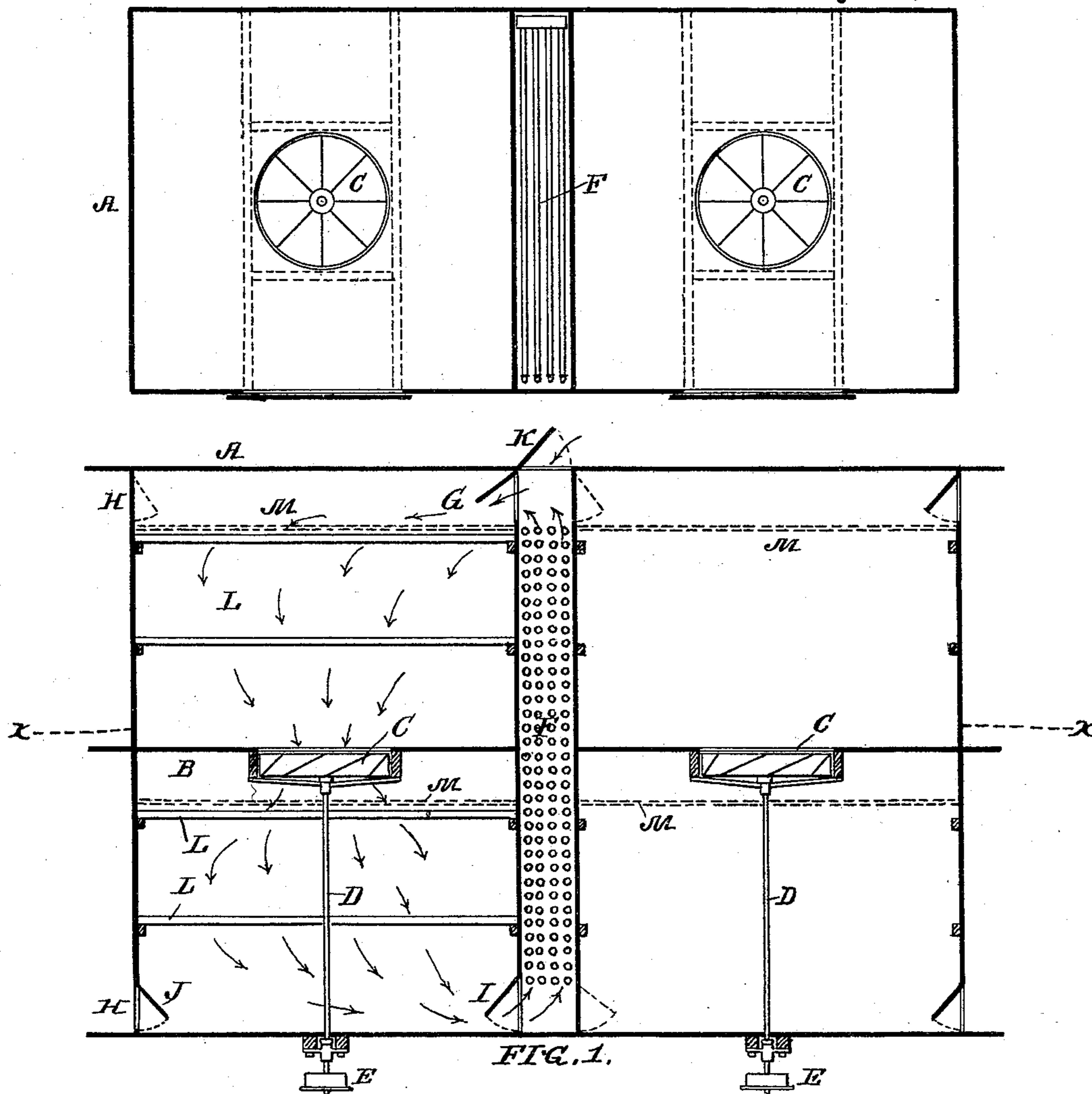


(No Model.)

J. K. PROCTOR & J. H. KNOWLES.
DRYING MACHINE.

No. 432,282.

FIG. 2. Patented July 15, 1890.



WITNESSES:

David St. Williams,
George Drury

INVENTORS:

J. K. PROCTOR
AND
J. H. KNOWLES
by their Atty.

[Signature]

UNITED STATES PATENT OFFICE.

JOSIAH K. PROCTOR AND JOHN HENRY KNOWLES, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE PHILADELPHIA TEXTILE MACHINERY COMPANY, OF SAME PLACE.

DRYING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 432,282, dated July 15, 1890.

Application filed January 19, 1889. Serial No. 296,828. (No model.)

To all whom it may concern:

Be it known that we, JOSIAH K. PROCTOR and JOHN H. KNOWLES, both of the city and county of Philadelphia and State of Pennsylvania, have invented an Improvement in Drying-Machines, of which the following is a specification.

Our invention relates to drying-machines; and it consists of certain improvements, all of which are fully set forth in the following specification, and shown in the accompanying drawings, which form a part thereof.

More particularly this invention relates to that class of drying apparatus in which the air is circulated through or among the material to be dried by means of suitable air-circulating devices. Our apparatus is not confined to the drying of any particular kind of material, but is equally suited to any kind of materials or goods which can be distributed through the drying-room so as to provide numerous vertical air-spaces somewhat evenly distributed.

The object of this invention is to arrange the parts of the drying apparatus (hereinafter for convenience of expression called a "drier") in a novel manner, so that the air used in drying shall be heated outside of the rooms or chambers containing the materials or goods, and then be passed into the rooms and be distributed evenly through and among the material.

In the drawings, Figure 1 represents a longitudinal vertical section of a pair of our improved drying-rooms, and Fig. 2 is a horizontal sectional view of the same on the line *x x* of Fig. 1.

In all the figures the same letters of reference refer to similar parts, and the arrows show the direction of the air-currents.

Although the drawings show two driers side by side, we will first proceed with our description as if there were but one drier, since each is like the other in construction, and afterward speak of the relation which the two have to each other. Each drier is composed of two rooms or chambers—an upper and a lower chamber—each entirely separate from the other, except as hereinafter described, and each of these chambers is pref-

erably made to occupy one floor of a building and of a sufficient height for a workman to enter and work comfortably in it.

A is the drying-room divided into upper and lower compartments by the floor B and provided with suitable doors for the entrance of the operators into the chambers. The floor B is provided with an opening or hole, preferably in the center, leading from one compartment to the other.

C is a fan located at the opening in the floor B, preferably immediately below it, for circulating the air. D is the shaft-bearing, and E the pulley, for supporting and driving this fan.

F is the steam-heating coil placed in a separate compartment just outside of the drying-room proper, (which for convenience we will hereinafter term the "heating-chamber.") The drying-room A is provided at its top or upper portion with passages G and H, communicating, respectively, with the heating-chamber F and the external air and at its bottom or lower portion with corresponding passages I and J, also communicating, respectively, with the heating-chamber and external air at the bottom. The heating-chamber F is provided with a passage K, communicating at its top with the air external to the chamber. All of these passages are provided with suitable doors which may be opened or closed, as desired, to regulate the temperature and humidity of the air in the drying-room, as hereinafter set out.

The operation of the machine is as follows: Supposing the material to be dried to be yarn hung upon supports L. The passages J, H, and K are closed and G and I are opened, and by the operation of the fan the air is circulated through the drier and the heating-chamber F. When the air is thus recirculated, it will become highly heated by constantly passing through the heating-chamber and very moist by absorbing the moisture from the material through which it passes in the drier, and when it has become sufficiently heated or sufficiently moist the passage J is opened to allow the damp and hot air to escape from the drier, and the passage K over the heater is opened to admit a supply of fresh cold air

to the drier. It is a great advantage to have the fresh air enter the drying-room by the passage K over the heating-chamber, as the dry and cool air is thus at once intermingled
 5 with the hot air arising from the heater, and the air entering through the passage G into the drier will be of one even temperature; but where it is not practical to have this opening K over the heater any other opening
 10 into the top of the drier may be used for this purpose—as, for instance, that at H. When the drying process is completed and it is desired to rapidly reduce the temperature in the drier, so that a workman may enter for
 15 the purpose of recharging the drier, the passages G and I, leading to the heating-chamber, are closed, and the passages H and J, leading to the external air, are fully opened. Cold air rushes in at H and is discharged at
 20 J, rendering the temperature within the drier comfortable to work in. If desired, during the whole process of taking the goods out and recharging the drier the fan C may be kept running, (preferably at a slower speed
 25 than usual,) so as to produce a grateful temperature to work in. In summer-time such a circulation of air during the recharging process is exceedingly pleasant and desirable. In drying other material than yarn some
 30 manipulation of the doors over the passages other than that described may be required for the goods in hand; but it will be seen that these doors may be regulated and adjusted to produce and maintain any required tem-
 35 perature or degree of humidity in the drier. In some cases the doors over the passages may be dispensed with, and a continued and uniform discharge of air may be maintained, and when heated air is not desired, or where
 40 heat may injure the goods, the heater F may be dispensed with and cold air only circulated through the driers. If desired, for the purpose of dividing and evenly distributing the air through the drier perforated barriers
 45 or partitions M may be placed across the chambers, as indicated in dotted lines in Fig. 1.

In the drawings we have shown two driers adjoining one another with a common heating-chamber and a single heater between
 50 them. While each drier may have its own independent heater without regard to any other drier, yet when two driers are necessary to accomplish the amount of work required to be done it is an economical arrangement
 55 to place the driers as shown. When the two driers are placed side by side, as shown, we

prefer to operate them alternately, using the heater first for the one and then for the other. The doors over the passages leading from the driers to the heating-chamber are alternately
 60 opened and closed, so that first one and then the other drier shall be connected with the common heating-chamber. During the time one drier is in operation the other drier may be recharged. Thus the steam is never shut
 65 off from the heater while the driers are in operation; but the heater is in constant use, first for one and then for the other drier, avoiding a loss of heat, which could not be prevented were the heater-rooms inoperative
 70 during the recharging process.

Instead of a fan—such as shown in the drawings—for moving the air, any other suitable air-moving device may be employed; and we do not limit ourselves to the mere details of
 75 construction here shown, as it is apparent that they may be varied in many ways without departing in the least from the principles of our invention.

Having now described our invention, what
 80 we claim as new, and desire to secure by Letters Patent, is—

In a drier, the combination of the following elements: a floor or partition dividing the drier into upper and lower compartments
 85 or rooms, the said floor or partition being provided with an opening forming a vertically-communicating passage-way between the rooms and being closed or air-tight except as to said opening, an air-circulating fan located
 90 in said opening for sucking air through one compartment and forcing it through the other, an external passage-way connecting the upper and lower compartments, heating-pipes in said external passage-way, an adjustable
 95 door between each of said compartments and said external passage-way, and an adjustable door in each compartment between the external atmosphere and the compartment, so arranged that cold air may be drawn into the
 100 upper and discharged from the lower compartment without passing through the passage-way containing the heating-pipes, all as and for the purposes described.

In testimony of which invention we here-
 105 unto set our hands.

JOSIAH K. PROCTOR.
 JOHN HENRY KNOWLES.

Witnesses:

SAMUEL W. THACKRUB,
 WALTER A. KREIDER.