J. P. BADENHAUSEN.

DRYING ROLL.

APPLICATION FILED MAY 29, 1915.

1,215,236. Patented Feb. 6, 1917.

Fig. 1.

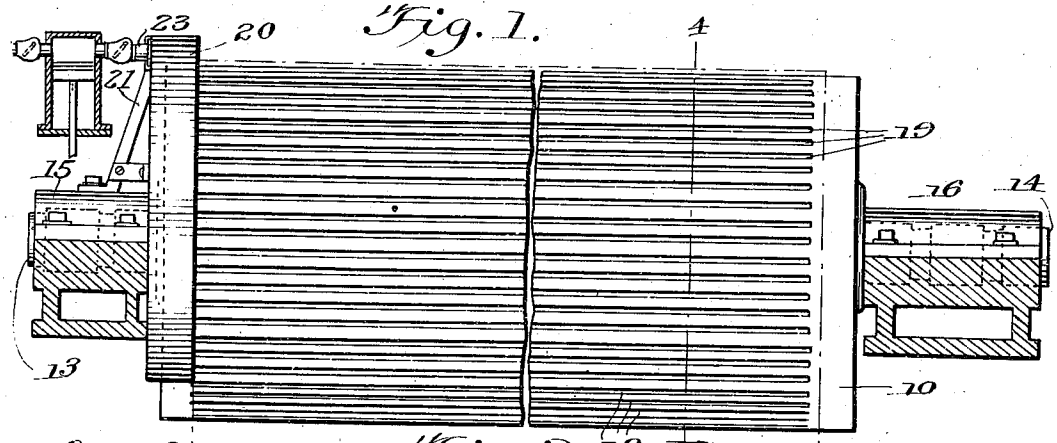


Fig. 2.

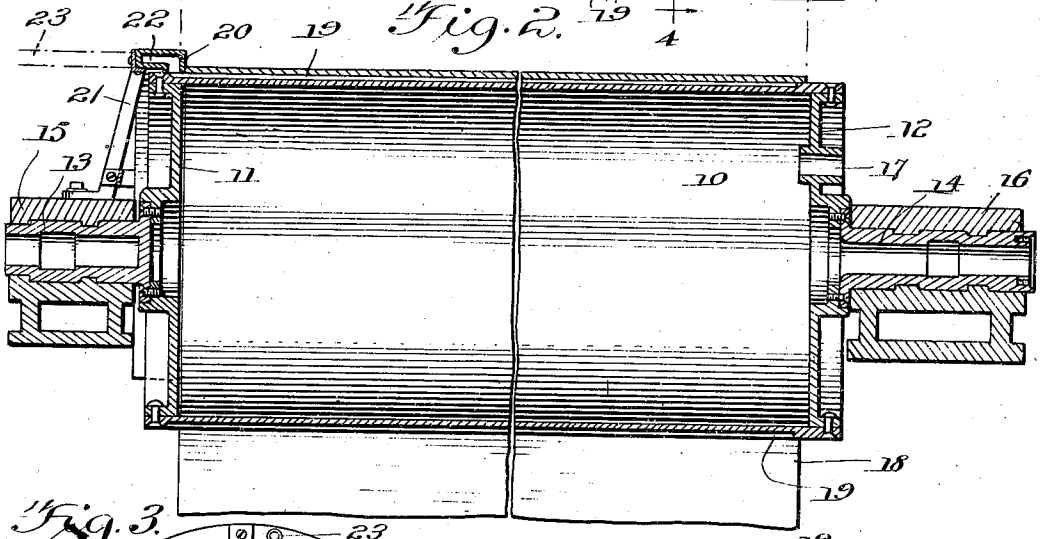


Fig. 3.

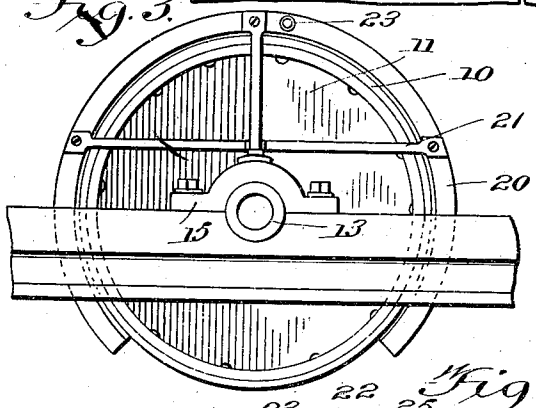


Fig. 4.

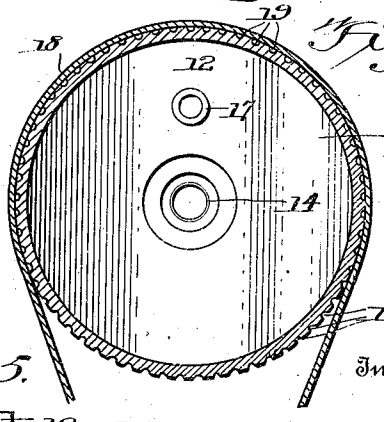
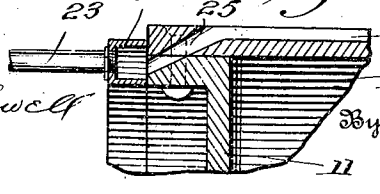


Fig. 5.



Witness

W. S. McKowell

Inventor

J. P. Badenhausen

By Victor J. Evans

Attorney

UNITED STATES PATENT OFFICE.

JOHN P. BADENHAUSEN, OF PHILADELPHIA, PENNSYLVANIA.

DRYING-ROLL.

1,215,236. Specification of Letters Patent. Patented Feb. 6, 1917.

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To all whom it may concern:

Be it known that I, JOHN P. BADENHAUSEN, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented new and useful Improvements in Drying-Rolls, of which the following is a specification.

This device relates to drying rolls and more particularly to that type of drying rolls used in connection with paper machinery, and has for an object to expedite the drying of paper pulp or other generic material.

In machines of this class, it is generally the practice to pass moist or wet paper pulp over steam heated drying rolls in order that the moisture contained in the pulp or stock may be driven off, so that when the material reaches the end of the machine it will be in a comparatively dry condition. This requires, however, a considerable number of drying rollers to accomplish this result, so that it is also a further object of this invention to hasten this drying process and to considerably diminish the number of rolls required by the machine.

Another object of the invention is to provide means coöperating with a drying roller to remove the usual film of steam that is confined between the outer periphery of the drying roll and the inner face of the stock, or web of pulp, in the machines now in general use. As is well known, the heat conductivity of steam is very low and therefore the film of steam, mentioned above, prevents the material from receiving the full benefit of heat issuing from the roller. A further object resides in removing this heat insulating steam in order that the stock may receive the entire volume of heat radiating from the drying roller.

A still further object of this invention is to provide a paper drying roll with recesses or grooves in the outer periphery, and a suitable form of suction pump communicating with said grooves at one or more sides thereof so that the steam generated and confined between the outer face of the heating roller and inner face of a paper belt will be immediately drawn away from the paper and roller for a purpose cited above.

With these and other objects in view, as will appear as the description proceeds, the invention comprises the various novel features of construction and arrangement of parts which will be more fully described hereinafter and set forth with particularity in the claims appended hereto.

In the accompanying drawing:—

Figure 1 is a side elevation of the drying roll,

Fig. 2 is a longitudinal sectional view thereof,

Fig. 3 is an end elevation,

Fig. 4 is a transverse section taken on the line 4—4 of Fig. 1,

Fig. 5 is a detail section illustrating a slightly modified form of construction.

Referring to the drawings the drying roll comprises a cylindrical body 10, provided with connecting end webs 11, and 12, to which are suitably secured axle members 13 and 14, mounted to revolve in bearings 15 and 16, positioned on supports, (not shown) located adjacent the roller 10. Steam, derived from a convenient source, is adapted to enter the hollow axle 14 and enter the hollow interior of the roll 10, to heat the latter. When condensation of steam occurs within the roller, the water of condensation is discharged through an opening 17, by the pressure exerted by the live steam.

This part of the device, however, is now in general use, and, in practice, a belt of paper pulp, or stock 18, is trained over a large number of rollers, so that the heat radiating therefrom will enter the stock for the purpose of evaporating the moisture contained therein. It is well known that a film of steam, caused by the moist stock 18 contacting with the heated roller 1, is confined between the outer face of the roller and the inner face of the stock. This film of steam, due to the poor heat transmission properties of steam, prevents the stock from receiving the full benefit of the heat arising from the roller 10.

Now to remove this film of steam, so as to cause the roller to be more efficient in its function, the latter has provided on its outer periphery a plurality of spaced recesses or grooves 19, shown as extending longitudinally of the roller 10, this having been found to be the preferred method developed so far, but it is to be understood, that I may resort to other designed grooves, if practice may so develop. The extremity of the grooves 19 that are adjacent the bearing 16, terminate underneath the stock 18, while the extremity

near the bearing 15, extends beyond the outer edge of said stock, and communicates with a casing 20.

The casing 20 is substantially circular in contour and partially encircles one end of the roller 10. Furthermore, the casing is supported by means of a frame-work 21, that is rigidly secured to the bearing 15, at its base, and to the casing 20 at its free end thereof. A hollow chamber 22 is formed interiorly of said casing, which is in communication with the outlet ends of the grooves 19, of the roller 10. Extending from the chamber 22 is a pipe section 23 leading to a suitable form of suction device, such as a pump A, as shown.

In operation, the moist stock 18 passes over the heated roller 10, to be dried. This action results in a film of steam being generated between the roller and the stock. This film of steam is collected within the grooves 19 so that when a suction is created by the suction pump, this steam will be drawn out of the roller into the casing 20, whence it is drawn out of the machine through the pipe 23.

In the modified form of construction shown in Fig. 5, the grooves 19 are provided with an angular outlet port 25, that opens on the edge of the roller. The casing 20, of course, being so disposed as to cover the ports 25, so that the steam issuing from the grooves 19 may be readily collected.

From the foregoing description, the advantages of construction and method of operation, of the present invention will be readily apparent, and having described the principle of operation of the mechanism, comprising the preferred embodiment of the invention, it should be understood, that the device shown is merely illustrative, so that such changes may be made when desired as fall within the scope of the claims.

I claim:—

1. A drying roll comprising a revoluble body having a series of steam passages in the periphery thereof, said passages extending longitudinally of the body, and a vacuum casing partially inclosing one end of the body and having said passages communicating therewith.

2. A paper drying roll comprising a cylinder having surface depressions formed in the periphery thereof, adapted to be closed by and to receive moisture from the paper stock traveling directly in surface contact with said cylinder, and means for discharging from said depressions the moisture deposited therein from said stock.

3. A drying roll comprising a hollow body forming an internal heating chamber, the periphery of said body having longitudinally extending steam passages formed therein, steam supplying and exhaust connections communicating with the heating chamber of the body, a casing partially encircling the body and having said passages communicating therewith, and suction means coöperating with the casing for drawing products deposited in said passages into said casing.

4. A stock drying roll comprising a revoluble body having longitudinally extending depressions formed in the periphery thereof, arranged to be closed in the rotation of the body by the movement of the stock over said periphery, said depressions extending beyond the line of a margin of the stock, a casing communicating with the portions, the passages extending beyond such margin of the stop, and a suction device for forming a partial vacuum in said casing.

5. A stock drying roll comprising a hollow rotating body forming a heating chamber, the periphery of said body being provided with longitudinally extending depressions formed therein, terminating at one side of the body within the line of one of the lateral margins of a web of stock lying upon the periphery of the body, and projecting at the opposite side of the body beyond the line of the other lateral margin of the stock, a casing communicating with the projecting portions of the depressions, and a suction device for forming a partial vacuum in said casing.

6. A paper drying roll comprising a cylindrical body having depressions formed in the periphery thereof, adapted to receive moisture from the paper stock traveling in contact with said body, means for heating the body, and a suction mechanism for withdrawing the moisture deposited in said depressions by the paper stock.

7. A paper drying roll comprising a cylindrical body having longitudinally extending grooves formed in the periphery thereof adapted to receive moisture from paper stock traveling in contact with said body, means for heating the body, and means for discharging from said grooves the moisture deposited therein from the stock.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN P. BADENHAUSEN.

Witnesses:
W. S. McDowell,
Lena H. Rohrer.