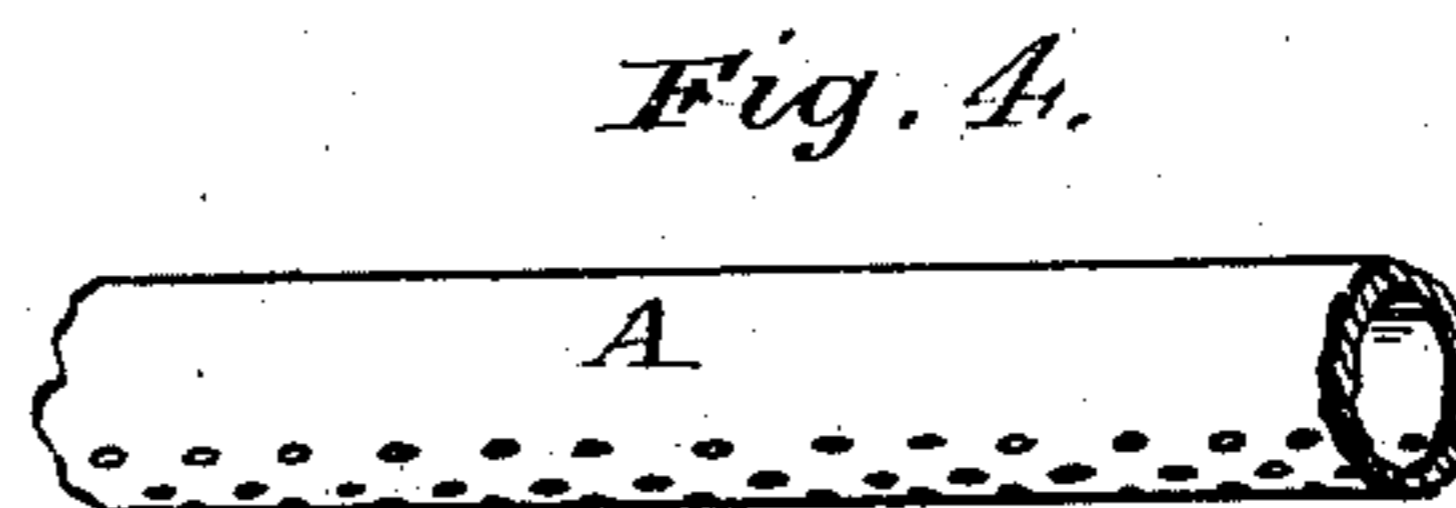
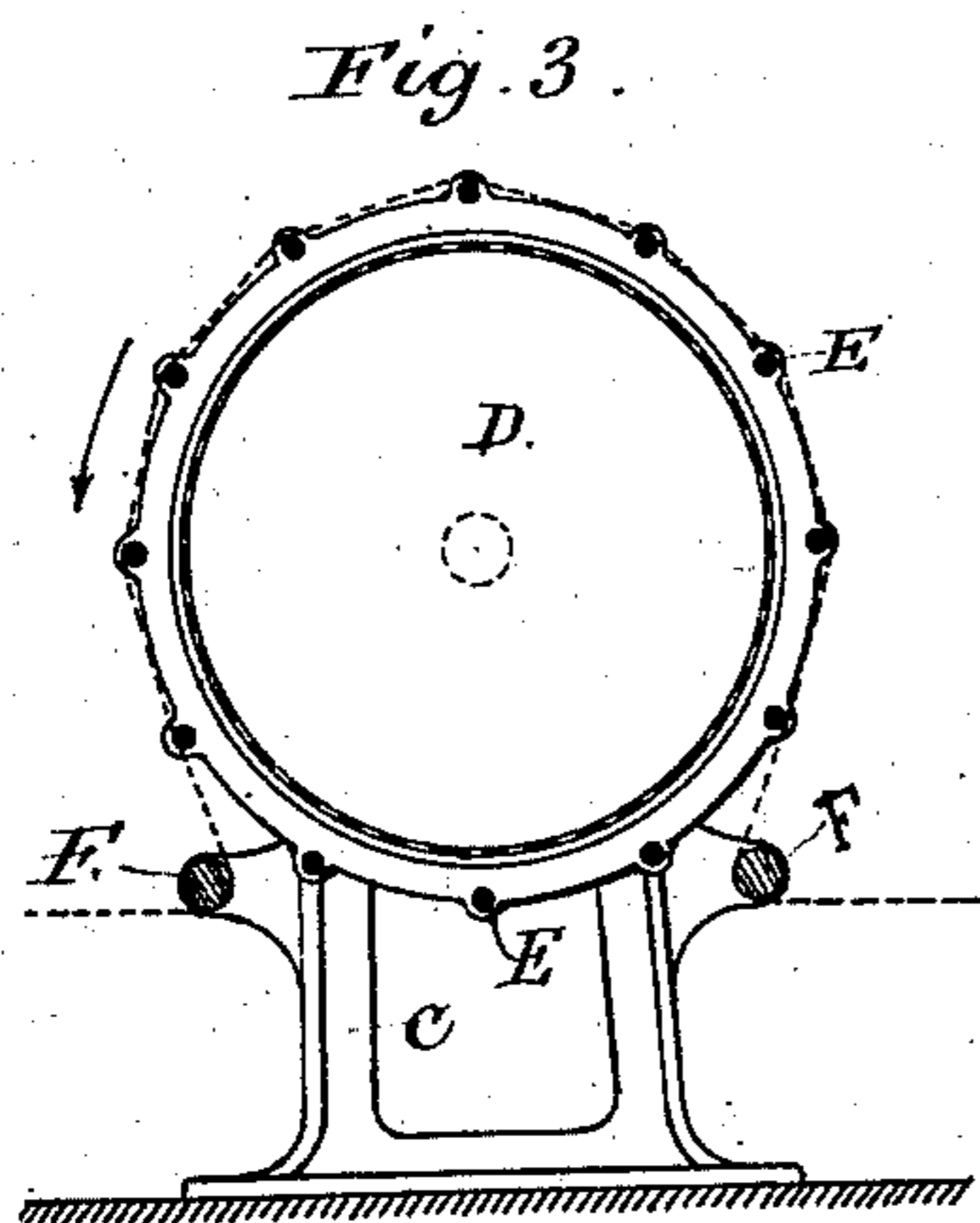
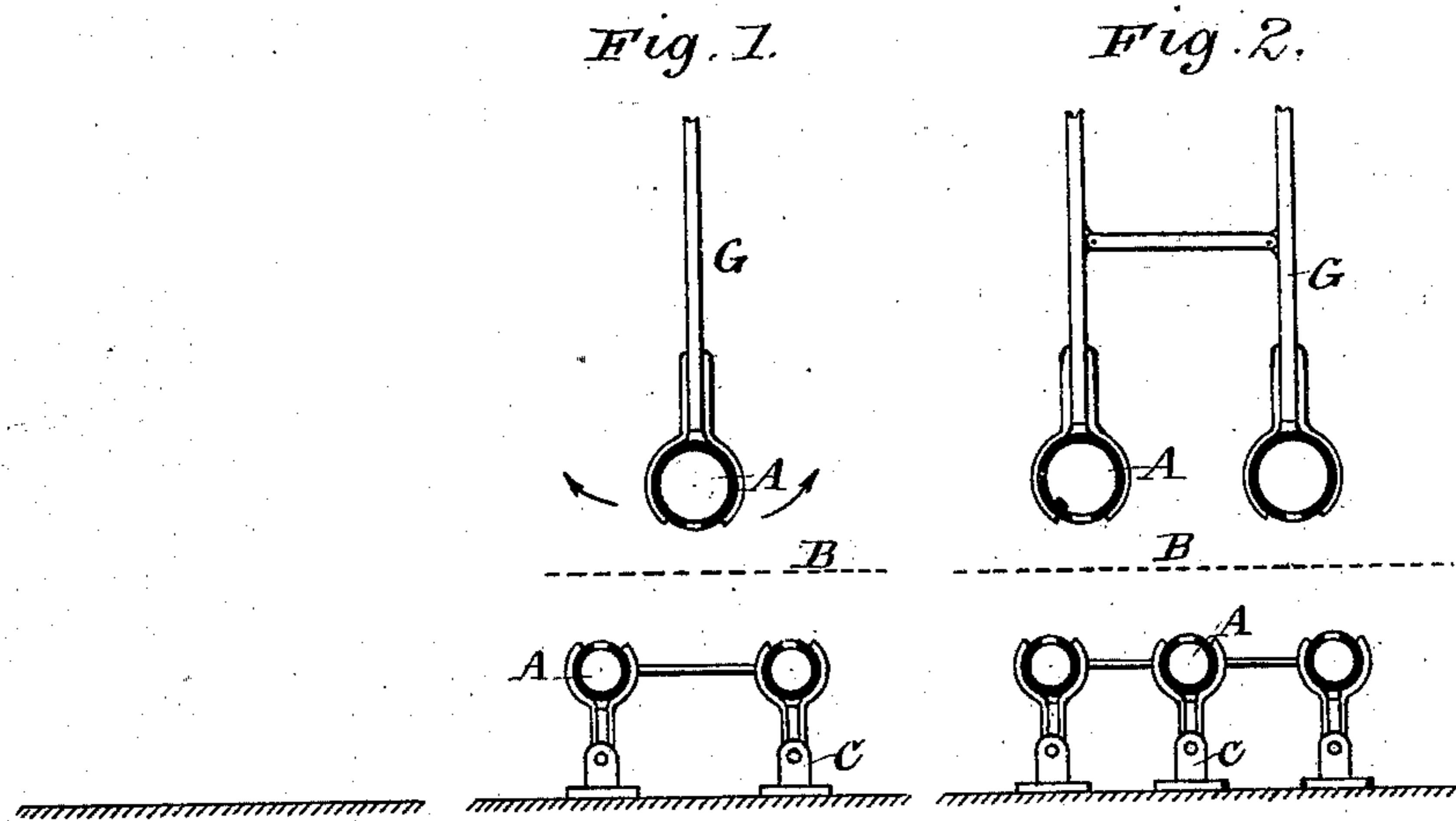


A. DELHARPE.  
 Process of Drying Textile Fabrics.  
 No. 235,937.                      Patented Dec. 28, 1880.



Witnesses:  
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# UNITED STATES PATENT OFFICE.

ALPHONSE DELHARPE, OF TARARE, FRANCE.

## PROCESS OF DRYING TEXTILE FABRICS.

SPECIFICATION forming part of Letters Patent No. 235,937, dated December 28, 1880.

Application filed July 7, 1879.

*To all whom it may concern:*

Be it known that I, ALPHONSE DELHARPE, of the town of Tarare, Department of the Rhone, Republic of France, have invented a new and useful Process of Drying Textile Fabrics while in Process of Manufacture, of which the following specification is a clear, full, and exact description.

My invention relates to a process for drying and finishing textile fabrics that have been sized or otherwise wetted or dampened while in course of manufacture or being finished for the market.

Referring to the drawings accompanying this specification, illustrating mechanism adapted for practicing my process, (but I do not lay any claim to the special mechanical devices illustrated in the drawings,) Figure 1 represents in cross-section one pendent perforated caliduct located above the fabric and two beneath it, supported by the standard C. Fig. 2 is a modification of Fig. 1, showing two such caliducts above and three below the fabric. Fig. 3 represents a sectional view of a perforated revoluble drum, D, surrounded by a series of guide rods or rollers, E, located a short distance from the periphery of the drum, upon which rollers or guides the fabric is supported while being dried, and having guide-rollers F mounted on the supporting-standard C, and under which guide-rollers the fabric passes in its transmission to and from the drum D. This drum is adapted to be used in conjunction with caliducts located above the fabric. Fig. 4 is an enlarged view of part of one of the caliducts, illustrating the preferable manner of making and locating the perforations.

Similar letters of reference indicate like parts on each figure.

The usual manner of treatment of cloths in a damp condition is to evaporate the moisture therefrom by agitating the surrounding air by means of large fans located above the fabric. This mode is tedious, and does not dry all the threads of the fabric with uniformity. The outer surface, being first subjected to the action of the fans, becomes first dried, leaving the interior and lower portions comparatively unaffected, and experience has shown that the texture and other properties of the fabric are best preserved in proper condition by having

the whole body externally and internally quickly dried at one and the same time. The fanning process does not accomplish this, and, besides, is extremely tedious. My process, by forcing air heated to a high degree steadily and uniformly directly upon the fabric, and upon both its under and upper surfaces, dries the whole material, not only upon both its surfaces, but entirely through its body, with uniformity. My process admits of the use of air heated to a high degree of temperature, because it is distributed in minute sprays, whereas, if forced upon either side of the fabric a single blast at the same degree of temperature there would be not only risk of combustion, but the color and texture would be disadvantageously affected.

By the use of my process not only can air heated to almost any degree of temperature be distributed upon the upper and lower surfaces of the fabric, but the force with which it is projected is always within the control of the operator, and any desired results can be attained as to partially or completely removing the moisture from any particular portion of the fabric; also, the operator can vary and control the effect of the process according to the degree of thickness of the material treated or its condition of moisture, as it does not always reach the drying-chamber equally dampened on all of its parts.

According to the present state of the arts to which my invention relates the drying process is usually carried on by means of an evaporating-chamber and fans. In sizing workshops the drying processes are of more varied character, and consist of the use of several descriptions of apparatus—as, for instance, first, a drum; second, a movable frame with fixed paddles or oars; third, a frame with continuous or revolving paddles or oars, the drying-drums being sometimes heated internally by steam. The frames which carry the fixed paddles or oars, generally from ten to sixty feet long, are operated in a room the atmosphere of which is heated from 40° to 60° centigrade, and these paddles or oars are made so as to agitate the air only above the fabric. When the frames carry continuously-following paddles or oars they are simply a modified form of the fanning process.

My process can be utilized on any of the

frames as ordinarily made, either separately or in combination with any of the devices commonly in use.

I will now describe the features and operation of my improved process.

Instead of fanning the fabric, I pump heated air by means of a cylinder or any pumping device, which air is then driven into pipes perforated with orifices, from which the heated air is eventually discharged on or near the fabric to be treated. Fig. 4 represents an enlarged view of one of these perforated pipes. These distributing pipes or caliducts are placed on an upper frame or supports, G, and others also on lower standards, C, so that both sides of the fabric can be treated simultaneously, if required. As the caliducts A are pierced with small perforations on that portion of their circumference nearest the fabric, as soon as the air is introduced therein it commences and continues to escape in minute streams or sprays, and as the exit-orifices are quite small in comparison with the openings in the pipes where the heated air is introduced, the streams or spray are projected with considerable force toward and onto the fabric, and from the circumferential location of the perforations the sprays diverge when leaving their apertures, causing a fan-like shower to flow toward the fabric, so that (especially when more than one caliduct is used) the whole surface, from center to edges, is equally treated at the same time. In order that even these small sprays may not continuously impinge on any given spot, I suspend the upper caliducts, A, in a swinging frame, G, which, by any mechanical movement, can be made to oscillate, and so sweep an arc of a circle, as indicated by arrows on Fig. 1. The lower caliducts can also be made to swing in the same manner by suitable pivotal connections with their supporting-standards C. In some cases but a single perforated caliduct will be required on each side of the fabric; but I do not desire to limit myself to any special size or number of distributing-pipes, as it is obvious that both may be varied without departing from the scope of my invention.

The caliducts may, if desired, be arranged so that they can easily be brought close to the fabric and then be removed therefrom, these movements being effectuated by any ordinary mechanical device or by hand manipulation.

The difficulty in speedily drying fabrics dampened or made wet while in process of manufacture has been the impossibility of supplying at one time the necessary quantity of heated air without running the risk of combustion. Speed in drying being a very desirable object, in my process I attain this result by supplying continuous streams of hot-air spray showered upon the fabric and heated to

the highest possible degree that it will bear without damaging the fabric or causing combustion of the same.

The results of my process are not only attained by the projection of the air on both of the surfaces of the fabric, but by its being forced into and between the several threads, thus penetrating all the fibers and interstices and coming into immediate contact with all the particles of moisture with which they are saturated.

As before said, my process can be used in combination with any of the well-known methods already in practice; but the evaporating-chamber and frame with paddles or oars can be entirely dispensed with, and a mere passage of the fabric between pipes or cylinders, perforated as described, through which a current of hot air is caused to flow, will be sufficient both for drying and finishing purposes.

It is well known that in finishing textile fabrics they must be properly stretched, according to the direction of their weft and warp. While being thus treated, and being fed toward the drying and finishing apparatus, a portion of the dampness can be taken away by a suitable arrangement of my perforated caliducts, the fabric thus being treated for drying while in transit to the finishing apparatus.

Fig. 3 illustrates one manner of utilizing my process.

D is a hollow drum, which may revolve, pierced with a number of minute perforations, and which may be placed beneath any of the upper caliducts, A, hereinbefore described. Around this drum are arranged a series of guide-rollers, E, and in the standard C are two guide-rollers, F. The fabric, being led toward this drum, passes under the guide-rollers F and over the rollers E, and during its transit is subjected to sprays of heated air escaping through the perforations in the upper caliducts, A, and also through the perforations in the drum D.

I lay no claim to the mechanical devices represented in the drawings or herein described, as any mechanism that will effectuate my process will answer as well as that described and illustrated.

Having now fully described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

The process of drying and finishing the interior and exterior of textile fabrics by means of minute jets or sprays of heated air distributed on both sides of the material, substantially as described.

ALPHONSE DELHARPE.

Witnesses:

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