Dec. 6, 1966 N. M. REITZEL 3,289,316

REMOVING LIQUID FROM A TRAVELING BODY

Filed April 22, 1964

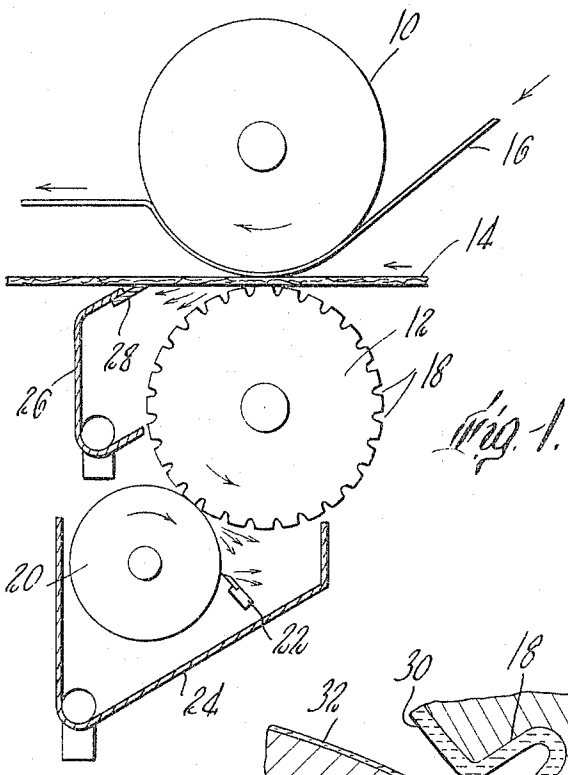

Fig. 1.

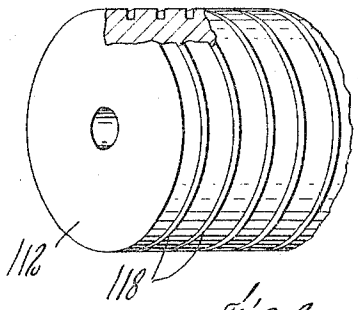

Fig. 3.

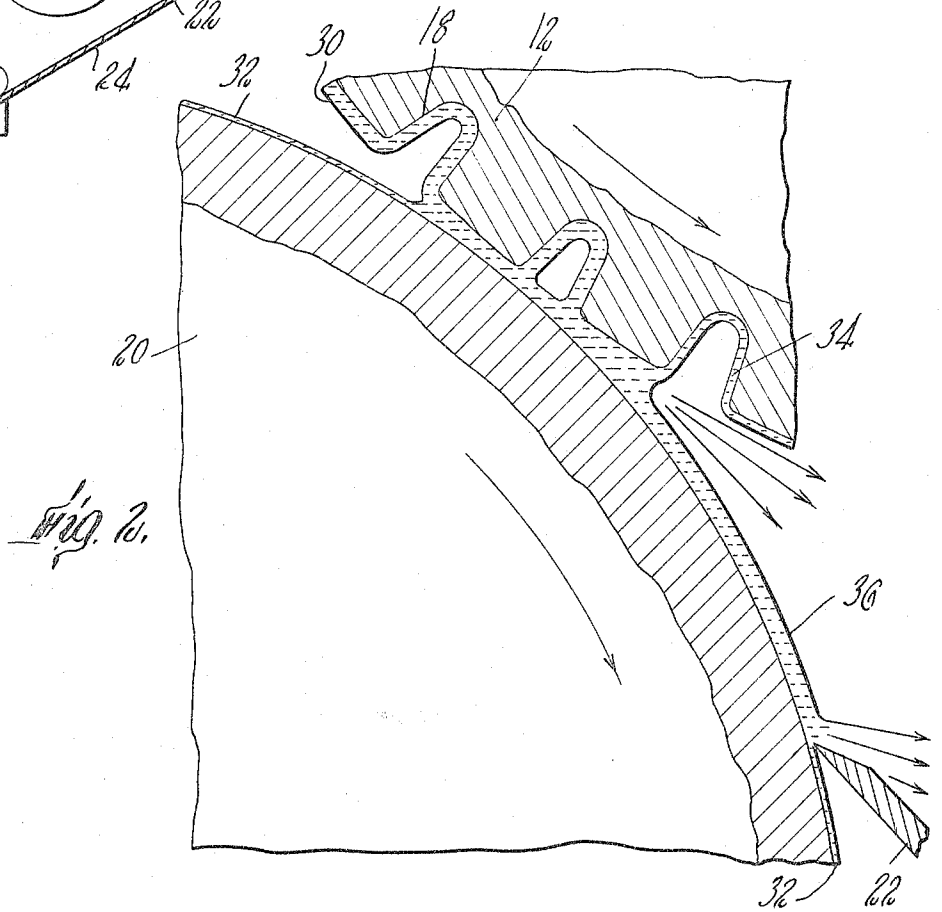

Fig. 2.

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REMOVING LIQUID FROM A TRAVELING BODY

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3 Claims. (Cl. 34—95)

This invention relates to drying of traveling webs. More particularly, it provides apparatus and method useful in drying, for example, papermakers' felts.

It is a broad object of the present invention to make possible obtaining improved dryness in a body, such as an endless papermakers' felt, from which liquid is squeezed by members such as rolls at least one of which has a surface intermittently recessed to accommodate liquid expressed in a nip defined by the surfaces of the members. Further objects are to accomplish this, and in turn make possible more efficient and complete drying of a web carried by the felt, at very small requirements of expense and power, and with at the same time not only simplicity but also versatility making easy use of the invention in various types of installation, for example in inverse press installations.

Generally speaking, the invention contemplates stripping liquid from recessed surfaces of one body by continuously contacting the outer surfaces of that body with the smooth surface of another body at one portion of the latter, the liquid being stripped as the body surfaces thereafter diverge.

Other objects, advantages, and features will appear from the following description of presently preferred embodiments shown in the attached drawings, in which:

FIG. 1 is a somewhat diagrammatic view of a presently preferred embodiment of the invention;

FIG. 2 is a partial view corresponding to FIG. 1 but on an enlarged scale; and

FIG. 3 is an isometric, broken away view of a modified press roll.

Referring now more particularly to the drawings, there is shown a pair of press rolls 10 and 12 through the nip between which moves endless papermakers' felt 14 (which may suitably be carried conventionally, by means not shown) carrying web 16. Press roll 10 has a smooth cylindrical surface, while the cylindrical outer surface of roll 12 is intermittently interrupted by transversely extending grooves 18. These rolls are mounted conventionally, by means not shown, for rotation with corresponding outer surface speeds and in opposite angular directions.

Smooth roll 20 (also rotatably mounted by conventional means not shown) is rotatably driven by friction contact with roll 12, against which it is lightly held, by a force for example of five pounds per linear inch of width of the papermaking machine, across which all the elements herein mentioned extend. A doctor blade 22 is in water-removing engagement with the roll 20, and pan 24 is provided to catch water. A second pan 26, associated with which is wiper 28, catches water thrown from the grooves 18 moving away from the nip and felt and removed by the wiper 28.

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The dryness imparted to web 16 is a function of the dryness of felt 14 at the time these two members come together just before the above-mentioned nip, and the dryness here of the felt is in turn a function of how dry the roll 12 is at the time the felt engages it in going into the nip. It has been surprisingly found that the roll 12, despite the relieved or recessed character of its grooved surface, can nevertheless be greatly improved in dryness, at negligible power expenditures, by letting it rotate in contact with the rotatable smooth drying roll 20.

While I do not wish to limit myself to any particular theory of operation, the mechanism involved presently appears to be substantially as illustrated in FIG. 2. When rolls 12 and 20 come into contact, the relatively thick layer of water 30 on the grooved roll merges with the relatively (thereto) thinner film of water 32 on the smooth roll 20. Then, as the rolls 12 and 20 again diverge, the tendency of the water to maintain a unitary film under these dynamic and configurational circumstance seems first to strip most of the water from the recesses to leave a relatively thin film 34, and then to rupture, throwing off much water immediately. A fairly thick layer 36 remains on the roll 20, however, and much of this is removed by doctor blade 22, leaving the thin film 32.

Other embodiments within the invention and the following claims will occur to those in the art.

I claim:

1. Apparatus for removing liquid from a traveling body which comprises a body-contacting nonporous press roll with a body-contacting surface, said surface being mounted for movement at a speed corresponding to that of said body and in contact therewith and said surface being intermittently relieved to provide for reception of liquid transferred thereinto from said body, and a drying element for removal of liquid from said body-contacting surface prior to a succeeding contact of a portion thereof with said body, said element having a continuous face, said continuous face being mounted for movement at said speed and in continuous noncompressive contact with said body-contacting surface at one portion of said face and continuously out of contact with said body-contacting surface at other portions of said face.

2. The apparatus of claim 1 in which said drying element is a roll.

3. The apparatus of claim 2 which includes a doctor blade mounted to engage said drying element for removal of liquid therefrom.

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