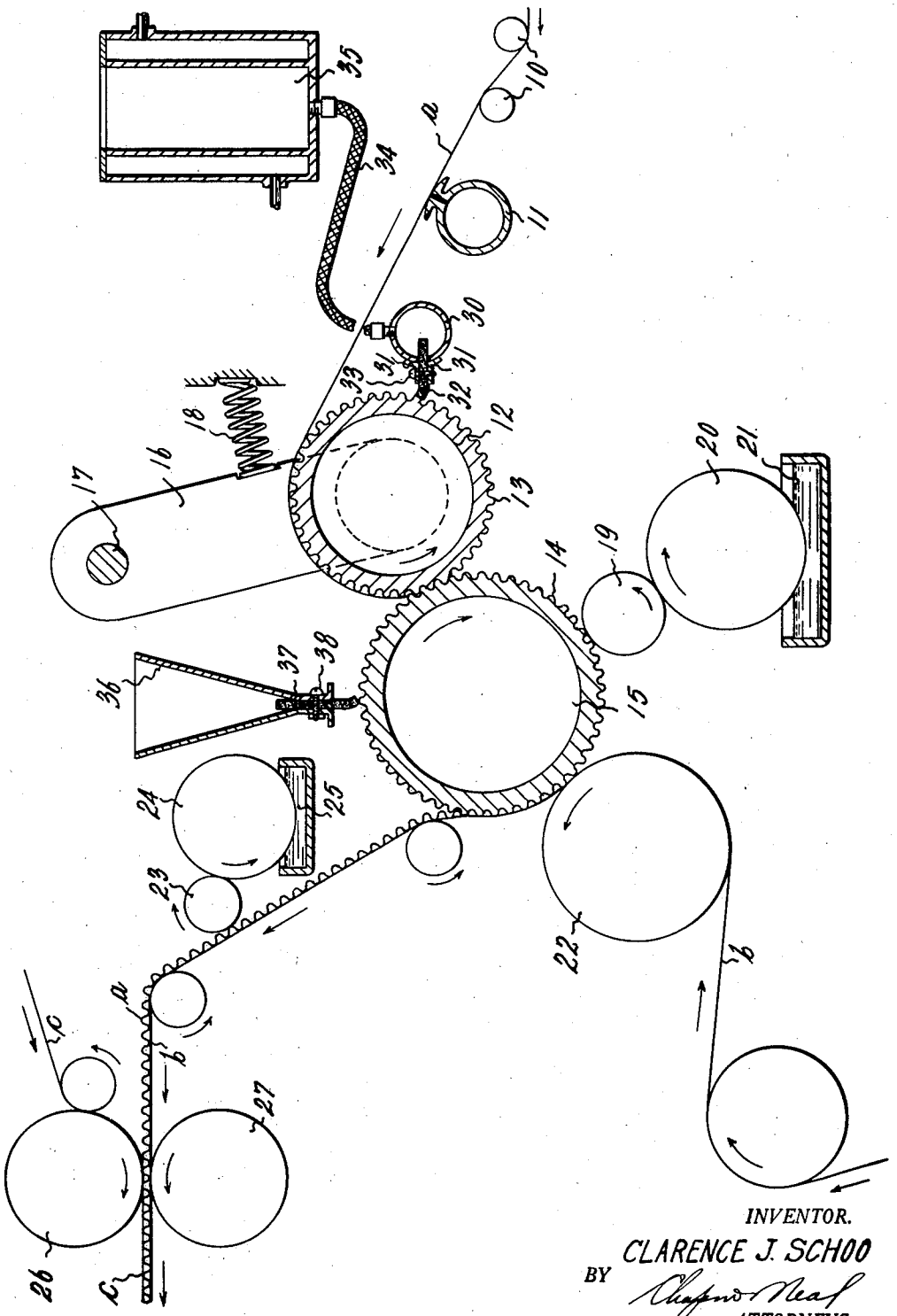
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PAPER CORRUGATING MACHINE

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PAPER-CORRUGATING MACHINE

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This invention relates to improvements in machines for the manufacture of corrugated paper board. The procedure generally followed in the production of this material is to pass a web of suitable heavy paper between a pair of meshing fluted rollers and then to secure adhesively a web of paper to each side of the corrugated sheet. These external or lining sheets are bridged across the corrugations in the central web and hold the latter against subsequent collapse.

In passing between the corrugating rolls the paper is subjected to heavy stress. Depending upon the nature of the paper it may yield to the stress with resulting weakening of its fibers, or it may resist the stress to a point where corrugations of full depth will not be obtained. I have found that by applying to the corrugating rolls a thin film of melted paraffin or other lubricant the difficulty of forming full height corrugations without injurious strain disappears. It is the object of the present invention to provide a corrugating mechanism with mechanism for transferring to the corrugating rolls a film of molten paraffin or other lubricant of controllable amount. The quantity applied is preferably sufficiently small so that the amount transferred to the paper by its contact with the roll will be insufficient to produce any commercially perceptible effect on the original properties of the paper, although sufficient to produce corrugations of full height without injurious strain on the fibers. A further object is to provide a mechanism of this character which can use molten paraffin as a lubricant without the necessity of using complicated steam jacketing. A further object is to provide a mechanism of this general character which will apply the lubricant in such a manner that it will not injuriously affect the bonding to the corrugated sheet of the subsequenty applied adhesively coated lining sheets. Additional objects will appear from the following description and claims.

The invention will now be described with particular reference to the accompanying drawing—which is a diagrammatic representation of mechanism by which my improved process may be practiced. The web *a* of material to be corrugated passes over guide rolls 10 and a steaming device 11 to the surface of a corrugating roll 12. This roll has teeth 13 meshing with similar teeth 14 on a second corrugating roll 15. The roll 12 is mounted on a bracket 16 pivoted at 17 to a stationary part of the machine and is pressed towards the roll 15 by a compression spring 18. As the paper web passes between the two corrugating rolls, it is forced into its final corrugated condition, and is set in this condition by the heat of the rolls, generally kept at over 300° F. This heat is generally supplied by steam circulated through the hollow interior of the rolls. An adhesive applying roll 19 runs in contact with the corrugated paper on roll 15 and applies a film of adhesive such as sodium silicate to the high points of the corrugations. This roll receives adhesive from a supply roll 20 dipping into a tank 21. A lining web *b* is passed over a roll 22 running adjacent to the surface of roll 15, and is pressed thereby into adhering contact with the corrugated paper. The composite web then passes an adhesive applying roll 23, which receives adhesive from a roll 24 and a tank 25 and applies adhesive to the second side of the corrugated web. The second lining sheet *c* is passed around a roll 26 and is pressed against the corrugated web by this roll and a mating roll 27.

This arrangement of apparatus has been described rather briefly, as it is common in the art. It does, however, illustrate the environment with which the mechanism now to be described is combined to produce the novel results referred to above. According to my invention the lubricant is preferably applied to the crests only of the flutings on the corrugating rolls, being allowed to spread over the remainder of the roll surface. This spreading takes place with considerable rapidity on account of the heat of the rolls, and I have found this method of application to have several features of advantage. In the first place the portions of the roll flutings which require the maximum lubrication are the crest and the sides. It is the crest which receives the maximum frictional contact of the paper during the drawing of the paper

around the roll into corrugated form. It is the sides to which maximum pressure is applied during the actual corrugating, and to which the paper is most likely to stick. The bottom of the groove gives comparatively little trouble during the corrugating operation, and requires little if any lubication. The bottom of the roll flutings, moreover, corresponds to the crest of the corrugation which is formed in the paper, and it is to this point that the adhesive is subsequently applied. Any appreciable quantity of lubricant will harmfully affect the sticking of the adhesive to the paper, and it is thus of importance to prevent the accumulation of an excess of lubricant at the bottoms of the roll flutings. My preferred manner of applying lubricant to the roll surface consists in permitting the outer portions of the flutings to wipe against a wick saturated with the lubricant. This has certain advantages over other methods of application such for example as spraying, for in the latter case the force of the spray would tend to cause an accumulation of lubricant at the bottom of the flutings with a minimum at the top and sides, the reverse of the condition desired.

Referring now to the mechanical details of the apparatus which forms the preferred embodiment of my invention, a tube 30, closed at its ends, is located adjacent the roll 12. Flanges 31 are secured in parallel relation along this roll, leaving between them a space communicating with the interior of the tube. A wick 32 fills this space and is subject to comprehension to any degree desired by one or more adjusting screws. By tightening the screws the wick will be compressed and the amount of lubricant delivered from the interior of the tube 30 will be lessened. The tube is positioned close to the roll 13, conveniently between it and the steaming device 11, so that when paraffin is used as a lubricant the normal heat of the surrounding parts will be sufficient to preserve the paraffin in molten condition without the use of special means for heating the tube. The wick 32 is positioned so that it drags upon the periphery of the corrugated roll 12, spreading a thin layer of the lubricant upon the crest of the flutings. As the tube is limited in size on account of its position and is for the same reason rather difficult to fill with lubricant, it is preferably kept filled from an external source. For this purpose it is conneced by a flexible conduit 34 to a steam jacketed tank 35 which may be positioned wherever convenient.

Above the second corrugating roll 15 is a funnel-shaped trough 36 having a wick 37 clamped between its lower edges by one or more adjusting screws 38. This trough is also so located relative to the normally heated machine parts that in practice paraffin will be kept melted in it due to the heat of the corrugating rolls, and a separate steam jacket will be unnecessary. The wick 37 drags over the crests of the fluttings on the roll 15 in the same manner as has been described with relation to the wick 32.

It will be noted that the wick 32 applies its lubricant to the crests of the flutings on roll 13 prior to the contact of the web *a* with it. The web travels at a speed higher than the surface speed of the roll, on account of the surplus material required for the formation of the corrugations. The lubrication greatly decreases the frictional resistance necessary to be overcome in drawing to the corrugating point the amount of paper required. It also facilitates the actual corrugating operation and prevents sticking of the paper to the roll. The valleys of the flutings on roll 12, which preferably receive the lubricant only through spreading and not directly from the wick, and which therefore receive the minimum amount, correspond to the crests of the corrugations which later contact with the adhesive-applying roll 19 and with the lining sheet *b*. While the total amount of lubricant applied is preferably very small (about one pound of paraffin for seventeen thousand square feet of paper being enough) this gives added insurance that on the crests of the corrugations there will not be a quantity of lubricant sufficient to prevent the later applied adhesive from adhering. Similar remarks of course apply to the wick 37.

What I claim is:

1. A paper corrugating machine comprising a pair of mating corrugating rolls, means for supplying a web of paper between the rolls, and a device for applying a film of lubricant continuously to the surface of at least one of the rolls prior to the contact of the paper therewith.

2. A paper corrugating machine comprising a pair of mating fluted corrugating rolls, a wick located in rubbing contact with the crests of the flutings of at least one of said rolls, and means for supplying a lubricant to the wick.

3. A paper corrugating machine comprising a pair of mating fluted corrugating rolls, means for supplying a web of paper between the rolls, and a device for applying lubricant continuously to the crests only of the flutings of at least one of said rolls.

4. A paper corrugating machine comprising a pair of mating heated corrugating rollers, a wick located adjacent each of the rollers so as to be in rubbing contact therewith, and a supply of molten paraffin associated with each wick so as to maintain them saturated with the molten paraffin, said supplies being located in such close adjacency to the heated rolls as to receive from them a sufficient quantity of heat to retain the paraffin in them in molten condition.

5. A paper corrugating machine compris-

ing a pair of heated mating corrugating rolls positioned one beside the other, means for supplying a web of paper across the top of one roll and then between the two rolls, a steaming device spaced from the roll first contacted with by the paper web and positioned to deliver steam against the under side of the paper web, a paraffin reservoir located between the steaming device and the adjacent roll and extending the length of the latter and positioned to receive heat from both the steaming device and the roll, a wick extending from said reservoir into rubbing contact with the adjacent corrugated roll, a second paraffin reservoir located above the second corrugated roll and positioned so as to receive heat therefrom, and a wick extending from said reservoir into rubbing contact with said second corrugated roll.

6. A machine for making corrugated board which comprises a pair of mating fluted corrugated rolls, means for supplying a web of paper between said rolls, a lubricant saturated wick located in rubbing contact with the crests only of the flutings in each roll to apply lubricant to each roll prior to the contact of the paper therewith, means for applying adhesive to the crest only of the corrugations in the web after the latter has passed between the rolls, and means for applying a lining sheet to each side of the web in bridging relation to the adhesive-coated crests of the corrugations therein.

In testimony whereof I have affixed my signature.

CLARENCE J. SCHOO.