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L. SHLICK

DRYING CYLINDER

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2 Sheets-Sheet 1

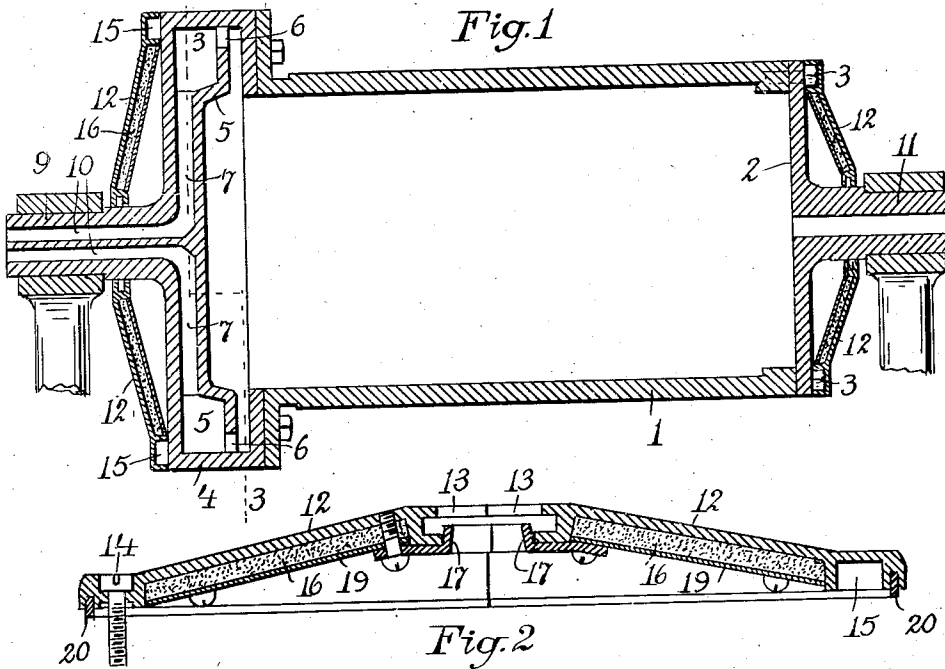
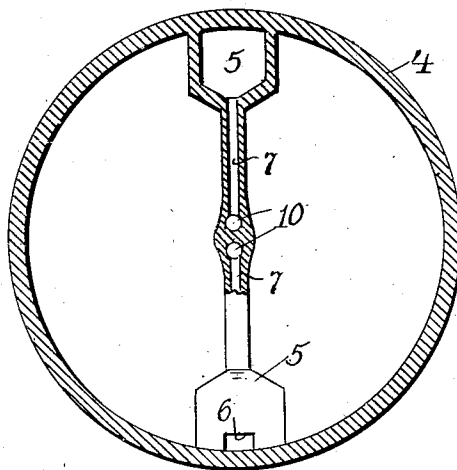


Fig. 3

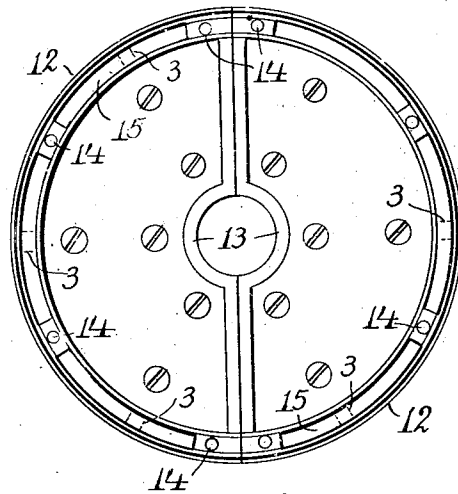


Fig. 4

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DRYING CYLINDER.

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The objects of this invention are, first, the effecting of means for preventing workmen from catching their clothing upon the bolts which attach the heads to the drying cylinders used in paper making; second, to means for reducing the radiation of heat from the ends of the cylinders; and, third, to means for the automatic discharge from the cylinders of the water which condenses from the steam which is let therein for heating them.

For the first two purposes, I provide a head-enclosure which is adapted to cover both its own attaching bolts and those of the head itself; and which is also provided with insulating material for preventing heat radiation. For the third purpose, I provide a receiving space farther from the axis of the cylinder than is the periphery of the latter, into which the water of condensation passes from the cylinder, and from which it is discharged through one of the trunnions.

In the drawings forming part of this specification, Fig. 1 is a longitudinal section of a drying cylinder embodying one form of the invention. Fig. 2 is a diametrical section of an insulating cover. Fig. 3 is a section on the irregular line 3-3 in Fig. 1. Fig. 4 is an inner view of a cover. Fig. 5 is a longitudinal section of another form of the invention. Fig. 6 is a section on the line 6-6 in Fig. 5. Fig. 7 is a section of another form of the invention; and Fig. 8 is a detail sectional view of the same.

The drum or cylinder 1 has at one end a head 2 attached thereto by bolts 3, and at the other end a diametrically enlarged head 4 provided with means for discharging through a trunnion the water of condensation entering it from the cylinder. The means for such discharge illustrated in Figs. 1 and 3, consists of one or more chambers 5 each having an opening 6 for the entrance of the water, and a drainage conduit 7 passing therefrom to and through the trunnion 9.

Whatever water condenses from the steam admitted to the cylinder through the trunnion 11, will flow from the cylinder into the hollow head 4, and thence through an opening 6 into the first chamber 5 which reaches the lowermost point in the rotation of the cylinder. Then, when this chamber has been elevated to a sufficient height, the water flows

therefrom through the conduits 7, 10 to the exterior of the cylinder.

The protecting cover or shield consists of two segments 12 each having a semi-circular hub 13 loosely fitting a trunnion, and provided with bolts 14 having their heads sunk therein, for the attachment of the shields to the cylinder. The shields are also formed with an annular groove 15 for enclosing the heads of the bolts 3, and thereby keeping the latter from injuring the clothing or persons of the workmen.

Between the groove 15 and the hub 13 of a shield are two semi-circular non-conducting pads 16, preferably composed of asbestos suitably reinforced. An insulating collar 17 is introduced between the hub 13 and its trunnion. Sheet metal 19 is fastened over the pads 16; and insulating material 20 is inserted in a groove in the outermost portion of the shield.

It is customary to provide the drying drums used in most of the pulp mills, with interior flanges 21 to which to bolt the heads. For these drums, as 22 in Fig. 5, it is impossible to employ the form of head 4 shown in Fig. 1 for the reason that the water of condensation cannot flow past the flanges. To accommodate the same, I have devised two slightly different constructions of head. In that illustrated in Figs. 5 and 6, holes 23 are drilled through the flanges 21 for the passage of the water into the enlarged head 25, from which the water can be removed in the same manner as shown in Figs. 1 and 3, or in the manner shown in Figs. 5 and 6. The arrangement here illustrated consists of a stationary drainage tube 26 in the trunnion 27, having an enlarged trough-like portion 29 within the head 25, which is open upward as shown in Fig. 6. In the head 25 is a plurality of approximately radial partitions 30 between the outer wall of the head and a diametrical partition 31, the latter having a hole 32 between each pair of partitions close to the annular wall of the head.

The water collected within the drum passes out through the holes 23 into the enlarged head 25, and thence through the holes 32 into each chamber located between two neighboring partitions 30 as it reaches its lowermost position during the rotation of

the drum. Then, as the drum and head rotate, the water is taken up until the outer end of a partition is higher than its inner end and the contents thereof can be emptied into the trough 29 from which it flows outward through the tube 26. To make sure that the water will not flow in along a partition 30 until the inner end of the latter is well above the edge of the trough 29, the outer portion of each partition is depressed, as at 33.

The construction illustrated in Figs. 7 and 8 differs from that just described in dispensing with an enlarged head, and in having a plain disk-like head 34 bolted directly to the flange 21. The partitions 35 in this case are separate and are bolted to the inner surface of the head 34, being in effect a series of troughs, and attached to the head from within the drum before its opposite head has been put in place.

The opposite head 36 I prefer to protect by means of insulation consisting of reinforcing netting 37 and asbestos 39 confined to the head by means of a sheet metal element 40.

In addition to the holes 23 shown in Fig. 5 for the passage of the water of condensation past the flange 21, I prefer to provide a form of scoop 41 attached to the inner surface of the cylinder 22 in a slightly helical manner, whereby, as the cylinder revolves, the water is scooped up and runs along the floor of the part 41 until it reaches the neck 42 and is poured into the enlarged head 25. One reason why such a scoop is desirable is that the holes 23 are liable to become more or less clogged by accumulations of rust and scale and thereby fail to deliver the water as readily as they should.

What I claim as my invention is:

1. A drying cylinder comprising a shell having a cylindrical drying surface, and heads provided with supporting trunnions, one of said trunnions being tubular and the head connected therewith enclosing a space between itself and the adjacent end of said shell whose radial extent is in excess of that of the outer surface of said shell, the inner surface of the latter opening into said space, and means for supplying the cylinder with steam, and for expelling the water of condensation from said space out through said tubular trunnion.

2. A drying cylinder comprising a shell having a cylindrical drying surface, and heads provided with supporting trunnions, one of said heads enclosing a space between itself and the adjacent end of said shell whose radial extent is in excess of that of the outer drying surface of the shell, and means for supplying the cylinder with steam and for expelling the water of condensation from said space out through one of said trunnions.

3. A drying cylinder as set forth in claim 2 having a scoop attached to the inner surface thereof disposed for delivering water of condensation from said surface to said space.

4. A drying cylinder as set forth in claim 2 having a scoop attached to the inner surface thereof and disposed obliquely to the axial line thereof.

5. The combination in a drying cylinder having means for the introduction of steam therein and provided with terminal trunnions one of which is hollow, of a head at an end of the cylinder enclosing a substantial space between itself and the adjacent end of the cylinder, the diameter of said space being far in excess of that of the cylinder to accommodate at any moment all the water of condensation within the cylinder, and means for expelling the water of condensation from said space out through said hollow trunnion.

6. A drying cylinder as set forth in claim 5 wherein steam pressure is the agent for the expulsion of the water of condensation.

7. The combination in a drying cylinder having means for the introduction of steam at one end and provided with hollow supporting trunnions, of a head attached to the other end of the cylinder from that receiving the steam and enclosing a substantial space between itself and the end of the cylinder, the diameter of said space being far in excess of that of the cylinder to accommodate at any moment all the water of condensation within the cylinder, and means acted upon by the steam pressure within the cylinder to expel the water of condensation from said space through the adjacent hollow trunnion.

8. A drying cylinder as set forth in claim 7, the trunnion through which the water is expelled being integral with said head.

9. The combination in a drying cylinder having trunnions and means for the introduction of steam therein, of a head attached to an end of the cylinder to enclose a substantial space between said end and itself, the diameter of which is far in excess of that of the cylinder, a chamber in said space communicating with and through the associated trunnion, said chamber having its outer wall spaced from the end of the cylinder but communicating therewith, the inner surface of the cylinder reaching uninterruptedly to said space.

10. The combination with a drying cylinder having trunnions and means for the introduction of steam therein, of a head attached to an end of the cylinder to enclose a substantial space between such end and itself the diameter of which is far in excess of that of the cylinder, a chamber in said space communicating with and through the associated trunnion, said chamber having its

outer wall spaced from the end of the cylinder and perforated at its radially outermost margin, and the inner surface of the cylinder reaching uniterruptedly to said space.

5 11. A hollow drying cylinder consisting of a shell having end plates for excluding the atmosphere, and supporting trunnions, means for admitting pressure steam within

the cylinder, means for withdrawing the 10 water of condensation therefrom, and insulating material strengthened by metallic reinforcement for the end plates.

In testimony that I claim the foregoing invention, I have hereunto set my hand this 15 21st day of September, 1926.

LEO SHLICK.