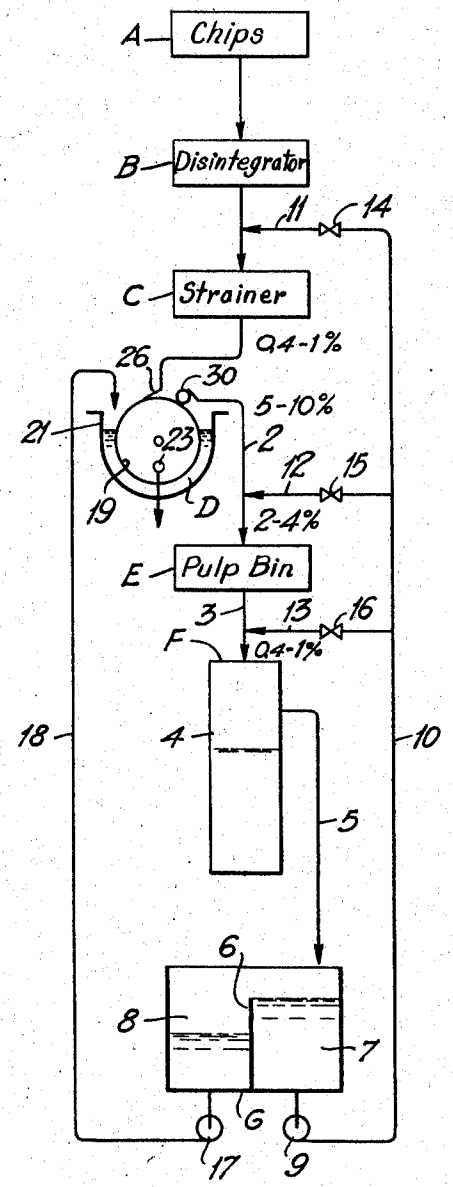
May 19, 1959 E. O. L. WALLEN 2,887,430

METHOD OF TREATING FIBRE PULP FOR THE PRODUCTION OF FIBRE PRODUCTS SUCH AS PAPER, FIBRE BOARDS AND THE LIKE

Filed Feb. 17, 1956 2 Sheets-Sheet 1

FIG. 1.

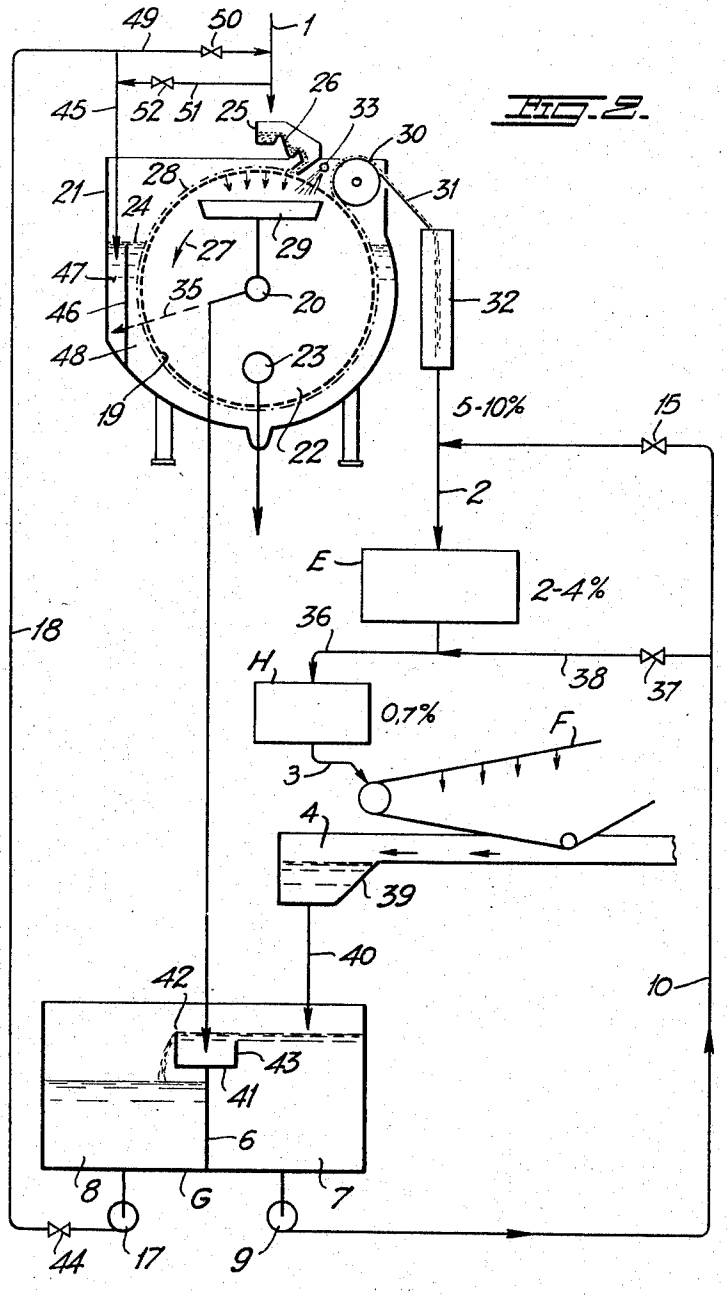


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FIG. 2.



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METHOD OF TREATING FIBRE PULP FOR THE PRODUCTION OF FIBRE PRODUCTS SUCH AS PAPER, FIBRE BOARDS AND THE LIKE

Emil Olof Lennart Wallen, Stockholm, Sweden, assignor to Leje & Thurne Aktiebolag, Stockholm, Sweden

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6 Claims. (Cl. 162—149)

The present invention refers to a method of treating wood fibre pulp in cellulose factories for the production of paper, pasteboard, fibre boards and similar fibre products, and the invention refers in particular to that section of the production process wherein the disintegrated and strained fibre pulp is thickened by dewatering. The apparatus hitherto used for this purpose generally consisted of a strainer, preferably in the form of a rotating strainer drum arranged in the fibre suspension, the fibres depositing on the jacket of said drum in the form of a fibre layer taken off by means of a doctor or the like. However, a strainer drum of this type is not sufficiently effective for complete removal of the fibres from the suspension, for which reason rather a considerable portion of the fibres is entrained with the water escaping through the strainer, particularly so, if the fibre length is small. The percentage of fibres of the escaping water is actually of about the same magnitude as that of the backwater obtained in the manufacture. Therefore, the water escaping from the dewatering apparatus must be purified, the fibres being then recovered by straining and filtering in apparatus separated from the production process.

The present invention has for its object to render the dewatering of the fibre pulp more effective. To this end, an apparatus with a rotating strainer drum is made use of, onto which the fibre pulp is applied under such conditions that the pulp is caused to form on the envelope of the drum a fibre layer effective as a filter and capable of filtering the suspension to such an extent that the escaping water need not be subjected to any purifying process. Said filter layer is preferably made up by the fibre suspension proper which is to be dewatered, by the latter being applied to a portion of the strainer drum lying free above the liquid surface, so that the fibres will be separated immediately to deposit on the jacket of the drum. In this manner, a solid fibre layer is formed on the downwardly running part of the drum, which layer is maintained intact during its passage through the suspension surrounding the drum and serves as a filter for the separation of the fibres from the suspension.

Fibre strainers of said type are known per se but would be used hitherto only for purifying back water. By thus using a fibre strainer with a filter layer in place of the dewatering apparatus as hitherto employed, not only will a lesser loss of fibres and a better recovery of the fibre pulp entering into the production process but also a more concentrated fibre pulp be obtained, which may then, if required, be thinned in the desired degree and transferred to a pulp bin or a machine vat for further conveyance to a take-up machine.

According to the invention, said dewatering apparatus may also be utilized to advantage for the purification of the back water escaping from the take-up machine and for the recovery of the fibres from the same. For this purpose the back water is transferred to the liquid space of the dewatering apparatus where it blends with the fibre suspension supplied to the apparatus, and is filtered

together with the latter through the filter layer of the strainer drum.

The invention will be described more closely with reference to the accompanying drawings. Fig. 1 illustrates diagrammatically the treatment of the fibre pulp in a wallboard factory. Fig. 2 is a more detailed illustration of a part of the plant according to Fig. 1.

Fig. 1 substantially shows the working process in the production and the treatment of wood fibre pulp. The raw material, which is assumed to consist of wooden chips, is taken from a supply container A and disintegrated in a disintegrator B. The fibrous material thus obtained is mixed with water and passes through a strainer C, wherein coarser particles and impurities are separated. The fibre suspension discharged from the strainer generally holds a fibre percentage of 0.5 to 1 percent by weight of dry substance. The suspension is carried through a conduit **1** to a dewatering apparatus D. The fibre pulp separated in this apparatus and holding a percentage of dry substance of 5 to 10%, for example, is thinned with water and carried through a conduit **2** to a pulp bin E, wherein the percentage of fibres is generally about 2 to 4%. From the pulp bin the fibrous pulp is conveyed further through a conduit **3** to the endless wire F in a take-up machine. Before that, the percentage of fibres has been reduced to 0.4 to 1% by the addition of water. The water escaping from the wire and separated substantially in the wet portion 4 of the wire constitutes the main portion of the back water obtained in the manufacture. This back water may be collected in various ways. In the example shown, it is transferred through a conduit **5** to a collecting container G, which is divided by a partition **6** into two compartments **7**, **8**. The back water enters the liquid compartment **7**, wherein the fibres partly float up to the surface and pass together with the overflow water over the overflow edge of the partition **6** to the liquid compartment **8**. From the compartment **7**, which contains a better back water, water is taken for thinning purposes through a pump **9**, by means of which the water may be fed in over a conduit **10** and branch conduits **11**, **12**, **13** at suitable points of the pulp conduits. Inserted into the branch conduits are valves **14**, **15**, **16** for a manual or automatic control of the thinning process. From the liquid compartment **8**, which contains a somewhat inferior back water, the latter is transferred by means of a pump **17** via a conduit **18** to the liquid space in the dewatering apparatus D. The construction of this apparatus will be described more closely with reference to Fig. 2, where the apparatus is shown to a larger scale.

The apparatus shown as an example is of the type wherein a strainer drum **19** is adapted to rotate on a horizontal shaft **20** in a liquid container **21**. The strainer drum has a cylindrical jacket consisting of wire gauze. The drum is tightened outwardly at one end thereof by means of a fixed end wall **22** having an outlet **23** arranged therein for the water escaping through the strainer gauze and relieved of fibres. The strainer drum is immersed only in part in the container. The suspension coming from the strainer C, Fig. 1, is applied onto the portion of the jacket of the drum which is free above the surface of the liquid, by means of a take-up channel **25** extending along the drum for the whole length thereof and by means of a distributing channel **26** on the uppermost portion of the strainer drum, which latter rotates at the same time in the direction indicated by the arrow **27**. The fibres then separated deposit on the jacket of the drum and form a fibre layer **28**, while the water escaping through the strainer gauze is taken up by a trough arranged within the drum. By the fact that the fibre layer **28** is thus permitted to deposit on the free portion of the jacket, the layer becomes comparatively solid,

When this layer passes during the continued movement of the drum through the surrounding fibre suspension, it substantially maintains its dense consistency and may thus serve as a filter layer, through which the fibre suspension is effectively filtered during its passage through the jacket of the drum. The fibre layer will then take up the fibres separated from the suspension, which are thus entrained with the filter layer and are taken off together with the latter by means of a roller 30 bearing on the drum and by a doctor 31, over which the pulp escapes to a collecting pocket 32. The portion of the jacket of the drum relieved of the fibre layer is liberated from fibre residues by spraying with water from a pipe 33, said fibre residues being then taken up in the trough 29. The water which is intermingled with fibres in the trough 19 is discharged through the hollow shaft 20 via a conduit to the collecting container G for the back water. If desired, a portion of this fibre suspension may be transferred to the liquid space 21, as indicated by means of a dotted line 35.

From the pocket 32, the fibre pulp is transferred to the fibre bin E on having been thinned with water from the branch conduit 12 on its way through the conduit 2. In the example shown in Fig. 2, a floating box H is connected between the pulp bin E and the wire F in the take-up machine. The pulp discharged from the bin E through the conduit 36 is thinned with water via a branch conduit 38 provided with a valve 37, so that the pulp in the box H will present a fibre percentage of approximately 0.7%. The water escaping from the wire F is collected in a channel 39, from which it is transferred to the compartment 7 in the back water container G through a conduit 40. Arranged on the partition 6 in the latter container is a double spillway in the form of a channel 41 with side walls 42, 43 of different heights. The water with the fibres floating up first passes over the side wall 43 into the channel 41 and then over the side wall 42 down into the compartment 8 in the back water container. From the compartment 8, the back water is transferred through the pump 17, a valve 44 and the conduit 18 to an inlet 45 opening into an outer liquid space 47 delimited by a partition 46 in the container 21. From said space, the back water passes further over the upper edge of the partition 46 to the inner liquid space 48. Arranged between the inlet conduit 45 and the outlet conduit 1 is a branch conduit 49 with a valve 50, through which back water may be supplied in the desired quantity to the suspension in the conduit 1. Furthermore, there is provided between the conduits 1 and 45 a connecting conduit 51 with a valve 52, through which a portion of the suspension supplied through the conduit 1 may be discharged and introduced into the liquid space of the container 21.

As will be seen from the above description, the dewatering apparatus D connected between the strainer C and the pulp bin E will serve at the same time as a thickener and a backwater purifier, whereby the otherwise required special back water purifier is dispensed with.

If necessitated by reason of a limited capacity of the dewatering apparatus D, a number of such apparatus may be connected in parallel in separate branch conduits between the strainer C and the pulp bin E, so that these apparatus will together effect the dewatering of the whole production of fibre pulp.

What is claimed is:

1. In the production of paper, fiberboard and the like, wherein back water is produced as an effluent, a method of simultaneously dewatering and thickening the fresh pulp for said production and separating fibers from said back water, the steps which comprise directing a slurry of disintegrated and strained fresh pulp upon an exposed foraminous surface to form a layer of said pulp thereon, introducing the foraminous surface carrying said layer of said pulp supported thereon into an aqueous body containing fiber particles suspended therein to effect deposition of said fiber particles upon said pulp layer, removing said foraminous surface with its pulp layer from said aqueous body, removing the pulp layer and fiber particles carried thereon from said foraminous surface, diluting the fiber particles thus obtained, feeding the diluted fiber suspension to a paper forming machine, removing back water from said machine, and introducing said back water into said aqueous body.

2. In the production of paper, fiberboard and the like, wherein back water is produced as an effluent, a method of simultaneously dewatering and thickening the fresh pulp for said production and separating fibers from said back water, the steps which comprise directing a slurry of disintegrated and strained fresh pulp upon an exposed foraminous surface to form a layer of said pulp thereon, introducing the foraminous surface carrying said layer of said pulp supported thereon into an aqueous body containing fiber particles suspended therein to effect deposition of said fiber particles upon said pulp layer, removing said foraminous surface with its pulp layer from said aqueous body, removing the pulp layer and fiber particles carried thereon from said foraminous surface, diluting the fiber particles thus obtained, feeding the diluted fiber suspension to a paper forming machine, removing back water from said machine, and introducing said back water and a portion of said slurry into said aqueous body.

3. In the production of paper, fiberboard and the like, wherein back water is produced as an effluent, a method of simultaneously dewatering and thickening the fresh pulp for said production and separating fibers from said back water, the steps which comprise directing a slurry of disintegrated and strained fresh pulp upon an exposed foraminous surface to form a layer of said pulp thereon, introducing the foraminous surface carrying said layer of said pulp supported thereon into an aqueous body containing fiber particles suspended therein to effect deposition of said fiber particles upon said layer, removing said foraminous surface with its pulp layer from said aqueous body, removing the pulp layer and fiber particles carried thereon from said forminous surface, diluting the fiber particles thus obtained, feeding the diluted fiber suspension to a paper forming machine, removing back water from said machine, introducing said back water into said aqueous body, and introducing a portion of said back water into said slurry.

4. In the production of paper, fiberboard and the like, wherein back water is produced as an effluent, a method of simultaneously dewatering and thickening the fresh pulp for said production and separating fibers from said back water, the steps which comprise directing a slurry of disintegrated and strained fresh pulp upon an exposed foraminous surface to form a layer of said pulp thereon, introducing the foraminous surface carrying said layer of said pulp supported thereon into an aqueous body containing fiber particles suspended therein to effect deposition of said fiber particles upon said pulp layer, removing said foraminous surface with its pulp layer from said aqueous body, removing the pulp layer and fiber particles carried thereon from said foraminous surface, diluting the fiber particles thus obtained, feeding the diluted fiber suspension to a paper forming machine, removing back water from said machine, introducing said back water into said aqueous body, collecting the water passing through said foraminous surface, and mixing said water with said back water.

5. In the production of paper, fiberboard and the like, wherein back water is produced as an effluent, a method of simultaneously dewatering and thickening the fresh pulp for said production and separating fibers from said back water, the steps which comprise directing a slurry of disintegrated and strained fresh pulp upon an exposed foraminous surface to form a layer of said pulp thereon, said pulp layer having a dry substance percentage of 5 to 10%, introducing the foraminous surface carrying said layer of said pulp supported thereon into an aqueous body containing fiber particles suspended therein to effect

deposition of said fiber particles upon said pulp layer, removing said foraminous surface with its pulp layer from said aqueous body, removing the pulp layer and fiber particles carried thereon from said foraminous surface, diluting the fiber particles thus obtained, feeding the diluted fiber suspension to a paper forming machine, removing back water from said machine, and introducing said back water into said aqueous body.

6. In a paper-making installation, an apparatus for the production of disintegrated and strained pulp, at least one thickener disposed to receive a suspension of said pulp from said apparatus, said thickener comprising a pulp suspension container, a rotary strainer drum mounted inside said container, means for depositing said suspension on the upper descending surface portion of the strainer drum to form a continuous fibrous filter layer thereon, and means for discharging the fibers from the

rising surface portion of the strainer drum, means for diluting the fibers obtained from said thickener, a paper forming machine, and means for feeding the diluted fiber suspension to the paper forming machine, means for removing back water from said machine and means for introducing said back water into said container.

References Cited in the file of this patent

UNITED STATES PATENTS

685,374	Gaara	Oct. 29, 1901
793,720	Godbe	July 4, 1905
1,472,238	Berkey	Oct. 30, 1923
1,958,855	Lacy	May 15, 1934
2,129,802	Wallquist	Sept. 13, 1938
2,331,455	Cowles	Oct. 12, 1943