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ADHESIVE APPLICATOR MEANS PARTICULARLY  
ADAPTED FOR CORRUGATING MACHINES

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2 Sheets-Sheet 2

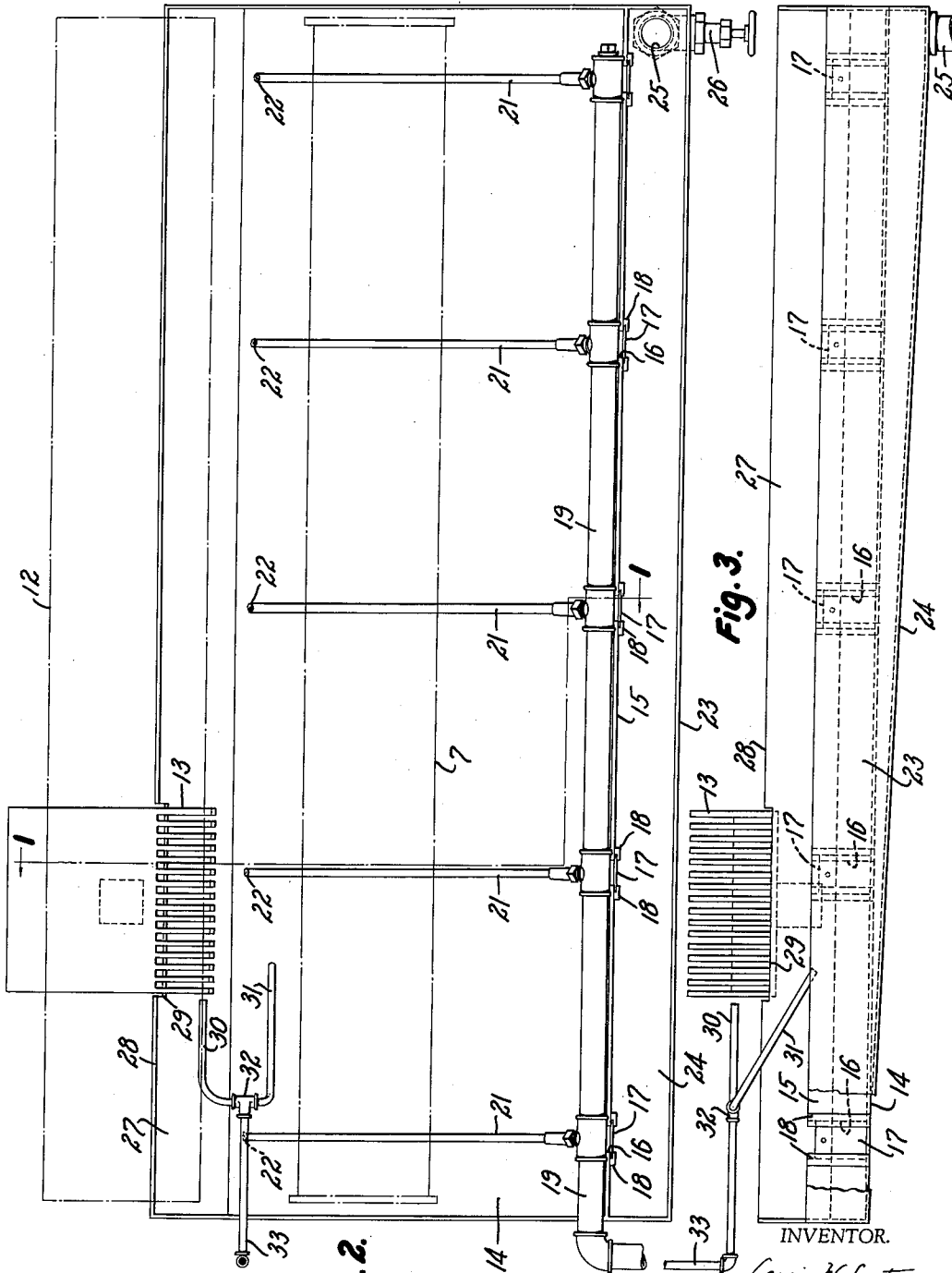


Fig. 2.

Fig. 3.

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**ADHESIVE APPLICATOR MEANS PARTICULARLY ADAPTED FOR CORRUGATING MACHINES**

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13 Claims. (Cl. 117—111)

This invention relates to paper making machinery, particularly machines for manufacturing corrugated paperboard, and it has especial reference to the construction, assembly, and functioning of the paste, or adhesive, furnishing means of such machines, primarily the paste pan and its adjuncts.

In the conventional arrangement of the paste furnishing means of corrugating machines the usual doctored paste feed roll has a portion of its periphery immersed in a bath of warm starch paste, usually of a temperature between 103° and 106° F., in a paste pan having its bottom inclined downwardly from the rear to the front of the machine. The warm paste coming from a suitable source is constantly fed to this pan adjacent to its low, front, end and fills the pan to a desired level which is controlled by constant overflow outlet means at such low end from which the excess is returned to the source. Thus a constant circulation of paste from the source to the pan, and back to the source, is provided during operation of the machine.

In such an arrangement the paste at the rear, high, end of the pan has a tendency to accumulate heat due to its proximity to the heated rear corrugating roll and the heated pressure roll, and to gel, and thus to interfere with its proper circulation. Moreover, where it comes in contact with certain elements of the machine, such as the splicing guide and pressure roll, due to splatter or spray from the rotating paste-applying rolls, particularly the paste transfer roll, it has a tendency to solidify, thus causing gumming up of parts and particularly of such splicing guide and pressure roll and necessitating frequent shut-down for cleaning. In some instances a water-cooled baffle plate has been interposed between the paste-applying rolls and the splicing guide and pressure roll to intercept this splatter or spray of paste, but such a baffle plate has been found to cause a build-up of paste upon itself, and also upon the crescents of the corrugating roll pair, with the result that the baffle plate as well as other parts of the machine must be subjected to frequent cleaning.

The primary object of the present invention is to provide a method and means for supplying paste to corrugating machines whereby the faults of conventional means are overcome, thus providing for more efficient functioning of corrugating machines and making the necessity of shut-down for cleaning less frequent, whereby operating time and output may be materially increased and an improved product obtained.

The invention comprises a method of supplying paste to corrugating machines, and a modification of the form of the usual paste pan and its functional location with respect to elements of the corrugating mechanism, a novel form, assembly and arrangement of the paste feeding and circulating means, means for controlling the splatter or spray of paste upon operative elements of the machine and means for returning such splattered or sprayed paste to the paste pan, all as will be explained hereinafter more fully and finally claimed.

In the accompanying drawings illustrating the invention, in the several figures of which like parts are similarly designated,

Fig. 1 is a longitudinal sectional elevation of the major operative elements of a corrugating machine of conventional type having the paste supplying means of the invention operatively assembled therewith, the sectional and elevational showing of such paste supplying means being taken substantially in the plane of line 1—1, Fig. 2,

Fig. 2 is a top plan view of the paste pan and paste supplying and controlling means of the invention with certain of the proximate conventional elements of the corrugating machine shown in full and in dot-and-dash lines,

Fig. 3 is a front end view of the paste pan parts, and some of the adjuncts, shown in Fig. 2, as seen from the lower edge of such figure, with parts broken away,

Fig. 4 is an enlarged fragmentary top edge view showing one of the paste level controlling gates or weirs of the paste pan, and

Fig. 5 is a front view of the parts shown in Fig. 4.

As hereinbefore intimated, the elements of the corrugating machine proper are of conventional form and arrangement, including feeding and conditioning means 1, 2 and 3 for the paper sheet *a* to be corrugated, the heated corrugating rolls 4 and 5 with their crescents 6, the paste feed roll 7, with its doctor blade 8, the paste transfer roll 9, the rolls 10 and 11 for feeding the backing or liner sheet of paper *b*, the heated pressure roll 12 for applying this liner sheet against the corrugated sheet *a* as it leaves the corrugating roll 5 with paste applied, and the splicing guide 13.

In accordance with the invention the paste pan has its bottom 14 slanted downwardly toward the front (left) of the machine at an angle of approximately five degrees to the horizontal so that the paste in the bath *c* will tend to flow by gravity to the front end of the pan where it is retained at the desired level, appropriate to the immersion of the periphery of the paste feed roll 7 by a wall 15 provided with a plurality of slots or openings 16 extending vertically of it and each having a gate or weir 17 removably slidable in fixed guides 18. These gates or weirs 17 seat against the bottom 14 of the pan and are of a height to maintain the proper predetermined level of the paste bath *c*, (see Figs. 1, 3, 4 and 5) and obviously this level may be properly adjusted by the provision of sets of gates or weirs 17 of various heights which are interchangeable.

The paste is fed to the pan, preferably by a pump and hence under pressure, from a suitable tank, or other storage source (not shown) by way of a valve-controlled manifold 19 (see particularly Figs. 1 and 2) joined to the tank conduit (not shown) by a quick-connect and disconnect coupling 20 of conventional form (Fig. 1). Paste flows from the manifold 19 into the rear (right) end portion of the paste pan through tube means 21, a plurality thereof (five thereof, for example, as shown) being preferable, and these tube means upwardly curved so that their exit ends 22 terminate adjacent to but below the level of the paste bath *c*.

Relatively cool paste thus constantly fed to the paste pan in the zone of high temperature will, as has been indicated, rise to the level established by the top edges of the gates or weirs 17, which are preferably equal in number to and disposed in longitudinal alignment with the inlet tubes 21 and, in maintaining such level, will spill over the gates or weirs for collection in a trough 23 the bottom 24 of which slants downwardly transversely of the pan to an outlet conduit 25 provided with a control valve 26 (Fig. 2) and leading back to the storage tank or source for the paste, thus providing for continu-

ous circulation of the paste during operation of the corrugating machine.

The emission of the paste from the exit ends 22 of the paste tubes 21 beneath the surface of the bath *c* tends to create a turbulence, or agitation, of the bath, which serves to aid in circulation of the paste from the rear, high, end of the pan, where it is introduced, to the front, low, end of the pan for spill over into the trough 23. Thus, the paste at the rear (high) end of the pan where it has been subjected to an accumulation of heat from the previously mentioned elements of the corrugating apparatus will constantly be replaced at such rear end by relatively cool paste and will flow by gravity to the front (low) end of the pan and spill into the trough 23 from which it is returned to the paste source for subsequent recirculation at its normal relatively cool temperature of from 103° to 106° F. This constant supplying of relatively cool paste to the zone of greatest heat in the pan is effective to counteract gelling in the pan and particularly in this zone of greatest heat. Moreover, the turbulence or agitation set up in the paste in the zone of greatest heat aids in preventing gelling of the paste.

It will be noted by reference to Fig. 1 that the conventional water-cooled splatter or spray baffle has been dispensed with, and hence the disadvantages in operation of the machine when such a baffle is used are obviated. Nevertheless, for efficient, trouble-free operation some means is needed for meeting the problem presented by the normal creation of the splatter or spray of paste from the paste transfer roll 9 and the pressure roll 12 and for returning the splattered or sprayed paste to the paste pan. To this end the rear wall 27 of the paste pan is raised and extended rearwardly (to the right, Fig. 1) so that its upper edge or lip 28 just clears the periphery of the pressure roll 12, and hence any paste carried by or dripping from the periphery of this roll will be caught by the rear wall 27 of the paste pan and returned to the bath *c*. The edge or lip 28 of the rear wall 27 of the pan is provided with a recess 29 which serves to clear the splicing guide 13 and enable this lip 28 to be brought into the desired close relation to the periphery of the pressure roll 12, thus closing the space between the bottom of the paste pan, the paste applying roll 7, the paste transfer roll 9, the corrugating roll 5 and the pressure roll 12.

In order to cool the splicing guide 13 and in a measure to direct the splatter or spray of paste away from it and hence prevent its fouling, an air jet from a pipe 30 is directed across the face of the splicing guide. Also, to aid in cooling the paste at the high end of the pan in the zone of greatest heat, and, in a measure, to augment turbulence in the paste bath, an air jet is directed against the surface of the bath in this zone from a pipe 31. The air jet pipes 30 and 31 are connected by a T coupling 32 with an air pipe 33 controlled by a valve 34 and leading from a source of compressed air (not shown).

From the foregoing it will be apparent that the method of the invention resides in supplying the paste at the normally hot zone at the high end of the paste pan, rather than at its relatively cool zone at the low end of the pan as is customary, thus to insure more reliable circulation of the paste and guard against its gelling.

Various changes and modifications are considered to be within the principle of the invention and the scope of the following claims.

What I claim is:

1. For association particularly with a machine for the manufacture of corrugated paperboard including the customary paper-feeding rolls, corrugating rolls, paste-applying roll and pressure roll, and a splicing guide adjacent to said pressure roll; means for immersing an operative portion of the periphery of such paste-applying roll in a bath of paste including a paste pan having its bottom arranged at an incline with the high end

thereof in the zone of greatest heat adjacent to the corrugating and pressure rolls for inducing gravity flow of paste from the high end of the pan to its low end, means functioning during operation of the machine for continuously supplying relatively cool fluid paste to the pan for establishing therein a paste bath, and means at the low end of the pan for establishing the level of said bath at that predetermined as proper for adequate immersion of the periphery of said paste-applying roll, the means for supplying paste to said pan being immersed in the paste bath and apertured to supply the relatively cool fluid paste below the level of said bath at the high end of the pan in the zone of greatest heat to thereby create turbulence and aid in circulation of heated paste from the high end to the low end of the pan and counteract tendency of the paste to gel.

2. Paste supplying means for corrugating machines as claimed in claim 1, in which said paste supplying means comprise a plurality of tubes having their exit end apertures immersed in said bath and their opposite ends connected with a manifold disposed adjacent to the low end of the paste pan said tubes extending from said manifold beneath said paste-applying roll to the high end of the pan.

3. Paste supplying means for corrugating machines as claimed in claim 1, in which the high end of the paste pan is provided with an end wall having a lip arranged in close proximity to the periphery of the pressure roll in position to catch and return to said pan the splatter or spray of paste incident to the paste-applying operation.

4. Paste supplying means for corrugating machines as claimed in claim 3, in which the lip of said pan wall is provided with a recess extending downwardly of said wall, said recess serving to clear the splicing guide when said lip is adjusted in desired proximity to the periphery of said pressure roll.

5. Paste supplying means for corrugating machines as claimed in claim 1, in which said paste pan is furnished at its low end with a wall having overflow apertures for the paste, gate means for establishing the level for such overflow and thereby the level of the bath, and a trough abutting said wall and serving to receive and convey away paste in excess of that necessary to maintain the level of said bath and escaping from said level establishing means.

6. Paste supplying means for corrugating machines as claimed in claim 5, in which the paste supplying means include a plurality of tubes and the gate means are equal in number to the number of such tubes and are arranged substantially in alignment with said tubes longitudinally of the pan.

7. Paste supplying means for corrugating machines as claimed in claim 1, in which means are arranged adjacent to the high end of the paste pan for directing a jet of air against the surface of the paste bath to aid in cooling and maintaining turbulence therein.

8. Paste supplying means for corrugating machines as claimed in claim 1, in which means are arranged adjacent to said pressure roll for directing a jet of air upon said splicing guide to prevent the accumulation upon said guide of paste splatter or spray incident to the paste-applying operation.

9. The method of supplying paste to the paste pan of a corrugating machine having conventional feed means for paper to be corrugated, and heated corrugating roll and pressure roll means displaced from said paper feed means in the direction of feed of the paper, which pan is adapted to contain a bath of paste having a normally hot zone adjacent to the heated corrugating roll and pressure roll means and a relatively cool zone substantially displaced from such roll means toward said paper feed means, which comprises the steps of introducing relatively cool paste from a source thereof to the

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said normally hot zone, circulating the paste from said normally hot zone to the relatively cool zone, and returning excess paste from such relatively cool zone to said source for recirculation.

10. The method as claimed in claim 9, in which the paste is introduced below the level of said bath. 5

11. The method as claimed in claim 9, in which a current of cool air is directed upon the bath of paste in the normally hot zone thereof.

12. The method as claimed in claim 9, in which, where the machine is provided with a splicing guide, a current of cool air is directed upon such guide. 10

13. The method as claimed in claim 11, in which, where the machine is provided with a splicing guide, a current of cool air is directed also upon such guide. 15

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UNITED STATES PATENT OFFICE  
CERTIFICATION OF CORRECTION

Patent No. 2,977,247

March 28, 1961

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It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 2, line 58, strike out "thereof", second occurrence; line 59, after "means" insert -- extended below the paste feed roll 7 and are preferably --.

Signed and sealed this 15th day of August 1961.

(SEAL)

Attest:

ERNEST W. SWIDER

Attesting Officer

DAVID L. LADD

Commissioner of Patents