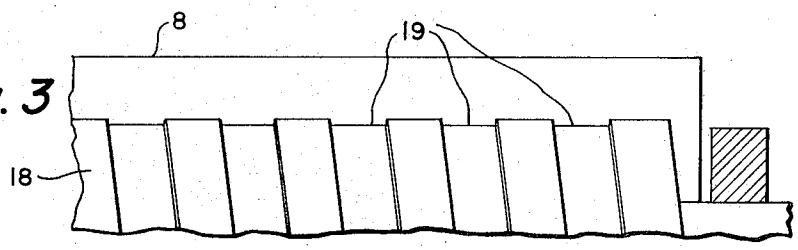


Fig. 3



GLUE-APPLYING APPARATUS FOR CORRUGATED PAPERBOARD MACHINE

BACKGROUND OF THE INVENTION

In the copending application of Beck and Bradenburg, Ser. No. 44,184, filed June 8, 1970, apparatus for applying glue to a traveling corrugated paper web is disclosed. It includes a feed roll with a smooth surface that dips into a vat of glue and applies the glue to annular areas of an applicator roll between annular grooves in that roll. The glue-carrying areas of the applicator roll then apply the glue to the crests of the corrugations of the corrugated web, each corrugation being provided with longitudinally spaced areas of glue. A smooth surface doctor roll is used for removing excess glue from the feed roll to control the thickness of the glue film left on the feed roll, due to the slight clearance between these two rolls.

SUMMARY OF THE INVENTION

The present invention is an improvement over the apparatus shown in the pending application in that a feed roll is eliminated and the applicator roll not only picks up glue from the vat but also applies it to the corrugated web. Also, the applicator roll, instead of being provided with laterally spaced grooves, has a plain or smooth cylindrical surface and it is the doctor roll that is provided with grooves. The areas of the doctor roll between its grooves tightly engage the applicator roll and keep the engaged areas of the latter free of glue, due to the pressure of the doctor roll against the other roll, so that only the areas of the applicator roll opposite the doctor roll grooves carry glue up to the paper corrugations. This apparatus is less expensive to make because it does not require a feed roll, and it is more economical to operate because it has an especially low glue consumption. The apparatus also is more compact than the earlier apparatus, which permits its use in all corrugated paperboard machines.

It is among the objects of this invention to provide corrugated paperboard gluing apparatus which is relatively inexpensive, which is economical to operate, and which is compact.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention is illustrated in the accompanying drawings, in which

FIG. 1 is a side view somewhat schematic;

FIG. 2 is a fragmentary profile view of the doctor roll with the applicator roll behind it; and

FIG. 3 is a view similar to FIG. 2, but of a modification.

DETAILED DESCRIPTION OF THE INVENTION

Referring to FIGS. 1 and 2 of the drawings, a strip or web 1 of paper runs from a suitable source of supply around a roller 2 and then between two corrugating rolls 3 and 4, the surfaces of which are provided with corrugations extending lengthwise of them. The corrugations of the two rolls mesh with each other so that as the web passes between them it is corrugated. The corrugated web extends about 180° around roll 4 and then travels away from it between that roll and a smooth surface roll 5. A plain paper strip or web 6 extends part way around the last roll and then between it and the adjacent corrugated roll, where the plain web engages the crests of the corrugation of the corrugated web. As about to be described, the crests of the corrugations receive glue before they engage the plain web 6, so that the two strips of paper are glued together as they pass between rolls 4 and 5 and travel away from them. Glue is applied to the crests of the corrugations of the corrugated web 1 as the latter passes around the middle roll 4.

It is a feature of this invention that a rotating smooth surface applicator roll 8 picks up glue 9 directly from a vat 10 below it, because the bottom portion of the roll dips into the glue. The applicator roll is continuously rotated by any suitable means in a direction opposite to the direction of rotation of corrugated roll 4. To conserve glue and to strengthen the corrugated paperboard, the glue is not applied in a continuous line or strip throughout the length of each corrugation. Rather, it is applied to the crest of each corrugation as a row of longitudinally spaced areas or patches. To do this, it is necessary that the area of the applicator roll that engages the corrugations be free of glue in areas spaced lengthwise of that roll.

Therefore, in accordance with this invention, glue is removed from selected areas of the applicator roll by a doctor roll 11 of novel configuration rotatably mounted beside it above the level of the glue in the vat. Unlike heretofore, the doctor roll is pressed tightly against the side of the applicator roll that is carrying glue upwardly from the vat to the corrugated web. The doctor roll is rotated continuously in the same direction as the applicator roll so that the surface of the doctor roll that engages the applicator roll moves downwardly to scrape glue from the upwardly moving surface of the applicator roll. However, the doctor roll does not remove the glue from the applicator roll throughout its length, but only from selected areas. These areas are formed by providing the doctor roll with grooves extending around it so that the grooved areas will not engage the applicator roll and remove glue from the areas of the applicator roll beside the grooves. As shown in FIG. 2, the doctor roll may be provided with a plurality of separate laterally spaced peripheral grooves 12 encircling the roll at intervals throughout its length. The grooves are very shallow, having a depth from about 0.1 to about 0.2 mm. The depth of the grooves determines the thickness of the film of glue that will be left on the applicator roll and then applied to the corrugations. It is preferred that these grooves be spaced apart a distance equal to their width.

As mentioned above, the doctor roll is pressed tightly enough against the applicator roll in any suitable manner to prevent the applicator roll from carrying any glue up past the laterally spaced areas engaged by the doctor roll. Consequently, films of glue are left on the applicator roll only opposite the doctor roll grooves. These films take the form of laterally spaced strips corresponding in width to that of the grooves. These thin strips of glue are carried upwardly by the applicator roll and applied in lines or patches to the crests of the corrugations of the corrugated web where the corrugations pass between rolls 4 and 8, the crest of each corrugation thereby being provided with a plurality of longitudinally spaced glue areas.

The compression resistance of the corrugated paperboard can be greatly increased if the glue areas on each corrugation are staggered relative to those on the corrugations at its opposite sides. This staggering can be effected by reciprocating the doctor roll axially by any

suitable reciprocating means **14** attached to the projecting end of one of the roll shafts. The roll should be moved in each direction from a central position a distance equal to the width of a groove. The frequency of the reciprocation is related to the revolutions per minute of the doctor roll so that the glue that the doctor roll leaves on the applicator roll will be properly staggered on the paper corrugations, assuming that the contact areas of the doctor roll have the same width of the grooves.

A scraper **16** of highly elastic material may engage the surface of the doctor roll, or air jets may be directed at a tangent to the doctor roll surface. The scraper or jets will remove excess glue from the doctor roll.

In the modification shown in FIG. **3**, a doctor roll **18** is shown which will cause staggering of the glue areas on a corrugated paper web without the roll being reciprocated axially. This is accomplished by connecting the grooves **19** in the doctor roll so that they form one continuous running groove extending helically around the roll. In other words, the roll is provided with a plurality of 360° helical grooves connected end to end to form a running groove. As this roll rotates against the applicator roll, the areas of the latter that will be cleaned of glue by the doctor roll will move across the applicator roll from one end to the other. The glue strips that are left on the applicator roll by the spiral grooves likewise will be continuously displaced lengthwise of that roll. By properly coordinating the rotational speeds of the different rolls, the glue areas applied to the crests of the paper corrugations will be staggered from corrugation to corrugation.

According to the provisions of the patent statutes, I have explained the principle of my invention, and have illustrated and described what I now consider to represent its best embodiment. However, I desire to have it understood that, within the scope of the appended claims, the invention may be practiced otherwise than as specifically illustrated and described.

I claim:

1. The combination with a support roll for a traveling corrugated paper web, of glue-applying apparatus comprising a glue vat below the support roll, a smooth surface applicator roll parallel to the support roll and disposed between it and the vat, means rotatably supporting the applicator roll with its bottom portion dipping into glue in the vat and with another portion of the roll positioned to engage the crests of the corrugations of a corrugated paper web traveling around the support roll, means for driving the applicator roll, a doctor roll above the glue level in the vat and parallel to the applicator roll, means rotatably supporting the doctor roll and pressing it against the side of the applicator roll that carries glue upwardly, means for driving the doctor roll in the same direction as the applicator roll to remove glue from the applicator roll, the doctor roll being provided with grooves extending around it to leave laterally spaced strips of glue on the applicator roll, surfaces of the doctor roll between said grooves being substantially the same width as the grooves whereby longitudinally spaced areas of glue will be applied to the crest of each paper corrugation, and a scraper of highly elastic material engaging said surfaces of the doctor roll between said grooves.

2. The combination recited in claim **1**, in which the depth of said doctor roll grooves is from about 0.1 to about 0.2 mm.

3. The combination recited in claim **1**, in which said grooves are laterally spaced circular grooves, said apparatus including means for reciprocating the doctor roll axially at a frequency depending upon the rpm of that roll to stagger the glue areas on successive corrugations.

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