

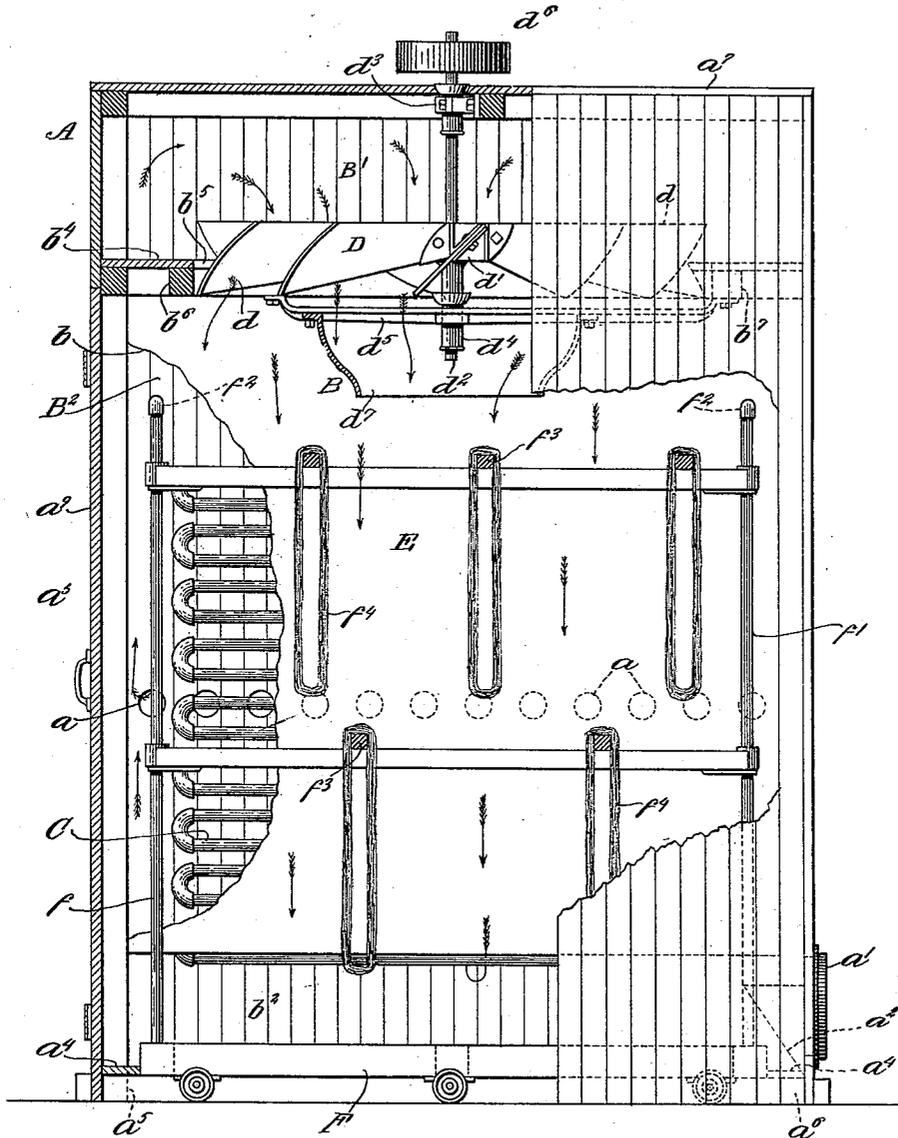


J. K. PROCTOR.  
DRYING MACHINE.

No. 525,921.

Patented Sept. 11, 1894.

Fig:2



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# UNITED STATES PATENT OFFICE.

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## DRYING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 525,921, dated September 11, 1894.

Application filed May 7, 1894. Serial No. 510,315. (No model.)

*To all whom it may concern:*

Be it known that I, JOSIAH K. PROCTOR, a citizen of the United States, residing at the city of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Drying-Machines, of which the following is a specification.

My invention has relation to apparatus for drying fibrous and other somewhat similar materials; and it relates more particularly to the construction and arrangement of an appliance for such purpose.

The principal objects of my invention are, first, to provide a comparatively simple, durable and efficient drying apparatus; second, to provide a compact drying apparatus in which a continuous circulation of the air is insured for drying as well as quickly absorbing moisture from suspended materials in a wet or other condition therein; and, third, to provide a drying apparatus adapted for the reception of a movable truck or similar appliance, which is adapted to support the fibrous or other materials in a wet or other condition in such manner as to be subject to the direct influence of a continuous and vigorous circulation of heated air or other medium to expeditiously dry out the same and the apparatus so arranged as that it may be operated continuously, that is, materials subjected to the influence of the circulating drying medium therein and under such arrangement as that the materials may be readily removed therefrom and other materials quickly introduced so as to be subject to the influence of such medium for a like purpose, without stopping or interfering with the perfect working of the appliance.

My invention consists of a drying apparatus, constructed and arranged for operation in substantially the manner hereinafter described and claimed.

The nature and general features of my invention will be more fully understood from the following description taken in connection with the accompanying drawings, forming part of my invention, and in which—

Figure 1, is a vertical central section through a machine embodying features of my invention, showing in elevation the agitating

device and the movable truck supporting in skein form yarn or similar fibrous materials in a position to be subjected to the influence of the drying medium; and Fig. 2, is a view partly in section and partly in side elevation of an apparatus such as illustrated in Fig. 1, showing the detail arrangement thereof.

Referring to the drawings A, is the exterior casing or housing of rectangular or other suitable form of the machine. In this casing or housing A, at or about midway in the length thereof on both sides or surfaces are provided in series, inlet openings  $a$ , and preferably in the rear wall thereof, with an outlet  $a'$ , having a funnel-shaped or contracted chute  $a^2$ , located in the interior of the housing and in rear of said outlet which serves as a means for directing the air, vapor or other matter in such manner as to permit of the escape of the same from the interior of the appliance into the open air. Moreover, said outlet  $a'$ , serves also as a means for inducing in a downward direction suction of the air or other drying medium through the body or inner compartment of the apparatus and thus to aid in the perfect circulation of the heating or drying medium therethrough.

B, is an inner shell consisting of two sides or surfaces  $b$  and  $b'$ , terminating some distance from the bottoms  $a^4$  and  $a^5$ , supported on stringers or girders  $a^5$  and  $a^6$ , as clearly shown in Fig. 1, and forming openings  $b^2$  and  $b^3$ , for a purpose to be presently described. The shell B, is provided with a top  $b^4$ , having a central opening  $b^5$  therein, which is supported to required position against the top edges of the sides  $b$  and  $b'$ , and by girders  $b^6$  and  $b^7$ , secured to the housing A. The shell B, at the top terminates some distance from the top  $a^7$ , of the housing A, so as to form a chamber  $B'$ , and on each side of the shell B, are formed chambers  $B^2$  and  $B^3$ , in which are arranged and supported coils of pipe C and C', for the passage therethrough of steam or other heating agent introduced into the same from a suitable source in any preferred manner. The air issuing through the two series of inlets  $a$ , provided in the sides of the housing A, is heated by radiation from the coils C and C', and by suction is drawn upward through the chambers  $B^2$  and  $B^3$ , and into the

chamber B', and then forced downward by means of an agitating device D, aided by suction from the outlet a', into and through the drying chamber or compartment E, and thence through the respective chambers B<sup>2</sup>, B<sup>3</sup> and B', again continuously, while the agitating device D, is in action. This agitating device D, comprises obliquely arranged blades d, secured to a hub d', which is mounted on a vertical shaft d<sup>2</sup>. This shaft is held at the top and bottom in bearings d<sup>3</sup> and d<sup>4</sup>, connected at the top with the housing A, and at the bottom with a bracket d<sup>5</sup>, which is secured to the girders b<sup>6</sup> and b<sup>7</sup>, preferably in the manner illustrated in Figs. 1 and 2.

d<sup>7</sup>, is a hopper or chute suitably attached to the bracket d<sup>5</sup>. This depending hopper or chute d<sup>7</sup>, as practice has demonstrated, is a valuable feature, because in the rotation of the agitator D, a portion of the air is deflected thereby downward in the direction of a median line through the compartment E, and about the materials supported therein and thus to expeditiously effect drying out of certain portions thereof that might not otherwise be subjected to the influence of the heated medium, if the hopper or chute was omitted, and said medium was permitted to take the course induced by the agitating device, which would be along the walls of the shell B, as such afford the freest line of travel therefor, and as it were, away from a medium point or portion of the compartment E.

In the drying chamber or compartment E, is mounted a movable truck F, having vertical uprights f and f', connected with each other at the top by means of a connecting rod f<sup>2</sup>, and with intermediate cross-bars f<sup>3</sup>, for supporting yarn f<sup>4</sup>, or other similar materials in skein form or the like therefrom adapted to be subjected to the direct influence of the drying medium. The truck F, with its suspended materials is introduced into the inner chamber or drying compartment E, through the door a<sup>3</sup>, of the housing A, which is hinged thereto as shown in Fig. 2, and so that this truck F, may assume a position therein, as shown. The shaft d<sup>2</sup>, at its upper extremity and beyond the top a<sup>7</sup>, of the housing A, is provided with a fixed pulley d<sup>8</sup>, adapted for the reception of a belt, not shown, to be connected with a similar pulley of a shaft receiving motion from any suitable source of power, so as to impart the required motion to the shaft d<sup>2</sup>, and thus to rotate rapidly or otherwise the air agitating device D, in the opening b<sup>5</sup>, in the top of the shell B.

In use, it will be seen from the drawings that the incoming air through the series of openings a, in the housing A, will pass between and among the coils of pipe C and C', in the chambers B<sup>2</sup> and B<sup>3</sup>, and by suction induced by the outlet a', in the rear of the housing A, will be drawn upward into and through the chamber B', and forced downward through the inner compartment E, so as to impart its influence to the suspended fibrous

material f<sup>4</sup>, of the truck F, and therefrom it will be drawn through the openings b<sup>2</sup> and b<sup>3</sup>, in the walls of the shell B, again into the respective chambers B<sup>2</sup> and B<sup>3</sup>, and in an upward direction therethrough into the chamber B', and thence downward into the compartment E, in the directions indicated by the arrows in Fig. 1.

It may be here remarked that a portion of the air in the continuous circulation of the same will of course pass off through the outlet a', and which will be directed thereto by means of the chute a<sup>2</sup>, as clearly illustrated in Fig. 2.

It may be here remarked that the particular advantageous feature of the compact arrangement of apparatus as hereinbefore described, is that the circulation of the drying medium is direct, continuous and economical and as the materials are subjected to the influence thereof, the same are expeditiously dried and can be readily removed from the apparatus without in the least interfering with the working of the apparatus for the reason that by simply opening the door a<sup>3</sup>, of the housing, the truck F, mounted on rollers can be withdrawn from the compartment E, thereof and another truck quickly introduced with the suspended materials in a wet or other condition connected therewith for being subjected to the influence of said medium, after closing the door a<sup>3</sup>, of the housing A.

Having thus described the nature and objects of my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A drying apparatus, comprising a housing provided with an outlet, an internal shell arranged to form one of the walls of top and side communicating chambers, an inner drying compartment having an opening in the top in communication with the top chamber and openings in the sides near the bottom in communication with the side chambers, a rotatable agitating device mounted in the opening in the top of said compartment, and coils of pipe in said side chambers for heating the drying medium in the circulation of the same, substantially as and for the purposes set forth.

2. A drying apparatus, comprising a housing provided with inlets, and an outlet provided with an internal chute, an internal shell forming the wall of three chambers, steam or heating coils mounted in certain of said chambers, said shell provided with an opening in the top and with apertures in the sides near the bottom in communication with an inner compartment, a truck adapted to support materials and introduced into and withdrawn from said compartment through a door of said housing, an agitating device connected with a vertically supported shaft and arranged in the opening in the top of said shell and means for rotating said device, substantially as and for the purposes set forth.

3. A drying apparatus, comprising a housing provided with inlets and an outlet, an internal shell arranged to form one of the walls

of chambers in direct communication with  
each other and with an inner drying compart-  
ment having an opening in the top with a de-  
5 pending chute or hopper for directing air into  
said compartment, an agitating device  
mounted on a shaft and adapted to rotate  
within the opening in said top, and coils of  
pipe in certain of said chambers for heating  
the drying medium in the continuous circu-  
10 lation of the same through the said chambers

and compartment, substantially as and for  
the purposes set forth.

In testimony whereof I have hereunto set  
my signature in the presence of two subscrib-  
ing witnesses.

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Witnesses:

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