July 1, 1930. K. MOLLER 1,768,777

APPARATUS FOR TREATING SHEET MATERIALS

Filed Jan. 7, 1928

FIG. I.

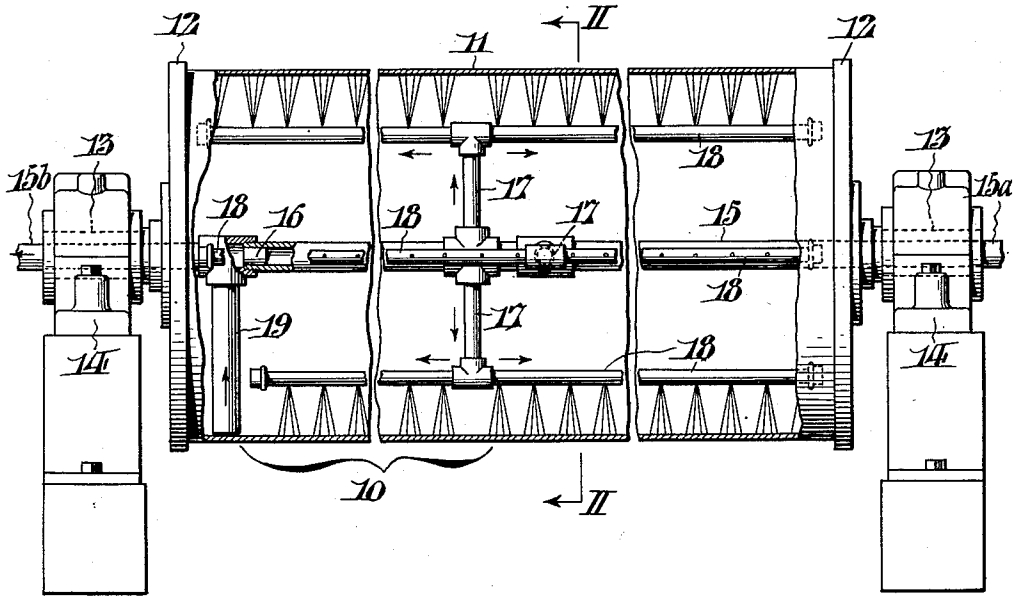
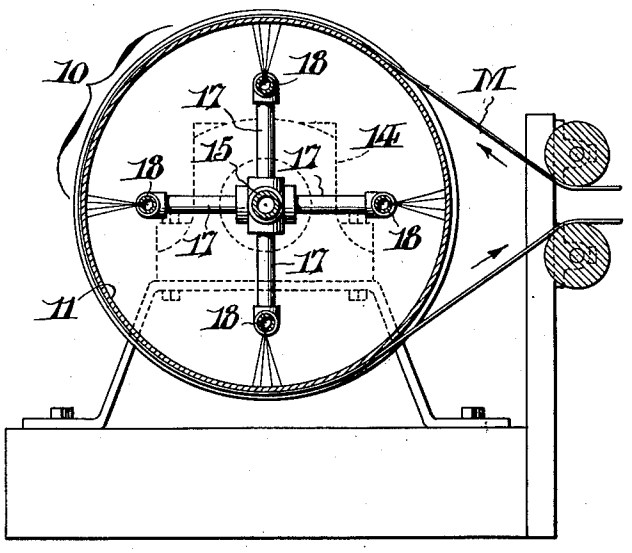


FIG. II.



WITNESSES

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UNITED STATES PATENT OFFICE

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APPARATUS FOR TREATING SHEET MATERIALS

Application filed January 7, 1928. Serial No. 245,201.

This invention relates to apparatus for treating materials more particularly in sheet form—for example cloth—after leaving drying cans, tenter frames, calenders or other machines, where it is desired to cool and condition it. For the specific purpose mentioned, it has been customary heretofore to employ drums cooled by a circulation of water through them, and over which the material was continuously drawn incidental to treatment. In such an arangement considerable difficulty is experienced in securing uniform results in the finished product, since water in bulk is extremely sluggish from the standpoint of temperature control, and therefore not in the best condition for dissipating the heat given off by the material. The drums, moreover, must be strongly built from comparatively thick metal to withstand the weight of the water, and are accordingly heavy, unwieldy and expensive to construct, and due to the excessive thickness of the metal, do not lend themselves to the rapid cooling.

The purpose of my invention is to overcome the various drawbacks of previous practice above recited, and to provide a simple, reliable and efficient, apparatus for the specified or analogous purposes, with a rotary cooling element which can be economically constructed from light materials to the end that the cooling medium comes into intimate contact with the surface to be cooled, and one in which the temperature of the cooling surface may be readily controlled, that will at no time contain any great bulk of water, and which will require very little tractive effort to turn.

One way in which the above desiderata as well as other advantages may be readily realized in practice will be apparent from the detailed description which follows of the typical embodiment of this invention shown in the accompanying drawings, whereof Fig. I is an elevation of my improved treating apparatus with parts thereof broken away and shown in longitudinal section; and,

Fig. II is a transverse sectional view, taken as indicated by the arrows II—II in Fig. I.

As herein depicted, the apparatus comprises a drum 10 having a cylindric shell 11 of light sheet metal which is closed at opposite ends by heads 12 affording hollow trunnions 13 by which the drum 10 is rotatably supported in suitable anti-friction bearings indicated at 14. A stationary tube 15 extending axially through the drum 10 and its trunnions 13, serves both as a conductor for fluid medium to heat or cool the drum 10 interiorly, and as an outlet for the fluid after having been sprayed into the drum 10 as presently explained. The tube 15 may be of standard piping, with a plug 16 used as a means to set apart inflow and outflow passages 15^a, 15^b, for the fluent temperature-modifying medium. Connecting into the inflow passage 15^a are branch pipes 17 which reach radially outward to support longitudinally-extending perforate jet pipes 18 adjacent the inner surface of the drum shell 11. The outflow end 15^b of the tubular axis 15, on the other hand, communicates with a siphon pipe 19 which terminates at a point closely contiguous to the bottom of the drum 10.

As the material M passes continuously around the drum 10 in the manner indicated in Fig. II, it is cooled (or heated as the case may be) through action of the temperature-influencing sprays constantly impinging against the inside surface of the drum shell 11 from the pipes 18. In practice, appropriate instrumentalities, such as standard control valves and thermal regulating devices are of course employed as auxiliaries to the apparatus, both for governing the intensity and the temperature of the sprays within the drum 10. The spent fluid collecting in the bottom of the drum 10 is drawn off through the pipe 19 or other means, and the connecting out-flow passage 15^b to the axis 15 with the aid of suitable suction means such for example as a pump (not shown) connectable at the outer end of said passage.

From the foregoing it will be seen that I

have provided an extremely simple and efficient apparatus for continuously treating sheet material M in preparation for close packing or rolling, or for further treatment in other ways. The thinness of the drum shell 11 obviously promotes rapid thermal transfer from the sprays at the interior to the material M, and is further contributive toward rendering its construction extremely light. In view of this and the fact that only a small quantity of fluid is maintained in the drum 10 at any time, very little effort is required to rotate it. The sheet material M is accordingly protected against injury from tractive strain incidental to its treatment.

Having thus described my invention, I claim:

1. In treating apparatus of the character described, a rotating drum adapted to be over-travelled by continuous material being treated; and means for cooling the walls of the drum interiorly including a stationary axial tube with an insert setting apart a portion thereof as an inlet for the cooling medium at one end with communication to a system of spray pipes lying contiguous to the inner surface of the drum and, at the other end, an outlet for the spent cooling medium via a siphon connection reaching down into close proximity to the drum bottom.

2. In treating apparatus of the character described, a drum adapted to be over-travelled by continuous material being treated, said drum comprising a cylindric shell of light thin sheet metal conducive to rapid thermal transfer, end closure heads with hollow trunnions by which the drum is rotatably supported; and means for cooling the walls of the drum interiorly including a tube extending axially of the drum through its trunnions, said tube having an insert plug setting apart the major portion thereof as an inlet for the cooling medium with communication to a system of spray pipes lying contiguous to the inner surface of the drum, and a minor portion thereof adjacent one of the end closures serving as an outlet for the spent cooling medium via a siphon connection reaching down into close proximity to the drum bottom.

In testimony whereof, I have hereunto signed my name at Wilmington, Delaware, this 29th day of December, 1927.

KENNETH MOLLER.