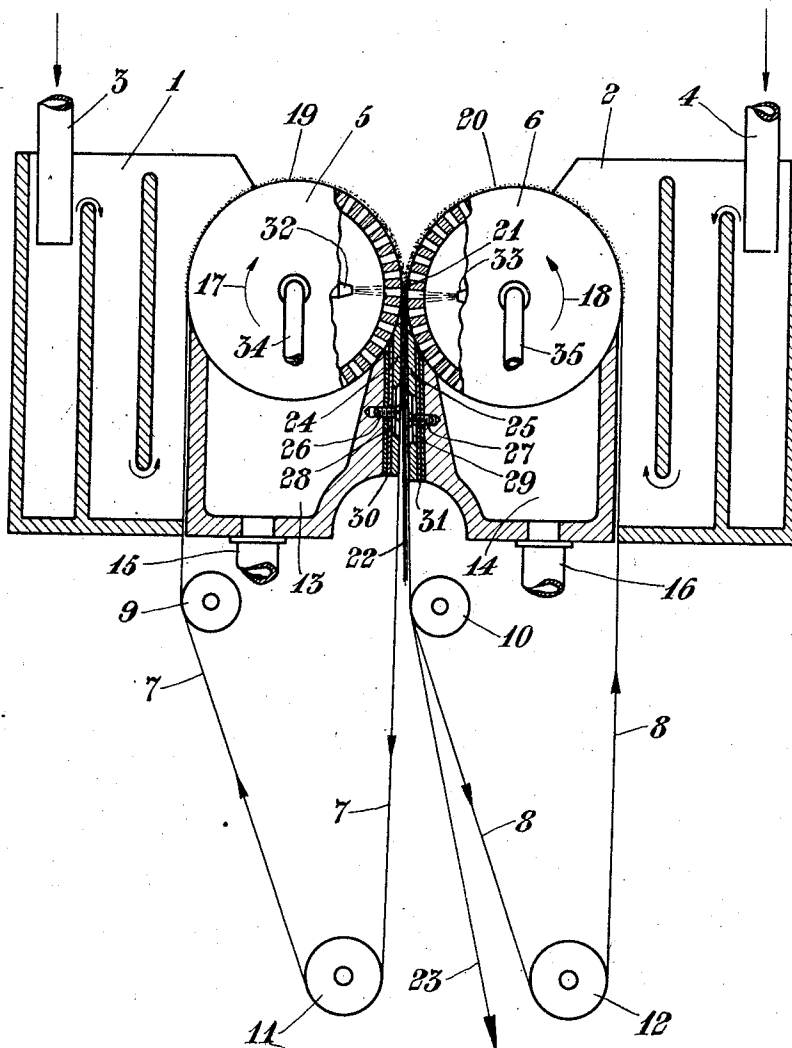


Aug. 4, 1931.

R. E. WAGNER ET AL.
MACHINE FOR SEPARATING LIQUIDS FROM SOLID
BODIES MIXED OR SUSPENDED THEREIN
Filed June 6, 1930

1,817,594



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MACHINE FOR SEPARATING LIQUIDS FROM SOLID BODIES MIXED OR SUSPENDED THEREIN

Application filed June 6, 1930, Serial No. 459,555, and in Sweden March 30, 1929.

The present invention relates to a machine for separating liquids from solid bodies mixed or suspended therein. The machine is mainly intended to be used as a collecting machine in the wood pulp and cellulose manufacture for collecting and shaping a layer or web of material out of the pulp which is diluted with water to a more or less thin consistency, said web of material being afterwards conducted to the drying machine to be further treated. The machine is provided in a manner previously known with two endless wire aprons each of which runs through and forms a wall of a pulp container, and each of which is supported by a rotatably journaled, perforated roller the interior of which communicates with a suction box, in such manner that the webs of material collected on the wire aprons during their passage through the pulp containers become pressed together to form one web at a point at which the two wire aprons are pressed against the intermediate material by the rollers which are journaled parallel to each other. Tests performed with double collecting machines of this type have proved that it is very difficult to press together the two webs to a single web in a satisfactory manner. These difficulties appear to be mainly due to the fact that the material becomes strongly compressed at the pressing point proper between the two rollers, after which it again swells owing to its inherent elasticity, which results in the wire aprons being subjected to much wear by friction against those packing plates which must be provided at the points where the wire aprons move away from the perforated rollers.

The present invention has for its purpose to eliminate these difficulties, and it consists broadly in that the machine is provided with two packing plates or the like, each of which bears with one edge which is preferably obliquely chamfered, against one of the perforated rollers immediately beyond the said pressing point taken in the direction of rotation of the roller, said plates being adjustably attached to the suction boxes, pulp containers, or other stationary parts of the machine frame in such manner as to be capable

of adjustment at various distances from each other. This arrangement renders it possible in each particular case to adjust the plates to suit the nature and condition of the pulp, at such distance from one another as to avoid squeezing of the compressed web of material between the plates and consequent rapid deterioration of the wire aprons due to heavy wear, and on the other hand, so as to avoid play between the plates and the wire aprons and air leakage resulting therefrom.

The accompanying drawing shows by way of example a pulp collecting machine according to the invention viewed partly in side elevation and partly in vertical section.

Referring to the drawing, 1 and 2 denote two pulp containers to which the pulp which is diluted with water, is conducted through the supply pipes 3 and 4, respectively. Rotatably journaled between the pulp containers are two perforated rollers 5 and 6 in such manner that their axes are parallel to each other, and so that there is only an inconsiderable space between the shells of the rollers.

Running over said rollers are endless wire aprons 7 and 8, respectively, which also run over suitable guide rolls 9 and 10, respectively, and stretch rolls 11 and 12, respectively, which are journaled in the machine frame, which is not shown in the drawing. Attached to the lower side of each roller which is not covered by the wire apron 7 or 8, respectively, is a suction box 13 and 14, respectively. These suction boxes communicate through pipes 15 and 16 with a vacuum pump, not illustrated in the drawing, by means of which a suitable vacuum can be maintained in the suction boxes and thus also in the interior of the rollers 5 and 6.

During operation the rollers 5 and 6 are caused to rotate in the opposite directions denoted by the arrows 17 and 18. The outer parts of the wire aprons 7 and 8 will thus run upwards through the pulp containers, so that each of said parts forms the inner wall of the associate pulp container. While the wire aprons run upwards through the pulp containers the pulp in the said containers will gradually deposit on the wire aprons,

particularly on those portions of the same which lie against the circumference of the rollers 5 and 6 in view of the fact that at these portions the suction from the suction boxes 13 and 14 contributes to effect the deposit of the pulp, rapidly removing the water passing through the wire aprons and conducting it through the perforations of the roller shells to the suction boxes, from which the water is afterwards conducted away in any suitable manner.

In this manner pulp webs 19 and 20 are formed on the wire aprons, which webs when raised by the rollers above the level of the liquid in the pulp containers, are still subjected to suction and are therefore further freed from water, whereupon at the pressing place 21 where the two wire aprons are pressed by the rollers against the pulp between said aprons, the webs are compressed to a single web 22 which is finally conducted away in the direction denoted by the arrow 23.

In order to produce the required tight packing at those points immediately beyond the pressing place 21 where the wire aprons 7 and 8 again move away from the rollers 5 and 6, two packing plates 24 and 25 are secured to the inner walls of the suction boxes 13 and 14, each of said plates having an upper obliquely chamfered edge bearing against the associate roller shell. The inner parts of the wire aprons 7 and 8 and the compressed web of material 22 must thus pass between these packing plates. It has been found that it is of particular importance in practice, in order to obtain a satisfactory compression of the two webs of material 19 and 20 to one web, that the distance between said packing plates is correct. This is due to the fact that the pulp is quite strongly compressed at the pressing place 21, and swells afterwards owing to its inherent elasticity. Therefore, if the distance between the plates 24 and 25 is too small, the compressed web of material 22 will be squeezed between said plates, which results in much wear on the wire aprons which will quickly deteriorate.

Again, if the distance between the plates is too great, there will be play between the plates and the wire aprons and resultant air leakage. For rendering possible a correct adjustment of the packing plates 24 and 25 in each particular case said plates are secured in such manner that they may be adjusted at various distances from one another to suit the nature of the pulp treated. In the embodiment illustrated, such adjustment is rendered possible by the packing plates 24 and 25 being detachably secured to the walls of the suction boxes by means of screws 26 and 27, respectively, which pass through slots 28 and 29, respectively, in the plates and are screw-threaded in the walls of the suction boxes, and by thin intermediate layers 30 and

31, respectively, being placed between the plates and said walls. In practice said layers may simply consist of a suitable number of paper sheets. By increasing or decreasing the number of these intermediate sheets it is thus possible in each particular case to adjust the packing plates at the correct distance from one another.

The screws 26 and 27 passing through vertical slots 28 and 29 in the two packing plates provides the possibility of adjusting the packing plates in the vertical direction, that is to say, approximately in the tangential direction relatively to the rollers 5 and 6, so that in this manner a correct bearing may in each particular case be obtained between the upper chamfered edges of the packing plates and the roller shells.

Finally, as illustrated in the drawing, the left-hand packing plate 24 is adjusted slightly higher than the right-hand plate, so that the oblique edge of the left-hand plate bears against the associate roller 5 somewhat closer to the pressing place 21 than the upper edge of the right-hand packing plate 25. This arrangement provides that the suction exerted through the roller 5 on the compressed web of material 22 ceases a short moment earlier than the suction from the roller 6, so that the web of material 22 is securely loosened from the wire apron 7 and follows the wire apron 8 down to the guide roll 10 where it is separated from said wire apron 8. In this manner it is ensured that the compressed web of material is not again ripped in two.

Flush pipes 32 and 33 are provided in a manner previously known in the interior of the rollers 5 and 6 through which pipes water supplied through the pipes 34 and 35, respectively, is thrown against the roller shells in order to keep the perforations in the same clean.

The construction above described and illustrated in the drawing is only to be regarded as an example, and it will be understood that it is capable of modification in various ways without departing from the principle of the invention.

We claim:

1. In a machine for separating liquids from solid bodies mixed or suspended therein, the combination of two pulp containers, two rotatably journaled perforated rollers, each such roller being associated with one of said pulp containers, a suction box for each of said rollers, two endless wire aprons, each of said aprons running over one of said rollers and forming a wall of one of said pulp containers, said rollers being adapted to press the webs of material collected on said wire aprons while passing through said pulp containers against each other, and two packing plates, each packing plate having an edge bearing against the associate roller im-

mediately beyond such pressing place taken in the direction of rotation of said rollers, said packing plates being adjustable at various distances from one another.

5 2. In a machine for separating liquids from solid bodies mixed or suspended therein, the combination of two pulp containers, two rotatably journalled perforated rollers, each such roller being associated with one of said
10 pulp containers, a suction box for each of said rollers, two endless wire aprons, each of said aprons running over one of said rollers and forming a wall of one of said pulp containers, said rollers being adapted to press the webs
15 of material collected on said wire aprons while passing through said pulp containers against each other, and two packing plates, each packing plate having an edge bearing against the associate roller immediately be-
20 yond such pressing place taken in the direction of rotation of said rollers, said packing plates being adjustable at various distances from one another and being capable of ad-
25 justment in a direction substantially tan-

direction of rotation of said rollers, said packing plates being adjustable at various distances from one another and being capable of adjustment in a direction substantially tangential to said rollers, and one of said
70 packing plates having its edge bearing against the associate roller at a shorter distance from said pressing place than the edge of the other packing plate bearing against
75 the other roller.

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3. In a machine for separating liquids from solid bodies mixed or suspended therein, the combination of two pulp containers, two rotatably journalled perforated roll-
30 ers, each such roller being associated with one of said pulp containers, a suction box for each of said rollers, two endless wire aprons, each of said aprons running over one of said rollers and forming a wall of one
35 of said pulp containers, said rollers being adapted to press the webs of material collected on said wire aprons while passing through said pulp containers against each other, and two packing plates, each packing
40 plate having an edge bearing against the associate roller immediately beyond such pressing place taken in the direction of rotation of said rollers, said packing plates being adjustable at various distances from
45 one another, and one of said packing plates having its edge bearing against the associate roller at a shorter distance from said pressing place than the edge of the other packing plate bearing against the other roller.
50 4. In a machine for separating liquids from solid bodies mixed or suspended therein, the combination of two pulp containers, two rotatably journalled perforated rollers, each such roller being associated with one of
55 said pulp containers, a suction box for each of said rollers, two endless wire aprons, each of said aprons running over one of said rollers and forming a wall of one of said pulp containers, said rollers being adapted to press
60 the webs of material collected on said wire aprons while passing through said pulp containers against each other, and two packing plates, each packing plate having an edge bearing against the associate roller immedi-
5 ately beyond such pressing place taken in the

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