Nov. 25, 1924.

R. E. WAGNER

1,517,036

ROLLER FOR PRESSING APPARATUS FOR WOOD PULP AND CELLULOSE

Filed March 10, 1919

2 Sheets-Sheet 1

Fig. 1.

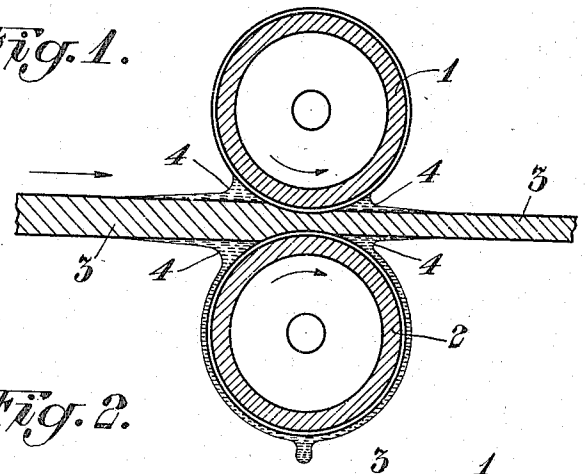


Fig. 2.

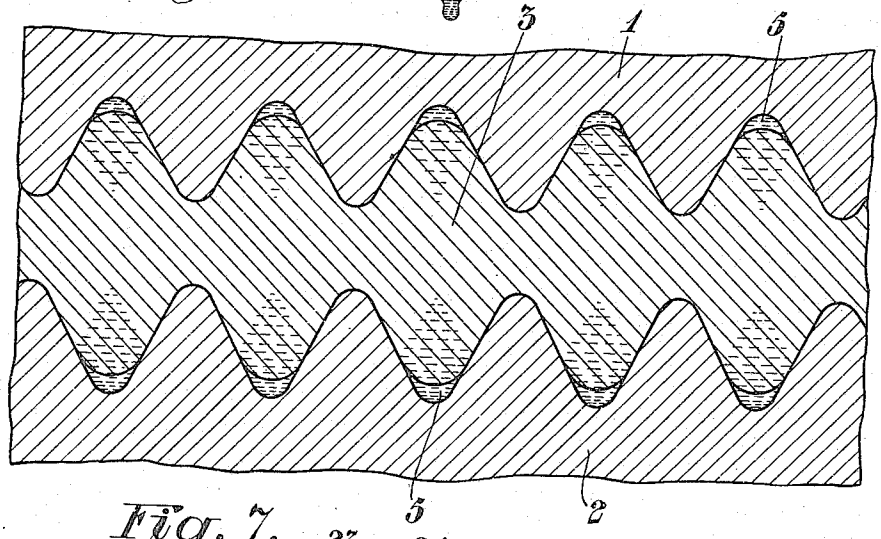
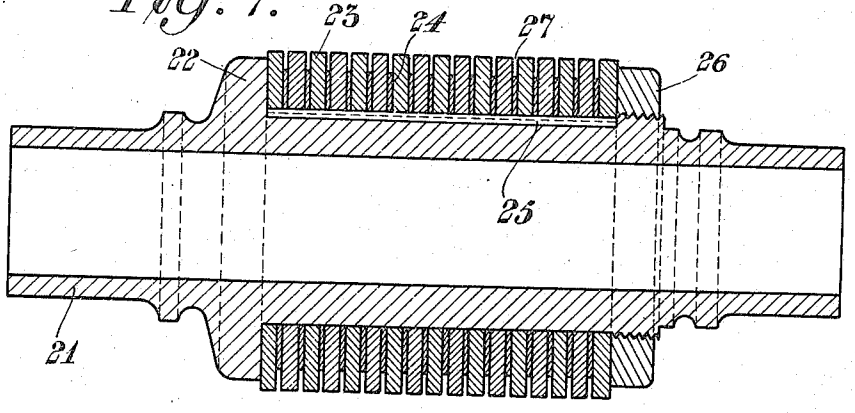


Fig. 7.



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2 Sheets-Sheet 2

Fig. 5.

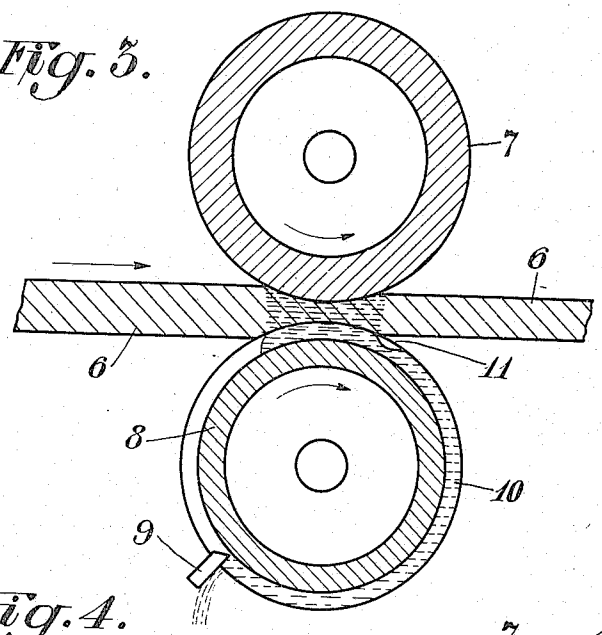


Fig. 4.

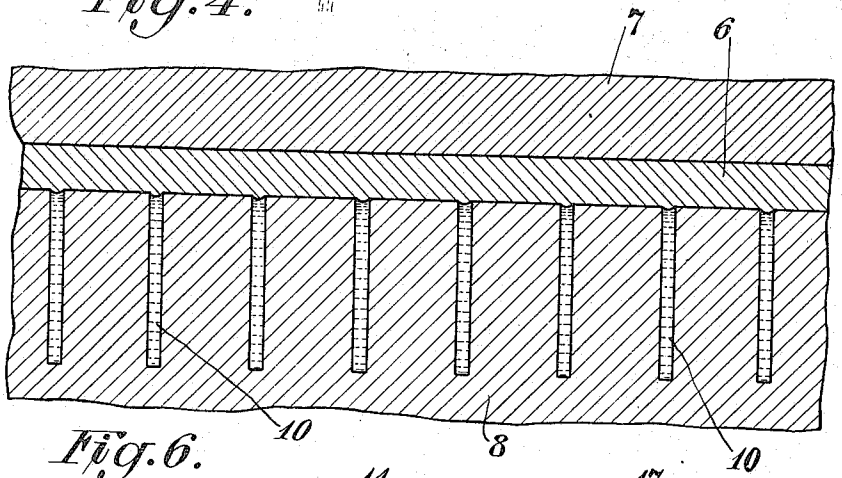


Fig. 6.

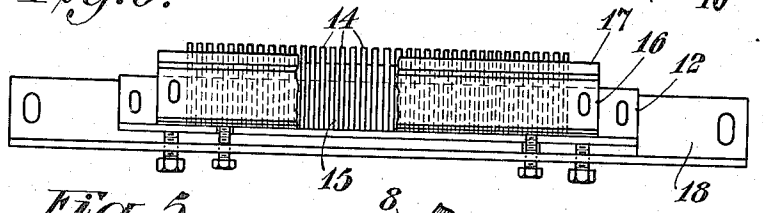
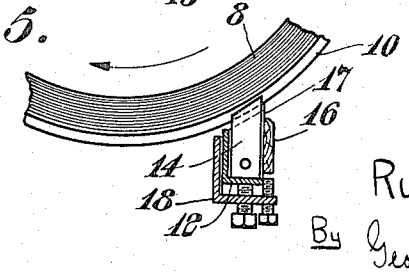


Fig. 5.



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UNITED STATES PATENT OFFICE.

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ROLLER FOR PRESSING APPARATUS FOR WOOD PULP AND CELLULOSE.

Application filed March 10, 1919. Serial No. 281,664.

To all whom it may concern:

Be it known that I, RUDOLF ERNST WAGNER, a subject of the King of Sweden, residing at Karlstad, in the Kingdom of Sweden, have invented a new and useful Improvement in Rollers for Pressing Apparatus for Wood Pulp and Cellulose (for which an application for patent in Sweden, No. 378/1918, has been filed on Feb. 2, 1918), of which the following is a specification.

In the wood-pulp and cellulose manufacture there have been made great efforts during the last years to attain an efficient pressing out of the water from the moist sheet of material. For the said purpose there have been used different kinds of rollers in the pressing apparatus, for instance corrugated rollers, or rollers wound with metal wire or with iron of special profile, or rollers surrounded by rings placed closely to one another, and so forth. When pressing with such corrugated rollers, or wound rollers, however, great difficulties are encountered on account of the water pressed out forming bodies of water in front of and behind the pressing place, on the upper as well as on the lower side of the sheet of material, a considerable quantity of water thus again penetrating into the sheet of material. The removing of the water from the upper side of the sheet of material also entails considerable inconveniences. The use of rings placed around the roller closely to one another, as mentioned above, has proved to be unfeasible in practice at high pressure, on account of the rings becoming flattened out or broken, and also on account of the sheet of material becoming ruined, for which reasons the said method of pressing pulp has come no further than to trials. When searching for the cause of the said bodies of water when pressing with corrugated rollers, it will be found that they are due to the pulp being forced so deeply into the corrugations that the opening for the water to flow off becomes too small, and the counter pressure at the bottom of the corrugation becomes so great that the water is pressed aside with too great speed at the pressing place and will be forced out at both sides of the same. The pressing out of the water with the use of the corrugated rollers is also only very imperfect, there being chiefly only obtained a displacement of the water in the sheet of material, said water being pressed from the interior of the sheet of material into the ribs formed on the upper and lower surfaces of the sheet.

The purpose of the present invention is to eliminate the said inconveniences and to attain an efficient pressing out of the water. The invention is broadly characterized by this that notches or slots are provided in the preferably smooth surface of the roller, the said slots or notches being of such a number and of at least such depth that they are capable of receiving and to bring along and remove, at the rotation of the roller, at least such quantity of water as is pressed out within the portion of the pressing surface corresponding to each slot, said slots being also of such small width that the pulp can not enter the same. The upper as well as the lower roller of a pressing apparatus may, of course, be constructed in the said manner, although, as a rule, it will be sufficient for attaining the desired pressing out of the water to use only one such lower roller, in which case the upper roller is preferably perfectly smooth.

Owing to the width of the slots being very small, the adhesion of the water to the metal in the slots becomes considerable, causing together with the rotation of the roller a sucking out of the water at the pressing place and also facilitating the removing of the water from the pressing place through the rotation of the roller. Said suction may be increased by increasing the depth of the slots, the surfaces of contact with the water and the adhesion being increased correspondingly and, simultaneously, the speed of the water in the slots becoming decreased in proportion to the speed of the surfaces of contact. On the other hand, the adhesion entails a tendency of the water to follow the roller around back to the pressing place instead of flowing off from the roller, and for this reason the arrangement has been provided, according to the present invention, of scrapers or the like projecting into the slots of the roller for removing the water from the same.

In the accompanying drawings, Fig. 1 shows a cross section of a pair of corrugated rollers as heretofore used, and Fig. 2 shows to a larger scale an axial section through the

pressing place of such rollers. Fig. 3 shows a cross section of a pair of rollers, the lower one of which is constructed accord ng to the present invention, and Fig. 4 shows to a larger scale an axial section through the pressing place of said rollers. Fig. 5 shows a cross section of a portion of a roller with a scraper, and Fig. 6 shows a side view of the scraper. Fig. 7 shows a longitudinal section of a roller according to the invention.

Referring to Figs. 1 and 2, 1 and 2 denote corrugated press rollers of the old construction. 3 is the sheet of pulp, and 4 denotes bodies of water such as are formed when using corrugated rollers, or rollers wound with wire. It will be obvious that water will be sucked into the sheet of pulp from the bodies of water beyond the rollers taken in the directing of feeding the sheet, particularly if said sheet expands beyond the pressing place. Fig. 2 illustrates how the pulp becomes pressed into the corrugations, and that only an exceedingly small opening 5 will be left for the water to flow off which causes a high counter pressure to be formed and the water thus to remain to a great extent in the pulp in the corrugations.

According to Figs. 3 and 4 the pulp sheet 6 is pressed by means of a smooth upper roller 7 against a lower roller 8 constructed according to the present invention and provided with scrapers 9. The roller 8 is provided with slots 10 extending in the cross direction of the roller and having such small width that during the pressing the pulp can not penetrate into said slots. On the other hand, said slots are so deep that they are capable of receiving all the water pressed out within the portion of the pressing surface corresponding to each slot, so that no counter pressure will be formed against the water pressed out, but that all the water will remain in the slots owing to the adhesion and will follow the slots during the rotation until it is removed by the scrapers 9 projecting into the slots. It has been established that with such slots no bodies of water whatsoever will be formed at the pressing place, all water pressed out flowing from the sheet of pulp into the slots 10. One of the most noteworthy results of the present invention is that the water pressed out will freely follow within the slots from the pressing place in the direction of rotation of the roller, and that at 11, that is to say, at the moment when the sheet of pulp leaves the pressing place, the water falls or is sucked a little downwards in the slots. This result is also easily explained when the speed of the surfaces of contact of the slots with the water is greater than the pressing-out speed of the water.

Figs. 5 and 6 show an embodiment of an assembled scraper for a roller according to the present invention. Thin scrapers 14 with suitable intermediate blocks 15 are assembled in a frame 12. In front of the scrapers 14 there is provided a shield 16 adjustable in direction towards the surface of the roller and having an edge 17. The frame 12 with scrapers 14, and so forth, is adjustable on a support 18 which is attached in such manner to the pressing apparatus that the thin scrapers 14 project into the slots 10 while the edge 17 bears against the surface of the roller 8.

By the term scraper in the above description I mean every such device which is adapted to project into the slots in the roller and remove the water therefrom, even if it is not in direct contact with the walls and the bottom of the slot.

Fig. 7 illustrates a practical embodiment of a roller according to the present invention. The body 21 of the roller is provided with a flange 22 serving as abutment for the rings 23 placed on the body 21 with intermediate disks 24 of thin sheet metal and of smaller diameter than the rings 23. Narrow slots 27 are thus formed closely to one another in the assembled roller. Instead of the disks 24 the rings 23 may be provided with corresponding turned bosses. The rings 23 and the disks 24 are secured on the roller body by means of one or more keys 25 and by means of a nut 23 or the like.

However, the slots may, of course, also be produced directly in the surface of the roller, as illustrated in Figs. 3 and 4.

I claim:

1. A roller for pressing apparatus for wood-pulp and cellulose provided with annular slots in its surface extending only in the peripheral direction of the roller circumferentially around the same, the annular portions of the surface of the roller remaining between said slots being several times wider than the mouths of said slots in the roller surface, said slots being of such small width that said remaining annular portions of the roller surface are capable of pressing the material without the material being pressed into said slots, and the depth of said slots being several times greater than the width of the mouths of the slots and being so proportioned relatively to the width of said remaining annular portions of the roller surface that each slot is capable of receiving and to bring along and remove at the rotation of the roller at least such quantity of liquid as is pressed out by each remaining annular portion of the roller surface.

2. The combination with a roller for pressing apparatus for wood-pulp and cellulose provided with annular slots in its surface extending only in the peripheral direction of the roller circumferentially

around the same, the annular portions of the surface of the roller remaining between said slots being several times wider than the mouths of said slots in the roller surface, said slots being of such small width that said remaining annular portions of the roller surface are capable of pressing the material without the material being pressed into said slots, and the depth of said slots being several times greater than the width of the mouths of the slots and being so proportioned relatively to the width of said remaining annular portions of the roller surface that each slot is capable of receiving and to bring along and remove at the rotation of the roller at least such quantity of liquid as is pressed out by each remaining annular portion of the roller surface, of scrapers entering said slots for removing water from the same.

3. In a roller for pressing apparatus for wood-pulp and cellulose, the combination of a roller body, a plurality of rings placed on said body, and distance pieces between said rings, the thickness of said rings in the longitudinal direction of the roller being several times greater than the thickness of said distance pieces and the difference between the radii of said rings and of said distance pieces being several times greater than the thickness of said distance pieces so as to produce in the surface of the assembled roller slots extending only in the peripheral direction of the roller circumferentially around the same, of such small width that the circumferential surfaces of the rings between the slots are capable of pressing the material without the material being pressed into said slots, and of such depth that each slot is capable of receiving and to bring along and remove at the rotation of the roller at least such quantity of liquid as is pressed out by the circumferential surface of each ring.

4. The combination with a roller for pressing apparatus for wood-pulp and cellulose comprising a roller body, a plurality of rings placed on said body, and distance pieces between said rings, the thickness of said rings in the longitudinal direction of the roller being several times greater than the thickness of said distance pieces and the difference between the radii of said rings and of said distance pieces being several times greater than the thickness of said distance pieces so as to produce in the surface of the assembled roller slots extending only in the peripheral direction of the roller circumferentially around the same, of such small width that the circumferential surfaces of the rings between the slots are capable of pressing the material without the material being pressed into said slots, and of such depth that each slot is capable of receiving and to bring along and remove at the rotation of the roller at least such quantity of liquid as is pressed out by the circumferential surface of each ring, of scrapers entering said slots for removing water from the same.

RUDOLF ERNST WAGNER.