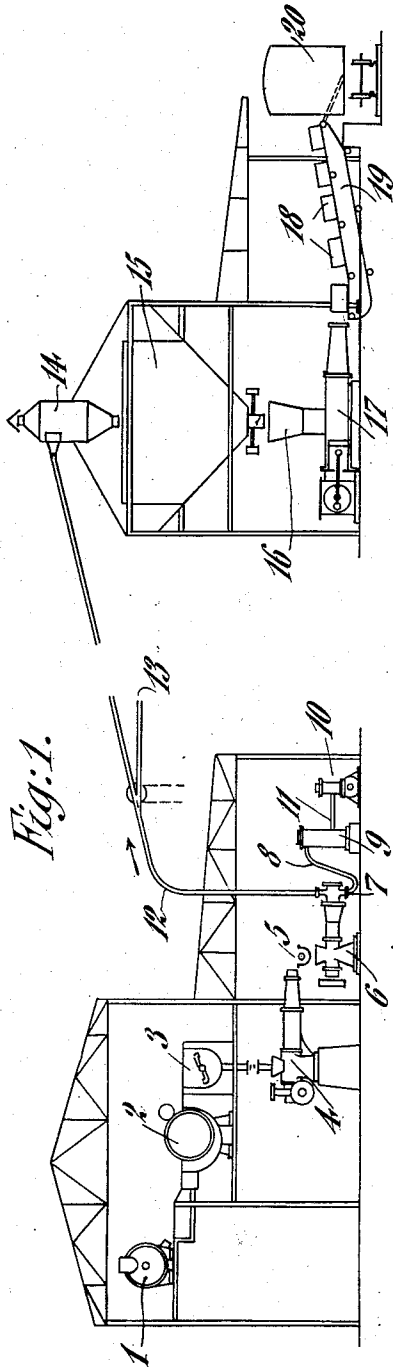
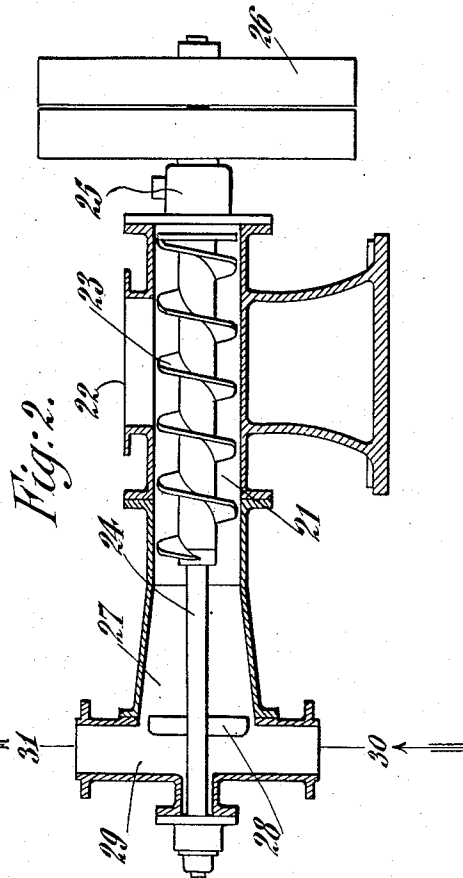


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METHOD FOR CONVERTING LIQUID PAPER PULP INTO A CONSISTENT MASS
SUITABLE FOR STORAGE, ETC., OR INTO BALES FOR SHIPMENT
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METHOD FOR CONVERTING LIQUID PAPER PULP INTO A CONSISTENT MASS SUITABLE FOR STORAGE, ETC., OR INTO BALES FOR SHIPMENT

Original application filed February 4, 1927, Serial No. 165,774. Divided and this application filed November 13, 1929. Serial No. 406,786.

This invention relates to a method for converting liquid paper pulp or the like into a consistent mass suitable for storage, etc., or into bales for shipment.

In this application I have shown and described an apparatus shown in my copending application for converting liquid paper pulp into a consistent mass suitable for storage etc., or into bales for shipment, Serial No. 165,774, filed by me on February 4, 1927, of which this application forms a division. Whereas in the parent application referred to I have claimed the apparatus for carrying through the new manufacturing method, in the present application the claims are directed to my new method steps which are capable of being carried out by any suitable apparatus or in any convenient manner.

The particular object of my invention is to eliminate the wet presses, hydraulic presses, carts, etc., as well as the enormous manual work involved with the present system for obtaining a pulp of consistent form such as would be suitable for storage or for producing bales from the liquid stock.

With the old system of using the said wet machines so called laps are produced containing about 65-75% of water. These laps have to be taken to hydraulic presses, and after felts or other drainage materials have been inserted between a limited number of laps, they are subjected in these presses for a second time to a high pressure, with the result of removing again a part of the water, to the extent of only 50% of same still remaining in the pulp. The felts or other intermediate layers which serve to drain away the water pressed out from the laps in the hydraulic presses, have then to be removed from the laps whereupon the latter, after having been reassembled, are sent to the storage or are packed into bales for shipment on the baling press which generally is of the same type as the hydraulic dewatering press, only of somewhat lighter construction. The wet presses used in that old pulp treating system, requires new wires and felts rather frequently, which means high maintenance and upkeep costs. Further the frequent insertion of fresh felt or other

drainage material between the layers of laps before pressing them out in the hydraulic press, as well as the necessity of taking them out again after the pressing operation has been finished, the reassembling of the laps before they are packed, and the baling operation itself, all those manipulations taken together require much manual work and an expensive installation, occupying an enormous floor space.

According to the method of my invention I avoid all these disadvantages by predewatering the pulp coming from the screens in a highly diluted state in so called deckers or slushing cylinders to a consistency of about 2 to 8 percent; thereafter feeding the predewatered pulp through pipes or open troughs into screw presses which press out of it as much as about 30 to 55 per cent of its moisture contents; thereupon the pulp is discharged from the screw presses into mechanical or pneumatic conveyors, which deliver it either to the storage bin or storage room, or directly into baling presses of the hay press type, which in turn surrender the finished bale on a bale conveyor leading to the store house or to the railway car or other shipping contrivance.

Where the pulp storage or baling department is at a location distant from the other parts of the pulp manufacturing plant, then the pneumatic handling of the pulp leaving the screw press is of considerable advantage. Therefore it is further an essential part of my invention, to have the pulp manufacturing plants adapted to such new and improved working conditions. When using my new method of pulp handling, I may connect a special feeding device between the screw press and the air pressure pipe line through which the pulp is blown to the storage or baling department. The compressed air is delivered to this piping from a compressor, and only a relatively low air pressure of 30 to 40 lbs. is required for blowing the pulp over a distance of half a mile and more.

In carrying out my method steps in my new manufacturing plant the feeding equipment may comprise a trough, a hopper, a screw feeder in the cylinder part of the

trough, and a pressure chamber into which the screw feeds the moist pulp. The end of the cylindrical part of the trough, into which the feeding screw does not pass, is of conical shape, having its larger end towards the pressure chamber and its smaller end towards the screw. The stock forced through this conical part into the pressure room is subject on the screw side to the pressure produced by the action of the screw, on the pressure chamber side it is under the pressure prevailing in the air pipe connected to the pressure chamber. The stock forms in the conical part a kind of plug, which prevents the stock from being blown back into the screw room of the trough. Suitable equipment may also consist in the arrangement, at the one end of the shaft of the screw towards the pressure chamber of a knife-like tool which scrapes small particles in even quantities from the pulp fed into the pressure chamber. These loosened particles are carried away by the compressed air passing through the pressure chamber and are transported through the adjoining piping to the distribution storage bin, baling press, hopper etc. Thereby the pressure chamber is preferably arranged in such a manner that the knife itself is almost fully out of the path of the compressed air current and only the pulp to be transported is in this path of the stream of air.

It is further a part of my invention to counteract a variation in moisture of the pulp to be blown to which purpose the distance between the end of the feeding screw and the knife may be varied; for pulp containing less moisture, the distance is shorter, whereas pulp with a higher moisture content requires a larger distance between the end of screw and the knife, in order to prevent the pressure in the pressure chamber from blowing the stock in the wrong way through the feeding screw instead of blowing it through the piping.

A mode of carrying out the present invention is shown by way of example in the accompanying drawings, in which:—

Figure 1 is a diagrammatic cross section of a pulp treating plant suitable for carrying out my new method; and

Fig. 2 shows a longitudinal section of the special pulp feeding device 6 in larger scale.

In the apparatus illustrated by way of example in Figure 1, 1 is the screen in which the pulp to be dewatered is freed from coarse particles, etc. The good pulp leaves the screen in a dilution of 1 part of solid matter to about 300 parts of water, which latter is partly removed in the decker 2 to a consistency of from 2 to 8% of the pulp. The pulp thus predewatered is collected in a chest 3 and flows from there to the screw press 4, where the final dewatering is taking place. The pulp leaves the screw press 4 with a consistency of 30 to 55% containing 70 to 45% water, and falls into the special feeding

device 6 which leads it into its pressure chamber 7 into which compressed air is blown through a piping 8, which is connected to the air tank 9. If more than one screw press is being used then the pulp leaving the presses is collected in a conveyor 5 and carried by it to the feeding devices 6. The compressed air is produced by the compressor 10, which is connected to the air tank 9 by means of piping 11. To the pressure chamber 7 is connected the pressure piping 12, through which the pulp fed into the pressure chamber is blown by the compressed air to either the storage 13, or to the cyclone 14 on the roof of the baling department. From the cyclone in which the air is separated from the pulp, the latter drops into the bin 15 and is fed from there into the hopper 16 of the baling press 17. The baling press delivers the pulp in bales 18 to a conveyor or the like 19, on which the bales are packed for shipment if necessary and which carries them directly into the freight car 20 or other shipping contrivance or the warehouse for storage in case no direct shipment is intended.

In Fig. 2 which shows the feeding device 6 with the pressure chamber 7 of Fig. 1 in larger scale, 21 designates the trough with hopper 22 into which the pulp is delivered from the screw press 4 of Fig. 1.

23 is the feeding screw in the cylindrical part of the trough, 24 is the shaft of the screw carried on the hopper side in a bearing 25 and driven on its free end through a pulley 26. 27 is the conical part of the trough in which the pulp forms the sealing plug, 28 is the knife fastened to the shaft on the pressure chamber side. 29 is the pressure chamber with openings 30 and 31 in it, to which the pipe 8 from the air tank 9 and the pipe 12 leading to the storage or cyclone are connected.

Instead of a feeder of the screw type, any other type of feeding device such as a piston feeder, etc., and instead of air handling any other system for conveying the pulp can be used without departing from the spirit of my invention.

It is to be understood that I do not limit myself to the precise method steps employed except as indicated in my claims, and it will be obvious to those skilled in the art to which my invention appertains that many forms of apparatus and kinds of equipment may be used to carry out the manufacturing method hereinbefore explained.

I claim:

1. In a method of treating paper pulp stock, first denuding loose paper stock of the greater part of its moisture content, then disintegrating the denuded pulp stock and finally subjecting particles of the pulp stock at the point of disintegration to the action of compressed air and conveying the same while

in air suspension to a remote point for further treatment.

2. In a method of treating paper pulp stock, first denuding loose paper stock of the greater proportion of its moisture content, then forming the stock into a progressively replenished compact mass and disintegrating said stock mass, and finally subjecting the disintegrated stock at the point of disintegration to the action of compressed air and conveying the same in air suspension to a remote point for further treatment.

In testimony that I claim the foregoing as my invention, I have signed my name hereto.

RICHARD T. LANG.