H. HINCKLEY.

STRIPPING MEANS FOR PRESSURE ROLLS.

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Fig. 1,

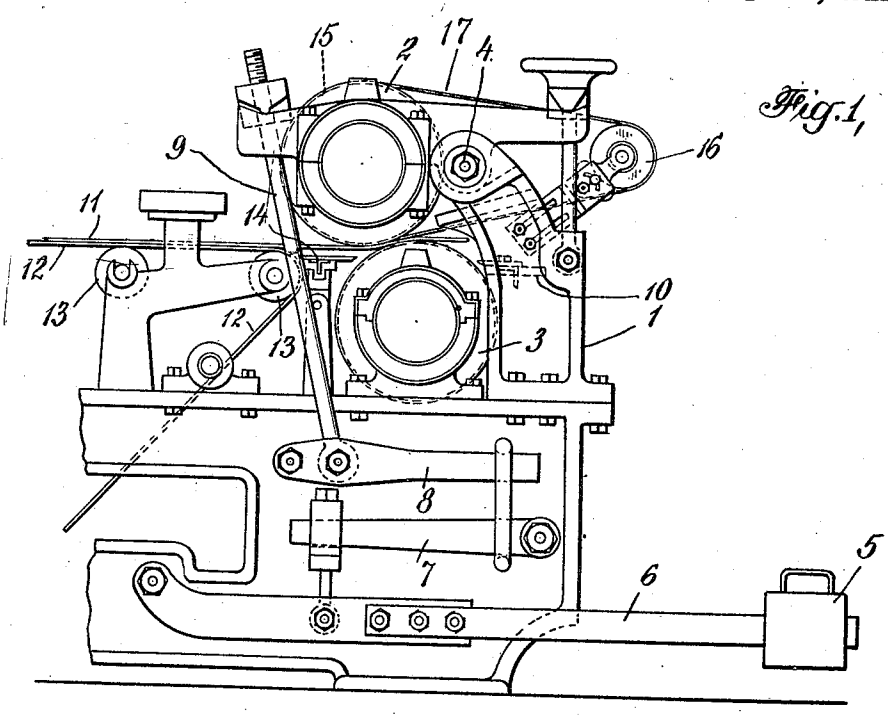
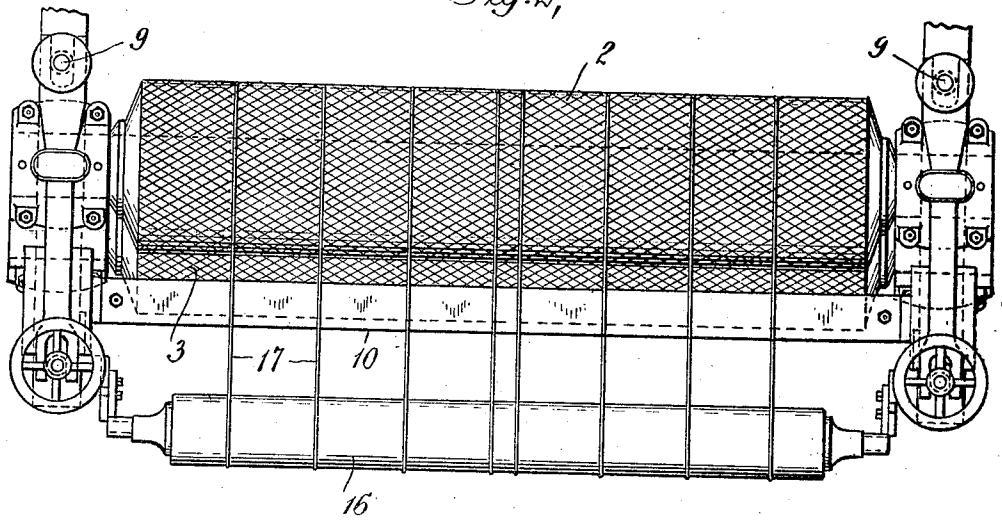


Fig. 2,



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UNITED STATES PATENT OFFICE.

HAROLD HINCKLEY, OF BANGOR, MAINE.

STRIPPING MEANS FOR PRESSURE ROLLS.

Application filed October 26, 1921. Serial No. 510,449.

To all whom it may concern:

Be it known that I, HAROLD HINCKLEY, residing at Bangor, in the county of Penobscot, State of Maine, have invented certain new and useful Improvements in Stripping Means for Pressure Rolls; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

In the manufacture of paper, the water is removed from the web in two stages. First, the web, supported on porous felts, is passed between successive pressure rolls and over suction boxes, and as much water as practicable is sucked and squeezed from it. In the second stage the web is run over and around a battery of steam-heated drying rolls and thus reduced to substantial dryness. In the manufacture of pulp in a wet machine this final drying stage is not economically feasible because of the cheapness of the product and the thickness of the pulp sheets. For this reason all of the water which is removed (and it is desirable to remove as much as possible) must be mechanically expressed. This has meant increasing the pressure exerted by the pressure rolls to a maximum. Where the pulp is carried between the rolls supported upon a felt, the maximum pressure is limited to that pressure which the felt can stand. A pressure high enough to be efficient from a dewatering standpoint would ruin the felt in a short time.

In accordance with the recent invention of Harry E. Tidmarsh, patented in U. S. Patent No. 1,387,954 August 16, 1921, the pulp sheets are passed through the final pressure rolls unsupported by the felt, he having discovered that by properly corrugating the surfaces of these rolls they would bite the pulp and carry it through, contacting only with the bare rolls themselves. It therefore becomes possible to increase the pressure and express more water than has formerly been practicable.

What is the practical limit of this pressure? It has been discovered that as the pressure is increased beyond a certain point the pulp is forced within the corrugations on the surface of the rolls, especially the fine pieces of pulp which result when the web is separated transversely into sheets. This pulp follows the roll past the edge of the doctor ordinarily employed to keep the rolls free of the pulp, until finally this doctor is forced out of position and the entire sheet or part of it follows the rolls and passes between it and the doctor. Where the upper roll is offset in the direction from which the pulp approaches, this difficulty is experienced, particularly in connection with that roll. If this difficulty could be eliminated, greater pressure could be exerted by the final pressure rolls and the efficiency of the wet machine increased accordingly. It is therefore an object of this present invention to overcome this difficulty, and devise means which shall prevent the pulp from adhering to and following the pressure rolls, even where excessive pressures are employed.

This object has been accomplished by providing the pressure roll to which the pulp tends to adhere, with a number of narrow circumferential grooves, and mounting guides within these grooves which extend tangentially beyond the point of contact of the roll in question with its mate. A series of endless belts running loosely within these grooves and around an idler roll beyond and in the direction of travel of the sheets have been found to serve well as these guides. The grooves are so narrow as not materially to subtract from the pressing area of the roll and deep enough so that the pulp is not forced around the guides. As the sheet emerges from the nap of the rolls it is forced forward by the guides and cannot follow the roll.

The invention will be more clearly understood after a study of the accompanying drawing, which discloses one preferred embodiment of it, although it is clear that other structural details might be employed without departing from the spirit of the invention. In these drawings Fig. 1 is a side elevation of the final bare pressure rolls of a wet machine equipped with a stripping device in accordance with this invention, and Fig. 2 is a plan view of these rolls and the stripping device.

The frame of the machine is indicated in general by the reference numeral 1. On this frame are mounted upper and lower corrugated pressure rolls 2 and 3 respectively, the upper roll being offset slightly in a direction toward which the sheet approaches.

The upper roll 2 is pivotally mounted about bearings 4 and is positively forced against the lower roll 3 by means of a weight 5 acting through compound levers 6, 7 and 8 and rods 9. The pressure can be varied by movement of the weight 5. The pulp sheets 11 are fed between the pressure rolls by means of a felt 12 passing over rollers 13. A table 14 is provided which serves to guide the pulp between the rolls, but this table may or may not be used, depending upon the stiffness of the pulp. The far side of the lower roll is provided with an adjustable doctor 10 which keeps this roll clean and is adequate to prevent the pulp from adhering to it. The foregoing structure is all old and is clearly disclosed in the patent to Tidmarsh discussed above.

In accordance with the present invention the upper roll 2 is provided with a plurality of grooves 15. Beyond the pressure rolls and adjustably mounted upon the frame of the machine is an idler roll 16. Running around this idler roll and seated within the grooves 15 are a plurality of endless belts 17. These belts are preferably very narrow, rope (cod line) one-eighth of an inch in diameter having been successfully employed, and the grooves 15 are wide enough only to accommodate these very narrow belts. The wider the belt and the grooves the greater the amount of pressing area which is lost. The grooves are deep enough to permit the belts 17 to run loosely and not be subjected to pressure when the pulp is passing between the rolls. The belts may to advantage be narrow chain belts.

The operation of the device will be clear from the foregoing, but may be briefly reviewed as follows. As the pulp sheets emerge from the nap of the rolls they are in contact with the endless belts 17 and forced away from contact with the upper roll. Hence, any tendency which the pulp may have to adhere to and follow this roll is counteracted and the sheet is fed forward onto the off-bearing belt which is not shown.

This invention has made possible the use of greater pressure than could heretofore be employed. It is simple in its operation, does not materially detract from the pressing efficiency of the rolls and makes it impossible for the pulp to adhere to and follow the upper roll. Although it has been found that in most instances only the upper roll causes trouble, yet it is clear that these guides could be employed in connection with either or both rolls should the pulp evince a tendency to adhere to either. The use of endless belts has also been found to answer the requirements, but it is possible that stationary guides might be employed, and under some circumstances might be desirable. The invention is therefore in no sense limited to the exact form of guides shown and described.

I claim:

1. In a wet machine, the combination of a pair of pressure rolls, a circumferential groove in the face of one of the rolls, and a guide in said groove at the point where the two rolls contact, said guide extending tangentially beyond the rolls.

2. In a wet machine, the combination of a pair of pressure rolls, a circumferential groove in the face of one of the rolls, and a guide in said groove, said guide extending beyond the rolls and serving to prevent the sheets passing between the rolls from adhering to that roll.

3. In a wet machine, the combination of a pair of bare corrugated pressure rolls, a plurality of circumferential grooves in the face of one of the rolls, and guides in said grooves at the point where the two rolls contact, said guides extending beyond the rolls and serving to prevent the sheets passing between the rolls from adhering to that roll.

4. In a wet machine, the combination of upper and lower pressure rolls, the upper roll being somewhat in advance of the lower, circumferential grooves in the face of the upper roll, and guides in said grooves at the point where the two rolls contact, said guides extending beyond the rolls and serving to prevent the sheets passing between the rolls from adhering to that roll.

5. In a wet machine, the combination of a pair of pressure rolls, circumferential grooves in the face of one of the rolls, and endless belts in said grooves extending between the rolls and serving to prevent sheets passing between the rolls from adhering to that roll.

6. In a wet machine, the combination of upper and lower pressure rolls, the upper roll being somewhat in advance of the lower, circumferential grooves in the face of the upper roll, and endless belts in said grooves extending beyond the rolls and serving to prevent sheets passing between the rolls from adhering to that roll.

7. In a wet machine, the combination of upper and lower pressure rolls, the upper roll being somewhat in advance of the lower, a plurality of narrow circumferential grooves in the face of the upper roll, narrow endless belts in said grooves passing between the two rolls and extending beyond to prevent sheets passing between the rolls from adhering to that roll, the grooves being deeper than the thickness of the endless belts.

8. In a wet machine, the combination of a pair of pressure rolls, circumferential grooves in the face of one of the rolls, an idler roll beyond the pressure rolls, and endless belts passing around the idler roll and in the said grooves in the pressure roll and

serving to prevent sheets passing between the rolls from adhering to that roll.

9. In a wet machine, the combination of upper and lower corrugated pressure rolls, the upper roll being somewhat in advance of the lower, a plurality of narrow circumferential grooves in the face of the upper roll, an idler roll between the pressure rolls, and endless belts passing around the idler roll and in the said grooves in the pressure roll and serving to prevent sheets passing between the rolls from adhering to that roll.

In testimony whereof I affix my signature.

HAROLD HINCKLEY.