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Heissenberger

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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, 100/110, 116, 118, 119, 120, 121; 162/208, 210, 314, 312, 358, 361, 205, 351; 144/281 B

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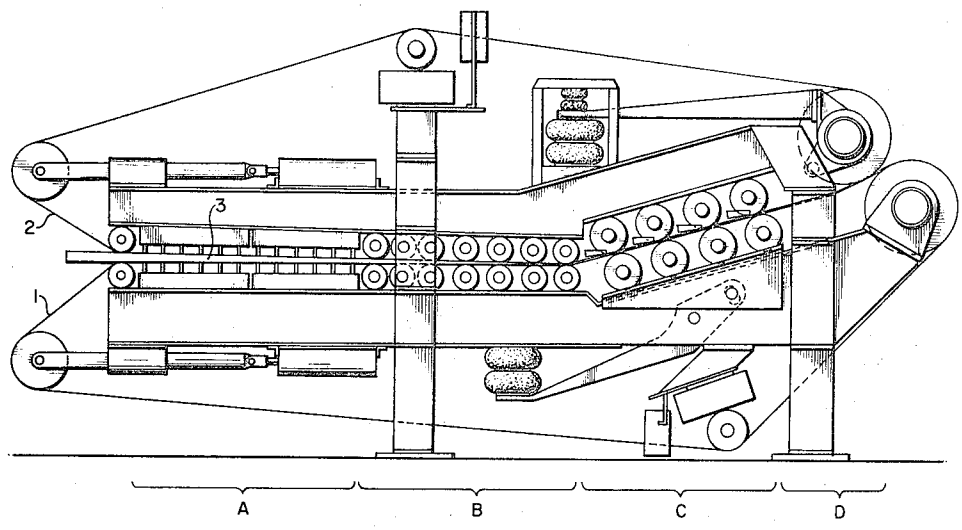
[57] ABSTRACT

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 registering station, 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 roller of at least one roller pair mounted offset with respect to the other roller in the traveling direction of the sieve, in said registering station.

4 Claims, 3 Drawing Figures



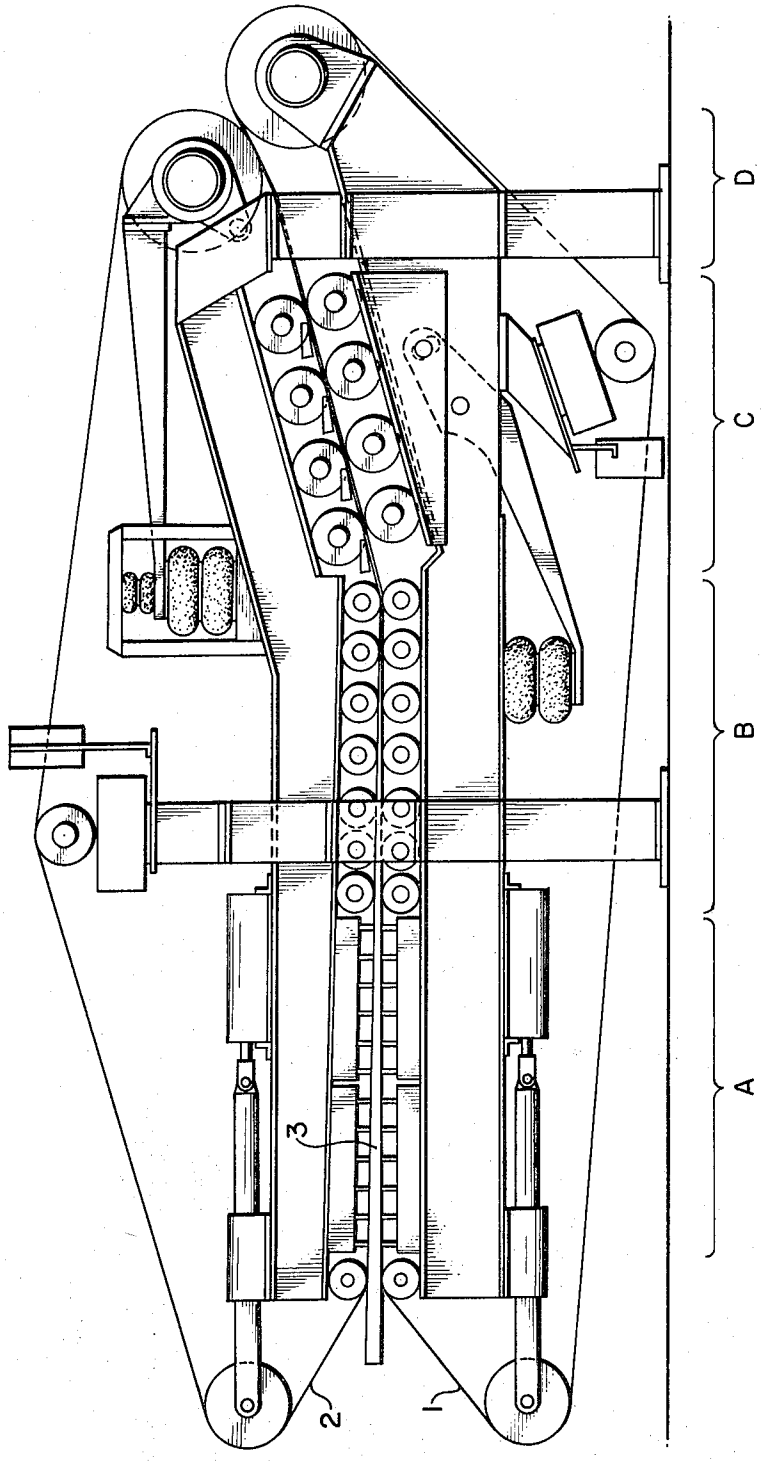


FIG. 1

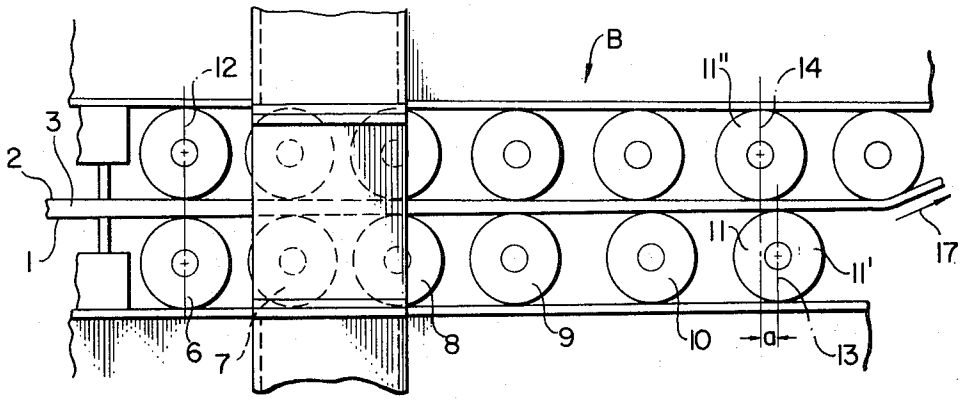


FIG. 2

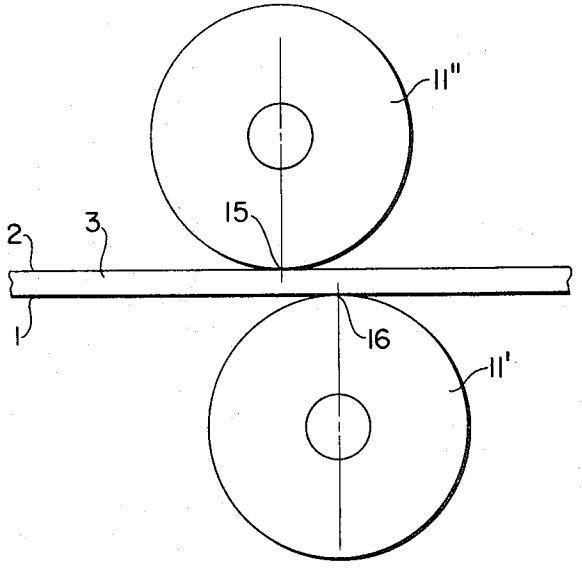


FIG. 3

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

The present invention relates to a press or squeezing system designed for the removal of water from 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 this type of press or squeezing device or system, the sheet or web of material, after the water has been suctioned off in the wet station, passes into the so-called registering station in which a first squeezing-out of the moisture is effected between pairs of rollers. In this registering station, the linear pressure between the roller pairs is still relatively small in order that the still insufficiently solidified sheet or web of material be not torn and/or damaged, and higher pressures are applied only in the subsequent preliminary squeezing or pressing station when the material emerges from the registering station already solidified. Also, the uniformity of the material thickness is not yet determined in the registering station. In the registering station, the rollers are mounted in a stationary manner, and in the known constructions the roller gap or clearance is therefore precisely determined. Since, however, the thickness of the sheet of material emerging from the wet station in which the water is suctioned off is subject to variations, there also will result variations in the pressing effect between the rollers, because with an identical roller gap a thicker sheet of material will be subjected to a greater pressing effect than a thinner sheet of material. As a result, the rollers are overloaded, on the one hand, in certain cases, and an unevenness of the sheet of material is produced on the other hand.

The present invention has the object of eliminating these disadvantages and drawbacks. In the present invention, in part of the roller pairs of the registering station, one roller is offset or is staggered as compared with and with respect to the other roller, in the traveling or operating direction of the sieve. In the known construction in which the axes of the two rollers of one roller pair are positioned in a plane at a right angle relative to the plane of the sieve, the thickness of the sheet of material is precisely determined by virtue of the axial distance. Because of the fact, however, that the axes of one roller pair are now no longer positioned in a plane at a right angle to the plane of the sieve, but since one axis is offset with respect to the other in the traveling direction of the sieve, no fixed abutment will be positioned opposite the line along which the pressing force of this roller is exerted in that normal plane with respect to the sieve plane which extends through the axis of the roller. The respectively oppositely-disposed sieve is supported only to the side of this plane and, in the line of application of the line pressure of one roller, merely the sieve stress or tension will counteract. By virtue of this provision, the thickness of the sheet of material is not rigid despite the rigid positioning of the rollers, but it is instead elastically delimited by the respectively oppositely-disposed sieve. As a result, the linear pressure between the registering or tube rollers is rendered uniform. The density of the material also becomes more uniform; the danger that the sheet or web of material is torn as a result of an overpressing action is precluded, and overloading of the rollers is eliminated.

In the registering station, the thickness of the sheet of material is changed in proportion to the water removal so that the width of the roller gap will decrease from the beginning to the end of the registering station. The more the pressing operation progresses, i.e. the stronger the compression to obtain smaller thicknesses of the sheet of material, the more pronounced will be the results of the lack of uniformity of the pressing action. According to the present invention, the degree of the staggered arrangement of the axes desirably will increase towards the end of the registering station or, if desired, the axes also may be offset with respect to each other only at the end of the registering station. In accordance with the present invention, the offset arrangement of the axis of one roller of the roller pair as compared to the axis of the other roller thereof will be, for example, from 10 to 20 percent of the roller diameter at least toward the end of the registering station. Either the lower roller or the upper roller may be prepositioned, or arranged ahead, in the traveling direction of the sieve.

The present invention is suitable primarily for the removal of water from or for the dehydration of cellulose or similar fibrous materials, but it also may be employed for the dehydration of non-fibrous materials, such as mud, for example, or foodstuffs.

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

FIG. 1 is a view of a cellulose dehydrating machine;

FIG. 2 illustrates the registering station of this machine at an enlarged scale, and

FIG. 3 illustrates the mounting of one pair of rollers at a still larger scale.

Referring to FIG. 1, the fibrous material to be dehydrated, or freed from water, is conveyed or fed between two endless sieves, the lower sieve 1 and the upper sieve 2, to the cellulose dehydrating machine. Reference numeral 3 identifies the sheet of material to be dehydrated. The sheet of material 3 passes first through the wet station A in which the water is suctioned off, and then passes into the registering station B in which a first squeezing out of the moisture takes place between roller pairs. Thereafter, the material passes into the preliminary pressing or squeezing station C where a further squeezing out of the water is effected between roller pairs. In the subsequent main pressing or squeezing station D, the liquid is squeezed out between two rollers, under a great amount of pressure, up to a permissible residual part.

FIG. 2 illustrates the registering station at an enlarged scale. The sheet of material 3 enclosed between the sieves 1 and 2 passes between the roller pairs 6, 7, 8, 9, 10 and 11 of the registering station B. Along the way or path from the first roller pair 6 to the last roller pair 11, the thickness of the sheet of material decreases progressively so that the dehydration and pressing effect continues. In the first pair of rollers 6, the roller axes are still positioned approximately within a vertical plane 12 at a right angle to the traveling or operating direction of the sieves 1 and 2. In the roller pair 11, the plane 13 which is vertical with respect to the traveling or operating direction of the sieve, as indicated by the arrow 17, and in which the axis of the lower roller 11' is positioned, is offset ahead in the traveling direction of the sieve, as compared with and with respect to the plane 14 which is vertical with respect to the traveling

direction of the sieve and in which the axis of the upper roller 11'' is positioned. The degree of the forward staggered arrangement has been designated with reference symbol *a*. As is apparent from the drawings, the axis of the lower roller is shifted or offset ahead as compared to the axis of the upper roller also in the preceding roller pairs, but this forward offset arrangement decreases toward the roller pair 6.

The effect which is achieved by means of this forward staggered arrangement is now explained with reference to FIG. 3. The pressing effect of the upper roller 11'' onto the upper sieve 2 is exerted along the line 15. Opposite this point 15, however, the lower sieve 1 is not supported but it is maintained under tension only by virtue of the seating thereof on the lower roller 11'. Similarly, the lower roller contacts the lower sieve 1 along the line 16, and here again the upper sieve 2 is freely positioned opposite this pressing line 16 and is merely held under tension by means of the upper roller 11''. Thus, the thickness of the sheet of material is not rigidly delimited, and the pressing operation is rendered elastic despite the rigid mounting of the rollers.

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.

What is claimed is:

1. In a pressing device for the removal of water from solid materials, particularly cellulose or similar fibrous materials comprising a registering station, a preliminary pressing station and a main pressing station in which each of said stations is provided with at least one pair of horizontally-disposed upper and lower rollers, respectively, between which a sheet or web of material to be dehydrated passes and at least one of said upper rollers and said lower rollers in all of said stations is enclosed by a sieve band, the improvement comprising a plurality of pairs of rollers fixedly mounted in said registering station, with respect to said material to be dehydrated, and the upper and lower of each of said pairs of rollers are offset from one another progressively greater distances from the entrance end toward the exit end of said registering station, with respect to the direction of travel of said material to be dehydrated through said device.

2. A device in accordance with claim 1 wherein the offset distance of the upper and lower rollers of the last pair of rollers adjacent the exit end of the registering station is about 10 to 20 per cent of the diameter of said rollers.

3. A device in accordance with claim 1 wherein the upper rollers of the pairs of rollers are offset ahead of the cooperating lower rollers of each of said pairs of rollers, with respect to the direction of travel of the material to be dehydrated through said device.

4. A device in accordance with claim 1 wherein the lower rollers of the pairs of rollers are offset ahead of the cooperating upper rollers of each of said pairs of rollers, with respect to the direction of travel of the material to be dehydrated through said device.

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