

Feb. 25, 1969

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3,429,256

APPARATUS FOR SEPARATING THE COMPONENTS OF A SUSPENSION

Filed April 25, 1966

Sheet 1 of 2

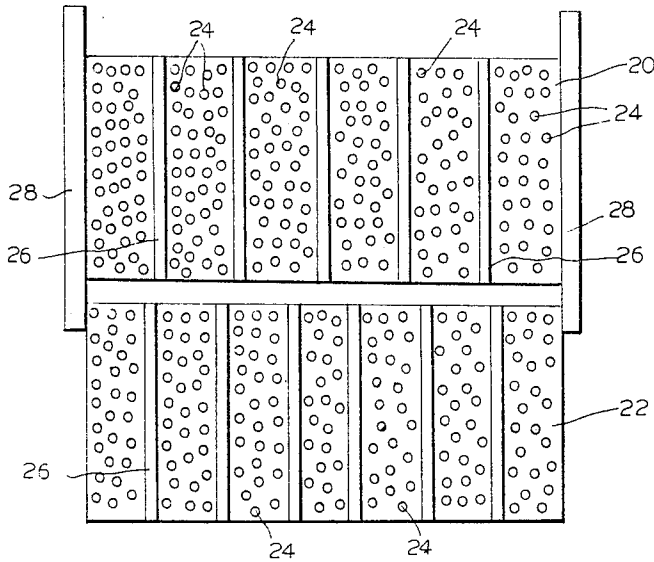


FIG. 1

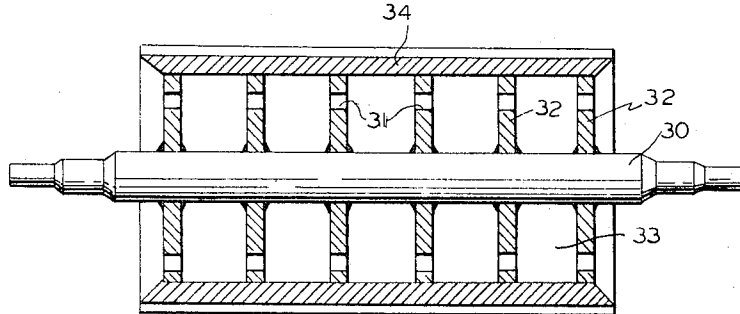


FIG. 2

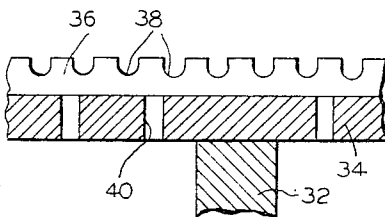


FIG. 3

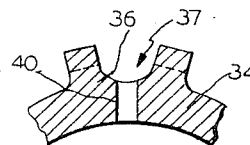


FIG. 3A

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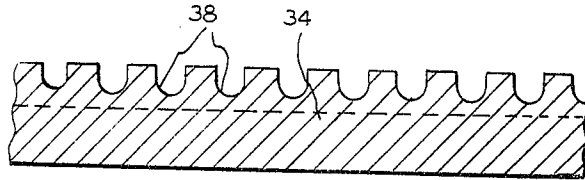


FIG. 4

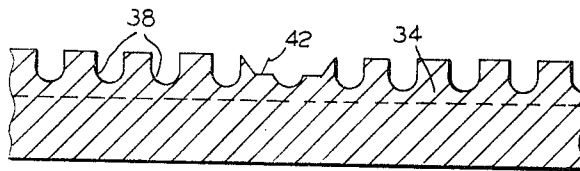


FIG. 5

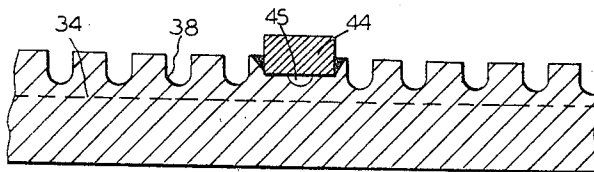


FIG. 6

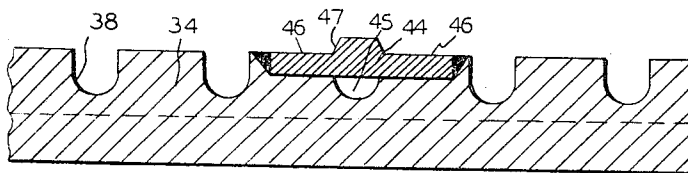


FIG. 7

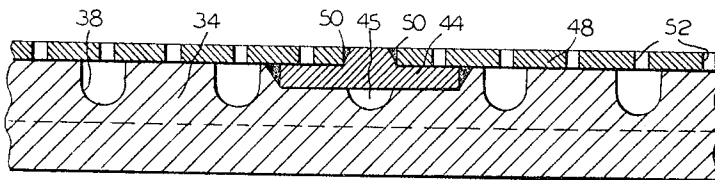


FIG. 8

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APPARATUS FOR SEPARATING THE COMPONENTS OF A SUSPENSION

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10 Claims

Int. Cl. B30b 9/20; B01d 33/06; B21b 27/02

This invention broadly relates to devices for separating solid elements from a liquid suspension thereof. More specifically, this invention relates to improvements in the rollers of roller presses used in devices for separating solids from liquid suspensions, and provides a novel construction and method of making said rollers.

Heretofore, liquids such as water, were expressed from a suspension of solids by conventional filter means. Such known devices utilize roller presses and generally comprise two turning, cylindrical and parallel pressing rollers having their outside surfaces perforated and provided with screens or perforated plates over these sleeve portions, so that the liquid may pass inside the rollers and be expelled while the solid material is retained and is expressed between the outside surfaces of the rollers. The rollers of these known devices generally comprise a shaft having braces thereon, a perforated sleeve covering this assembly and an outer screen or perforated plate. The perforated plate has been in the form of a single piece and has been applied by conventional means, such as by rolling onto the shaft-brace-sleeve assembly followed by welding thereto. These known rollers are subject to numerous disadvantages due to the operating conditions to which they are subjected. For example, when a plate is attached as described above, it has been observed that the manner of attaching it to the sleeve allows plays to develop between the plate and sleeve when the plate becomes deformed. This deformation which is practically unavoidable in known devices, is due to the extremely high pressures developed at the roller nip when solid material is expressed between the rollers, and through the difficulty of attaching such important perforated plates on the sleeve portion correctly enough to avoid any play, the plays which develop have an accumulating effect with each indentation in the surface plate and eventually cause the plate to tear away from the weld which holds it to the roller sleeve. A previous attempted solution to this problem included welding the plate to the sleeve at points on the underside of the plate, however, these points have also failed. Another attempted solution has been to rivet the plate to the sleeve, however, these rivets also fail in that the pressing rollers quickly become deformed and thus yield an irregularly pressed product.

In view of the difficulties above-mentioned, it is an object of the present invention to provide a roller press for use in separating liquid from solids by compression which comprises two cooperating rollers having a shaft, braces, perforated sleeve, and outer perforated plate constructed in such a manner that the plate will not become deformed and tear away from the sleeve.

Another object of this invention is to provide a method of attaching perforated plates to a sleeve portion of a roller used in a roller press for separating liquid and solid materials whereby the plate will not be deformed by the roller construction and whereby plays will not develop between the plate and the sleeve resulting in tearing away of the plate from the sleeve.

A more specific object of the invention is to provide a roller of the type described wherein a plurality of individual perforated plate elements are attached to a perforated sleeve element by means of circular straps having

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shoulders thereon which have been embedded in the sleeve element.

These and other objects of the invention will appear more clearly in the specification, claims, and drawings.

According to the present invention, the above objects are achieved and the above disadvantages are avoided by providing a roller comprising a shaft having bracing elements extending in a radial direction thereon and having a sleeve fitted over the shaft-braces assembly. Said sleeve is provided with lengthwise ribs, crosswise grooves, and orifices extending therethrough, all for the purpose of draining expressed liquid. A number of circular cuts are made around the periphery of the sleeve and a corresponding number of circular straps are placed therein. The circular straps are machined to provide a rib portion and two shoulder portions. A number of individual perforated plate elements are then attached to the circular straps as by welding, and the ends of each individual strap is then welded along the generatrix. This system allows the plates to be attached to the sleeves in a closely fitted relationship avoiding any play therebetween and provides stronger means for attaching the plate. Since the attachment is stronger, the rollers avoid tearing of the plates and produce a more uniform product. This increased strength is seen to result as a consequence of attaching a number of narrow plates continuously on both edges thereof and at the ends thereof, as opposed to prior methods of attaching a single wide sheet along the end only, or along the end and at random points.

The pressing rollers which are the object of this invention are adapted to treat any liquid-solid suspension but are particularly adapted for treating thick suspensions. A specific application of the invention is in the treatment of alkali cellulose suspensions in the soda used to prepare viscose solutions to make cellulose films, rayon, or rayon staple.

Exemplary of a roller useful in the treatment of alkali cellulose suspensions may be a shaft with braces and sleeve thereon whose length is 1.40 meters and whose diameter is 0.6 meter. Attached thereto are six perforated plates having a width of approximately 0.2 meter and a thickness of 15 to 25 millimeters.

The invention will be described further in connection with the accompanying drawings wherein like numbers represent like elements. The drawings are considered to be exemplary of the invention and do not constitute a limitation thereof.

In the drawings:

FIGURE 1 shows schematically, in a plan view, a pressing roller assembly comprising two pressing rollers of the present invention.

FIGURE 2 shows schematically, in a sectional view, a pressing roller before it has been machined according to the present invention.

FIGURE 3 shows schematically, a partial sectional view of a sleeve contemplated by the present invention.

FIGURE 3A shows schematically, an end view of the sleeve of FIGURE 3.

FIGURES 4-8 represent sequential steps in the machining of a sleeve and application of outer perforated plates according to the present invention.

Referring now to the drawings, FIGURE 1 illustrates two pressing rollers 20 and 22. Each roller comprises a number of perforated plate elements 24. Roller 20 is shown with six elements 24 and roller 22 is shown with seven elements 24. It is to be understood that these numbers are not critical, it being possible to vary the number and size of the plate elements as necessary or desirable. The perforated plate elements 24, rest on circular straps 26. The number of straps used will, of course, vary with and depend on the number of plates 24 utilized. Roller 20 carries cheeks 28 which extend beyond roller 20 and

onto the adjacent ends of roller 22. These cheeks aid in keeping the expressed solids in a uniform area and also aid in producing a product of uniform size.

FIGURE 2 shows one roller in a sectional view, a shaft 30, is provided having braces 32 attached thereto by suitable means, as by welding. A sleeve 34 is fitted on the shaft and braces assembly. Void areas 33 are provided which receive liquid which drains through orifices provided in sleeve portion 34. Orifices are seen in the enlarged section view of sleeve 34 shown in FIGURE 3. Suitable drainage means for the liquid from the voids 33 to a receiving means may be provided, such as by allowing the liquid to flow through channels 31 shown provided through the braces 32.

The details of sleeve portion 34 may be seen in FIGURES 3 and 3A. The sleeve surface is provided with ribs 36 which extend in an axial direction and which form channels 37 connecting with orifices 40 for draining expressed liquid. Ribs 36 are grooved as at 38 in a direction perpendicular to the ribs.

The assembled roller contemplated by this invention can best be seen with reference to FIGURES 4-8. A circular cut 42 is made in sleeve portion 34. This cut, as seen in FIGURE 5, does not extend to the depth of grooves 38 in order to allow the liquid to circulate freely through the channels 37 whose bottom is shown by the dotted line on FIGURES 4 to 8. The width of the cut may be varied but it must be as narrow as possible in order to limit the portions where the liquid is expressed with some more difficulty. For yielding regularly pressed product, this width must not exceed 15 mm. It is also to be noted that the cut 42 extends around the entire periphery of sleeve 34. Into cut groove 42 a circular strap 44 is embedded and attached by suitable means such as by welding. This strap may be machined to provide rib portion 47 and shoulder portions 44 either before or after assembly. After the machined strap 44 is suitably attached to the sleeve, the perforated metal plates 48 are attached to the shoulders of the strap by weld seams 50. These plates are perforated, as shown at 52, for drainage purposes.

The operation of the roller press is briefly as follows: A liquid suspension containing solid material and liquid is fed upward between the presser rollers 20 and 22. Both rollers 20 and 22 are positively driven and, as described, have cheeks on their ends which convey the material through the nip of the rollers. Since the rollers are provided with perforated plates and a perforated sleeve, the water is expressed through the plates via perforations 52 and through the sleeve via grooves 38, channels 37, and orifices 40. As shown in FIGURE 1, by supplying a different number of perforated elements on each roller, the straps are not superposed on the two rollers and unnecessarily large pressures on the welds is avoided. By utilizing the above-described novel presser rolls, greater durability of rollers and greater uniformity of product is achieved.

The terminology used in the specification is for the purpose of description and not limitation, it being understood that the scope of the invention is defined by the claims.

What is claimed and desired to be secured by Letters Patent is:

1. A process of making pressing rollers which comprises attaching brace elements on a shaft portion, arranging and attaching a perforated sleeve portion in overlying relationship thereon, machining of circular cuts in said sleeve portion along the entire periphery of said sleeve portion, attaching a circular strap in said circular cuts, and attaching perforated plate elements to said circular straps.

2. A process of making pressing rollers which comprises welding brace elements on a shaft portion, shrinking a perforated sleeve portion in overlying relationship thereon, machining a circular cut in said sleeve portion, spot-welding a circular strap in said circular cut, spot-welding perforated plate elements to said circular strap, joining the ends of each perforated plate element along the starting generatrix with a welding head, and conducting general welding by electric welding in an argon atmosphere.

3. The process of claim 1 wherein a circular strap is attached in each circular cut around the entire periphery of the sleeve portion.

4. The process of claim 3 wherein the circular straps are machined after their attachment in the circular cuts to provide a rib portion and two shoulder portions thereon.

5. The process of claim 4 wherein perforated plate elements are attached to the roller by attaching each edge of each plate to the shoulders of the circular straps, and wherein the end of each perforated plate is joined along the starting generatrix.

6. In a device for separating the components of a suspension, pressing rollers which comprise a shaft, braces attached to said shaft, a perforated sleeve portion overlying the assembly of shaft and braces, said sleeve portion having lengthwise ribs and crosswise grooves on the outer surface thereof, and a plurality of perforated plate elements attached to said sleeve by means of circular straps embedded in the sleeve portion, which straps are provided with shoulders to facilitate attachment of the perforated plate elements.

7. The device of claim 6 wherein elements of the rollers are attached by welded seams.

8. The device of claim 6 wherein a plurality of circular cuts extend around the entire periphery of the sleeve.

9. The device of claim 8 wherein a circular strap is attached in each circular cut along the entire extension of said cut.

10. The device of claim 8 wherein the perforated plates are welded along each of their edges on the shoulders of the circular straps along the entire extension of said straps.

References Cited

UNITED STATES PATENTS

2,149,649	3/1939	Webb	29—121
2,329,469	9/1943	Huck	29—125 X
2,808,730	10/1957	Shank	29—148.4 X
3,186,063	6/1965	Dopp	29—148.4

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