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[54] **PRESSING DEVICE FOR THE REMOVAL OF WATER FROM CELLULOSE OR THE LIKE**

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[51] **Int. Cl.**..... **B30b 9/24,** B30b 5/04

[58] **Field of Search**..... 100/151–154, 110, 100/116, 118, 119, 120, 121; 162/208, 210, 314, 312, 358, 361, 205, 351; 144/281 B

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[57] **ABSTRACT**

This invention relates to an improvement in a pressing device for the removal of water from solid materials, particularly cellulose or similar fibrous material, comprising a preliminary pressing station and a main pressing station including pairs of upper and lower horizontal rollers between which a sheet or web of material to be dehydrated is passed, on a sieve or between two sieves. The improvement comprises a lower roller mounted ahead of the paired upper rollers in a staggered manner in the traveling direction of the sieve, in at least one of said preliminary and main pressing stations.

9 Claims, 2 Drawing Figures

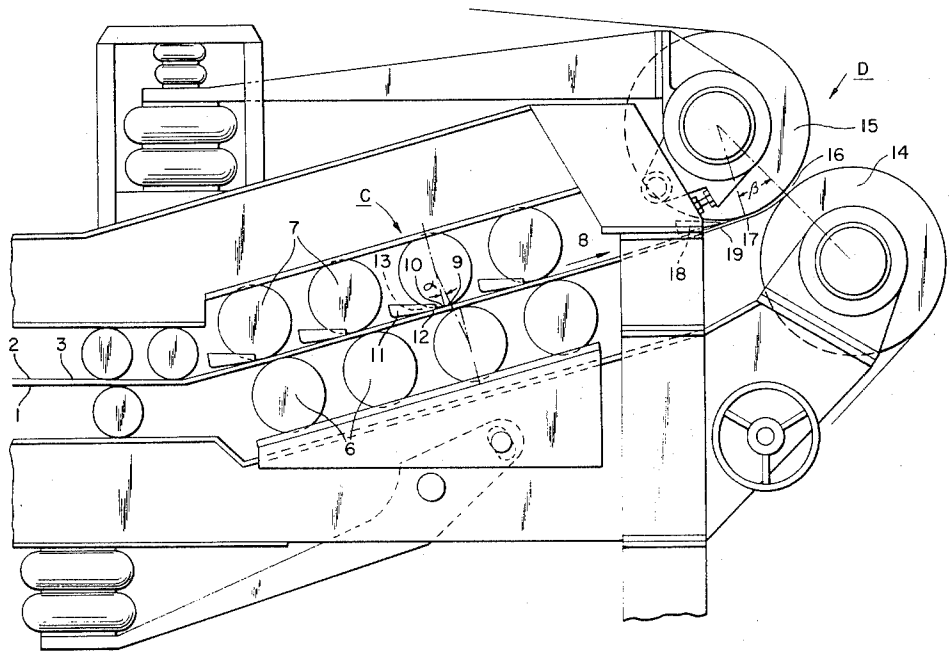


FIG. 1

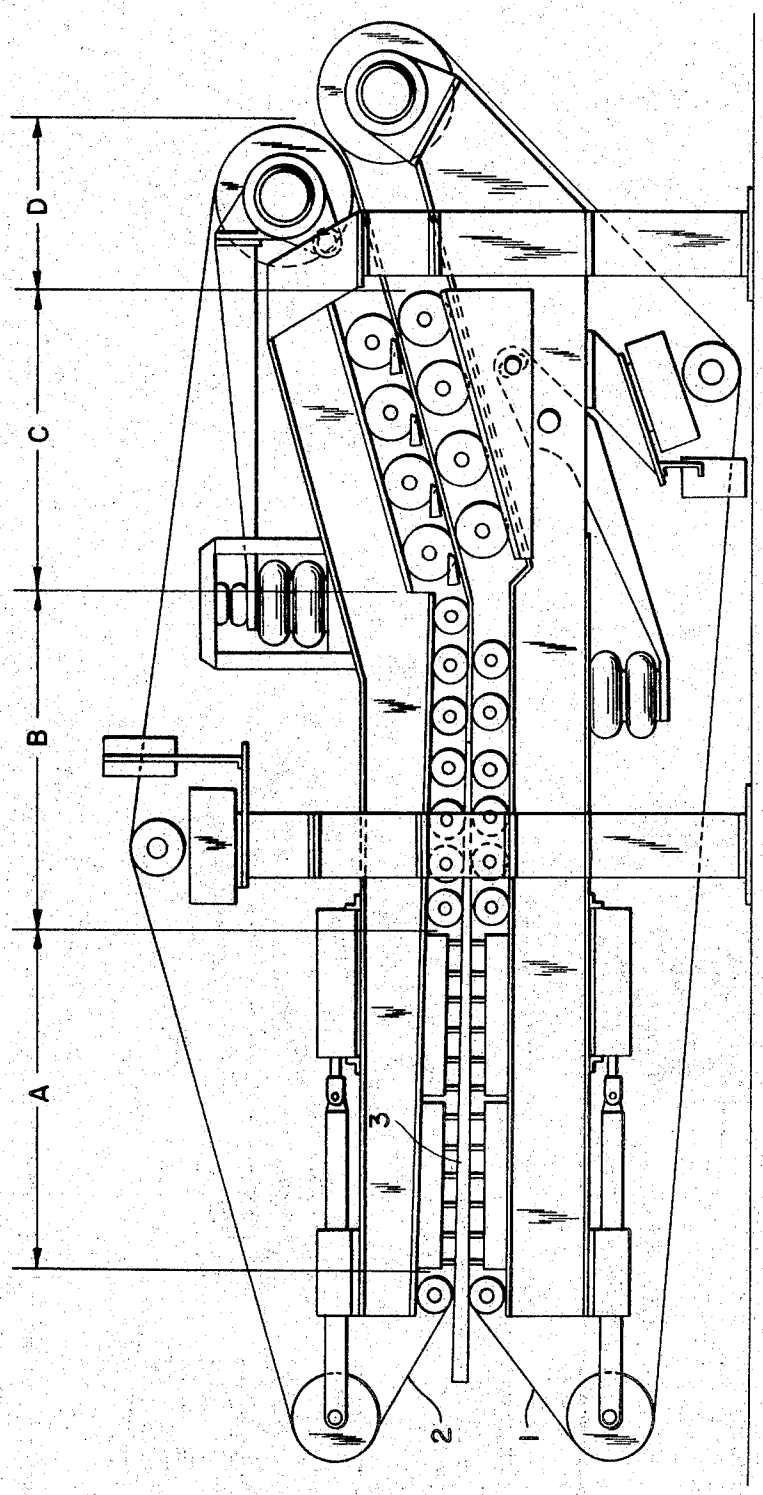
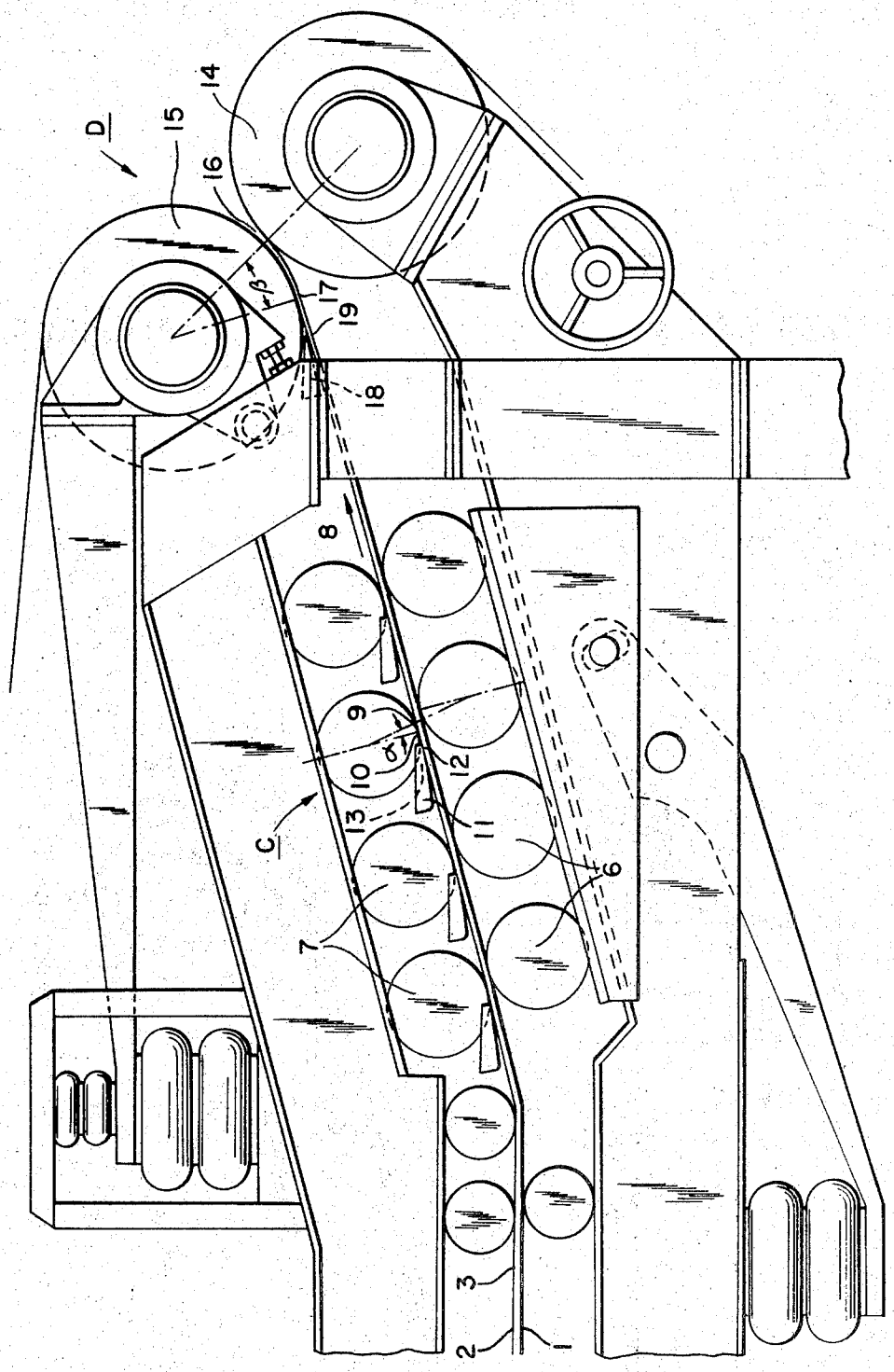


FIG. 2



PRESSING DEVICE FOR THE REMOVAL OF WATER FROM CELLULOSE OR THE LIKE

The present invention relates to a press or squeezing system designated for dehydrating cellulose or similar fibrous materials, or other substances, in which a sheet or web of material to be dehydrated is passed on a sieve, or between two sieves, between pairs of horizontal rollers. In presses or squeezing systems of this type, the material which has already been dehydrated to a large extent is further dehydrated between pairs of rollers in a preliminary squeezing station and in a main pressing or squeezing station. This involves or results in the disadvantage, however, that the squeezed-out water again reaches or arrives on the sheet or web and is suctioned into the material so that the dehydrating effect is impaired.

The present invention has the object of counteracting this disadvantage. In the preliminary squeezing station and/or in the main pressing or squeezing station, the lower roller of one pair of rollers is arranged or offset ahead, compared with or with respect to the upper roller thereof in the direction of travel of the sieve. By virtue of the fact that the lower roller is mounted ahead with respect to the upper roller, the sieve, and therewith the sheet or web of material to be dehydrated, is tightened against the upper roller ahead of the point of application of the lower roller so that the sheet or web, before entering into the roller gap, is pressed against the upper roller at a specific looping angle. Above this looping angle, the sheet or web of material is positioned under pressure so that a suctioning in of the moisture, which is being squeezed out at the underside of the sheet or web by the lower roller, is effectively counteracted.

As a result thereof, entry of the liquid into the sheet or web at the underside is largely prevented. Ahead of the upper roller, however, the sheet is not pressed so that at the upper side of the sheet or web the water being retained by the upper roller will again reach the sheet, involving the danger that this water will penetrate from above into the sheet. By reason of the fact that the upper roller is set back as compared with and with respect to the lower roller and the sheet or web of material is pressed against the upper roller only by means of the sieve, and will be squeezed out only later in the roller gap between the upper roller and the lower roller, the danger of a penetration into the sheet of water being pushed back by the upper roller is increased, such that part of the improvement of the drainage or dehydration which has been achieved by the forwardly-shifted setting or arrangement of the lower roller is again canceled out. This phenomenon may be counteracted, in accordance with the present invention, in that, in the preliminary pressing or squeezing station and/or in the main pressing or squeezing station, the sheet of material is guided in an ascending fashion, and transverse channels are disposed in front of the upper rollers, whose front edges touch the sheet of material or the upper sieve. The front edges of the transverse channels preferably extend into the catchment gap of the upper rollers. In this manner, the water which is preferably discharged at the upper side of the sheet, due to the resetting or backwardly-shifted arrangement of the upper rollers, is carried off laterally, and moistening of the sheet with this water is effectively prevented.

The forward setting or arrangement of the lower rollers may be so selected, for example, that the resulting looping angle of the upper roller in the preliminary pressing or squeezing station amounts to 5°– 20°, preferably approximately 10°, and in the main pressing or squeezing station 10°– 45°, preferably approximately 30°.

By virtue of the present invention, the dehydrating effect is thus significantly improved. The present invention is primarily suitable for the removal of water from cellulose or similar fibrous material; but it also may be employed for the removal of water from non-fibrous substances, such as for example mud, or foodstuffs.

One embodiment of the present invention is schematically illustrated in the accompanying drawing, wherein

FIG. 1 is a view of a cellulose dehydrating machine, and

FIG. 2 illustrates the preliminary pressing or squeezing station and the main pressing or squeezing station at an enlarged scale.

The fibrous material to be dehydrated is conveyed or fed between two endless sieves, namely the lower sieve 1 and the upper sieve 2, to the cellulose dehydrating machine. Reference numeral 3 designates the sheet or web of material to be dehydrated or freed from water. The sheet of material 3 passes first through the wet portion or station A in which the water is suctioned off, and then travels into or reaches the registering portion or station B in which a first squeezing-out of the moisture is effected between pairs of rollers. Thereupon, the material passes into the preliminary pressing or squeezing station C where a further squeezing-out of the water takes place between pairs of rollers. In the adjacent main pressing or squeezing station D, the liquid is squeezed out between two rollers, with a great amount of pressure, up to an admissible residual part.

FIG. 2 illustrates the preliminary pressing or squeezing station C and the main pressing or squeezing station D at an enlarged scale. The sheet or web of material 3 positioned between the lower sieve 1 and the upper sieve 2 is passed through between the pairs of rollers 6, 7 in the preliminary pressing or squeezing station C. The lower roller has been identified therein with reference numeral 6 while the upper roller has been identified with reference numeral 7. The lower rollers 6 are mounted ahead or forwardly offset as compared with and with respect to the coordinated upper rollers 7 in the traveling direction of the sieve, as indicated by the arrow 8. The material rests against the upper roller 7 within the area between the roller gap 9 and the running-up point 10, which will result in a looping angle α around the upper roller. This looping angle α is between 5° and 20°, depending upon the extent of the forwardly shifted or staggered arrangement of the lower roller, and preferably may amount to approximately 10°. As a result, the sheet or web of material 3 is pressed against the upper roller by means of the lower sieve 1 within the looping area or zone defined by the looping angle α, and by virtue of this pressing, a penetration into the sheet or web of the water being dammed up by the lower roller in the roller gap 9 is prevented to a large extent.

The water is dammed up or held back at the running-up point 10 of the material sheet or web also by the upper roller. In order to prevent as much as possible a penetration there of the dammed up water into the

sheet of material 3 from above, transverse channels 11 are provided for whose front edges 12 touch the sheet of material 3 and/or the upper sieve 2, if the latter is employed. As a result, the water being held back or dammed up on the upper side of the sheet of material 3, and respectively the upper sieve 2, is laterally carried off, and a penetration thereof into the sheet of material 3 is thus prevented. In order to catch this dammed-up water as closely as possible to the point of engagement of the upper roller, the front edges 12 of the transverse channels 11 extend into the catchment gap 13 of the upper rollers, as indicated in the drawings.

Also in the main pressing or squeezing station D is the lower main squeezing or pressing roller 14 mounted ahead or pre-set as compared to the upper main pressing or squeezing roller 15 in the traveling direction 8 of the sheet of material 3. In this case, the roller gap between the lower roller 14 and the upper roller 15 has been designated with reference numeral 16 whereas the running-up point of the upper sieve 2 and, respectively, the sheet of material 3 on the upper roller has been identified with reference numeral 17. Between the points 16 and 17, there will be produced a looping angle β of the upper sieve 2 and, respectively, the sheet of material 3 around the upper roller. This looping angle β may be from 10° to 45° and preferably is approximately 30°. The effect is again the same as has been described hereinbefore in connection with the pairs of rollers of the preliminary pressing or squeezing station C. In the area or zone of the looping angle β, the sheet of material 3 is pressed against the upper roller 15 by means of the lower sieve 1, whereby a penetration of the liquid being dammed up or held back by the lower roller 14 is effectively counteracted. Here again, a transverse channel 18 is provided whose front edge 19 touches the upper sieve 2 and the sheet of material 3 so that the water being held back or dammed up by the upper main roller 15 is laterally carried off.

It will be obvious to those skilled in the art that many modifications may be made within the scope of the present invention without departing from the spirit thereof, and the invention includes all such modifications.

I claim:

1. A press for dehydrating materials, particularly cellulose or like fibrous materials, including a preliminary pressing station and a main pressing station in which the material to be dehydrated is passed through a sieve or between two sieves and between at least two pairs of horizontally-disposed rollers defining at least one of said preliminary pressing station and said main pressing station and each consisting of an upper roller and a lower roller, the improvement comprising each successive pair of said pairs of rollers, with respect to the direction of the path of travel of said material to be dehydrated, being disposed at a height greater than the height of the next previous pair of said pairs of rollers in a manner to form a gradually ascending path of travel of said material to be dehydrated which forms an acute angle with a horizontal plane and said lower roller of each of said pairs of rollers being offset from and forward of said upper roller of said pair of rollers, with respect to said direction of travel of said material to be dehydrated, to form an acute angle α between a line through the center of said upper roller and perpendicular to said material to be dehydrated and a line through said center of said upper roller and the center of said lower roller, whereby said material to be dehydrated forms an arcuate loop over the bottom of said upper roller between the side limits of said angle α.

2. A press in accordance with claim 1 wherein at least one of said pairs of rollers is part of the main pressing station and a line through the center of the upper roller of said pair of rollers in said main pressing station and perpendicular to the material to be dehydrated and a line through said center of said upper roller and the center of the lower roller of said pair of rollers in said main pressing station form an angle β which is larger than the angle α of the remaining ones of said pairs of rollers.

3. A press in accordance with claim 2 wherein the angle β is between 10° and 45°.

4. A press in accordance with claim 3 wherein the angle β is about 30°.

5. A press in accordance with claim 2 wherein the rollers in the main pressing station are larger in diameter than the rollers in the preliminary pressing station.

6. A press in accordance with claim 1 wherein the angle α is between 5° and 30°.

7. A press in accordance with claim 6 wherein the angle α is about 10°.

8. A press in accordance with claim 1 wherein trough means are disposed behind the upper rollers of the pairs of rollers, with respect to the direction of travel of the material to be dehydrated, and the front edges of said trough means are in contact with one of said material to be dehydrated and an upper sieve of the two sieves.

9. A press in accordance with claim 1 wherein all of the pairs of rollers are a part of the preliminary pressing station.

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