No. 720,794. PATENTED FEB. 17, 1903.

C. H. FISH.

DRYING CYLINDER.

APPLICATION FILED OCT. 1, 1900.

NO MODEL.

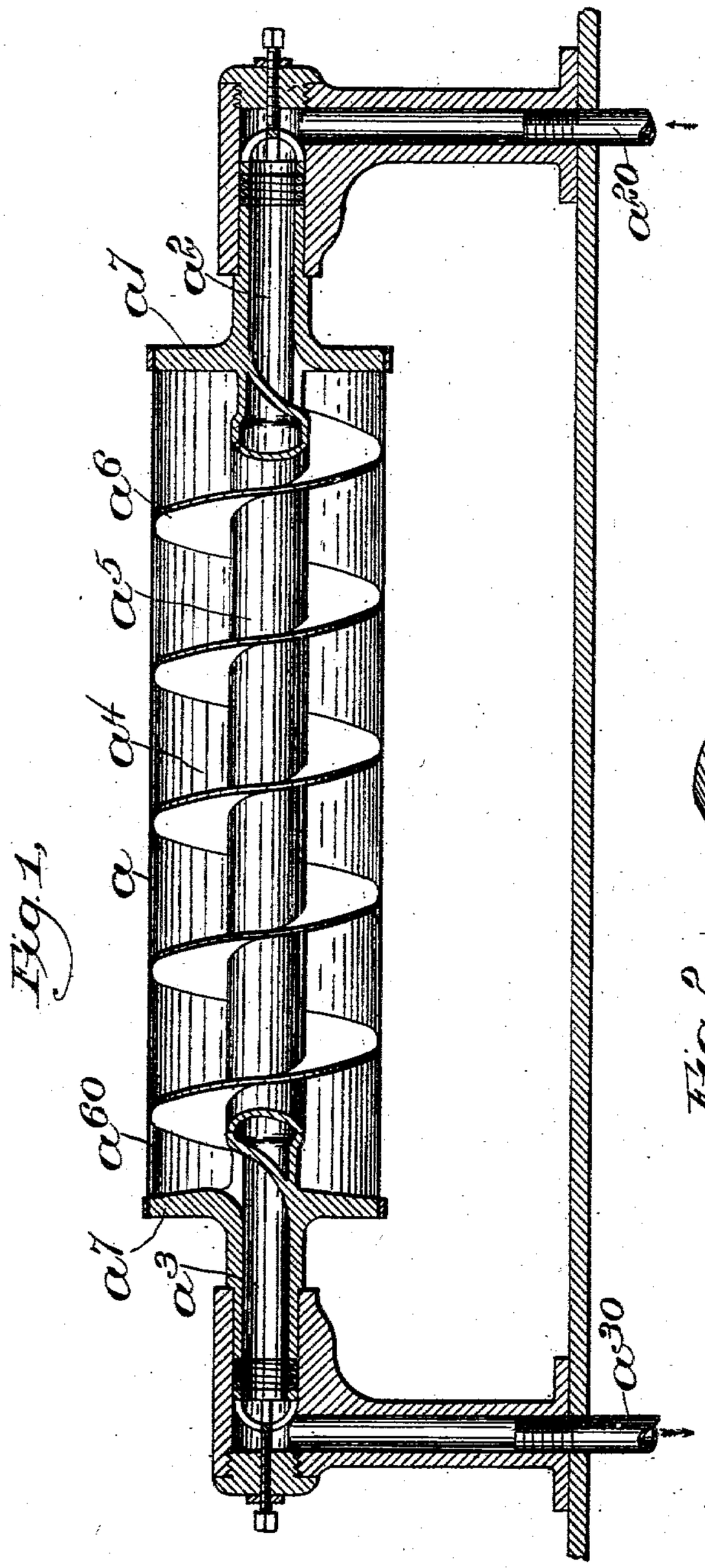

Fig. 1.

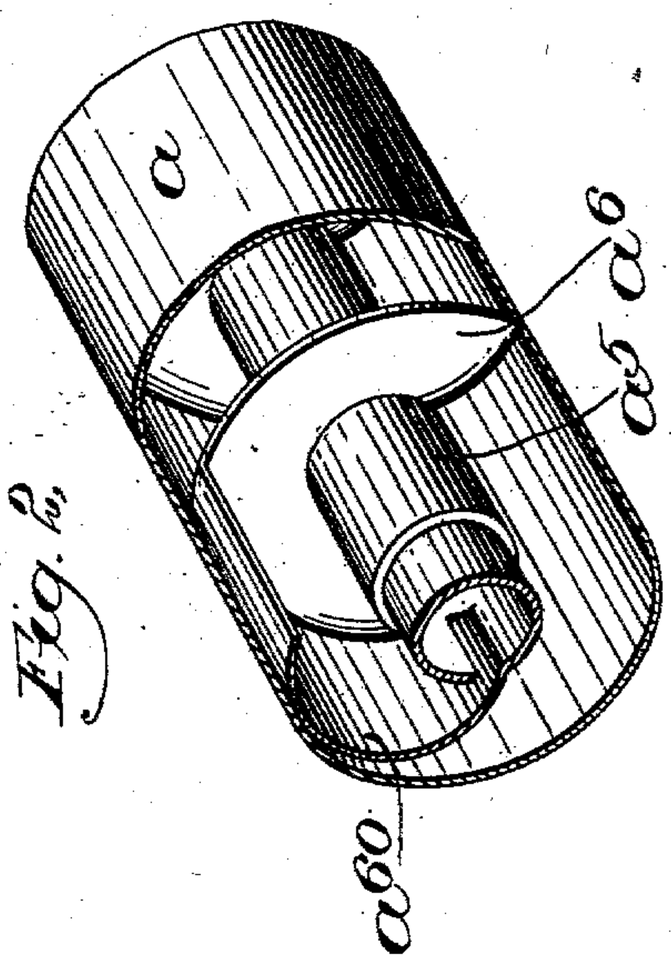

Fig. 2.

Witnesses:
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UNITED STATES PATENT OFFICE.

CHARLES H. FISH, OF DOVER, NEW HAMPSHIRE.

DRYING-CYLINDER.

SPECIFICATION forming part of Letters Patent No. 720,794, dated February 17, 1903.

Application filed October 1, 1900. Serial No. 31,668. (No model.)

To all whom it may concern:

Be it known that I, CHARLES H. FISH, of Dover, county of Strafford, and State of New Hampshire, have invented an Improvement in Drying-Cylinders, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

The present invention relates to a drying-cylinder such as is used in drying a web of fabric, paper, or other material, which in the drying process is passed over or around the surfaces of a number of such cylinders after the manner of a belt. These cylinders are commonly made hollow and heated by steam, and difficulty has been encountered in getting rid of the water of condensation which accumulates within the cylinder and prevents the proper distribution of the heat, not only cooling the cylinder, but also increasing materially the strain upon the cylinder and its bearing and driving arrangements owing to the increased weight. Moreover, if the cylinders are allowed to stand for a while the water becomes cool and upon starting up is liable to cause a sudden condensation of the steam when first turned on, producing a partial vacuum, which often collapses the cylinder. It is obvious, moreover, that in drying it is most essential to have the surface of the cylinder as hot as is possible and that it is therefore desirable to have nothing but dry steam present in the cylinder.

It is the object of the present invention to obviate these and other objections; and to this end the invention is embodied in a drying-cylinder provided with novel means for continually and completely carrying off the water of condensation as fast as it accumulates, said means consisting in a continuous passage or channel extending spirally along the periphery of the cylinder and terminating at the steam-outlet, which is coaxial with the cylinder, so that the water of condensation, which tends to the lowest point in the cylinder, is advanced in the rotation thereof toward the said outlet and flows out. As herein shown, the said passage is formed by providing the cylinder with a wing or rib extending spirally around the same and projecting inward from the inner wall of the cylinder, the said wing finally being curved away from the inner wall of the cylinder toward the steam-outlet.

Figure 1 is a longitudinal section of a cylinder embodying the invention, the main portion of the core and spiral wing being shown in elevation; and Fig. 2 is a perspective view, partly in section, of one end of the cylinder.

The cylinder embodying the invention comprises a hollow cylindrical body a, which may be formed in any suitable or usual way, and is provided with an inlet a^2 at one end and an outlet a^3 at the other end, said inlet and outlet being coaxial with the cylinder. The said inlet a^2 is adapted to receive steam from a pipe a^{20}, and the said steam in passing into and through the cylinder is in contact with the wall of the cylinder and adapted to heat the same so as to act upon the web of material which lies against the outside of the cylinder during the drying process. Such water of condensation as forms in the passage of steam through the cylinder is conducted along a continuous spiral passage a^4, which terminates at the outlet, so that said water continually flows away. The said cylinder and passage may be formed in any suitable or usual way, and, as herein shown, the cylinder has a core a^5 and an endless spiral wing a^6, extending from the outer wall of the cylinder to said core. In the construction shown the core a^5 is provided with flanges a^7, one at each end, which, together with the spiral wing a^6, afford a firm support for the outer wall, so that the danger of collapse is greatly decreased, although the wall may be made of thin sheet metal, as is desirable. The inlet-passage a^2 is shown as extending into the space between the said core a^5 and the outer wall of the cylinder, so that it opens into the spiral passage a^4, afforded by the spiral wing a^6. The steam entering through the said inlet a^2 therefore follows the said spiral passage to the outlet a^3, while the water of condensation as fast as it accumulates will be advanced in the rotation of the cylinder toward the outlet a^3, the spiral wing a^6 terminating at the said outlet, while the spiral passage is completed by a supplemental deflecting portion a^{60}, extending from the wall of the cylinder toward the center along the edge of the wing. The said outlet a^3 communicates with a pipe a^{30}, and the water of condensa-

tion after leaving the cylinder can be separated from the steam in any suitable or usual way, as by means of a steam-trap in said pipe. (Not herein shown.)

By the construction hereinbefore described it is obvious that the water of condensation will be continuously carried away, having a free open passage, and will be substantially prevented from collecting even if the cylinder is rotated at a high rate of speed. This is of material advantage, since it is frequently desirable to operate at a high rate of speed where thin fabrics are being operated upon, as such fabrics do not require to be subjected to heat for any great length of time. High speeds have, however, been heretofore impracticable, owing to the fact that the expedients commonly employed for carrying away the water of condensation will not properly operate under such conditions. This is true in the case of scoops or buckets arranged to pick up the water of condensation in the rotation of the cylinder and deflect it toward the outlet-passage, while in the case of tubes arranged to carry off the water in response to steam-pressure the device is apt to become inoperative owing to stoppage.

It is not intended to limit the invention to the specific construction herein shown and described, since modifications may be made without departing from the invention.

I claim—

1. In an apparatus of the character described, a revolving cylinder, a steam-inlet, a water-outlet, and a device located transversely to the axis of rotation of said cylinder and inclined to said axis for removing through its passage the water of condensation from said cylinder and closing communication between said inlet and said outlet except through its said passage.

2. In an apparatus of the character described, a revolving cylinder, a steam-inlet, a water-outlet, and a screw for removing the water of condensation through its spiral passage from the cylinder to the outlet.

3. In an apparatus of the character described, a revolving cylinder, a steam-inlet, a water-outlet, and a device inclined to the axis of rotation of said cylinder and located between said inlet and said outlet for removing the water of condensation from the cylinder through its spiral passage which establishes communication between said inlet and said outlet and through which passage said water of condensation passes to the outlet.

4. In an apparatus of the character described, a revolving cylinder, a steam-inlet, a water-outlet, and a screw fast in said cylinder and located between said steam-inlet and said water-outlet for removing the water of condensation through its spiral passage from the cylinder to the outlet.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES H. FISH.

Witnesses:
MARTHA E. VICKERY,
SARA C. HAMILTON.