

(No Model.)

J. K. PROCTOR & J. H. KNOWLES.

DRYING MACHINE.

No. 411,836.

Patented Oct. 1, 1889.

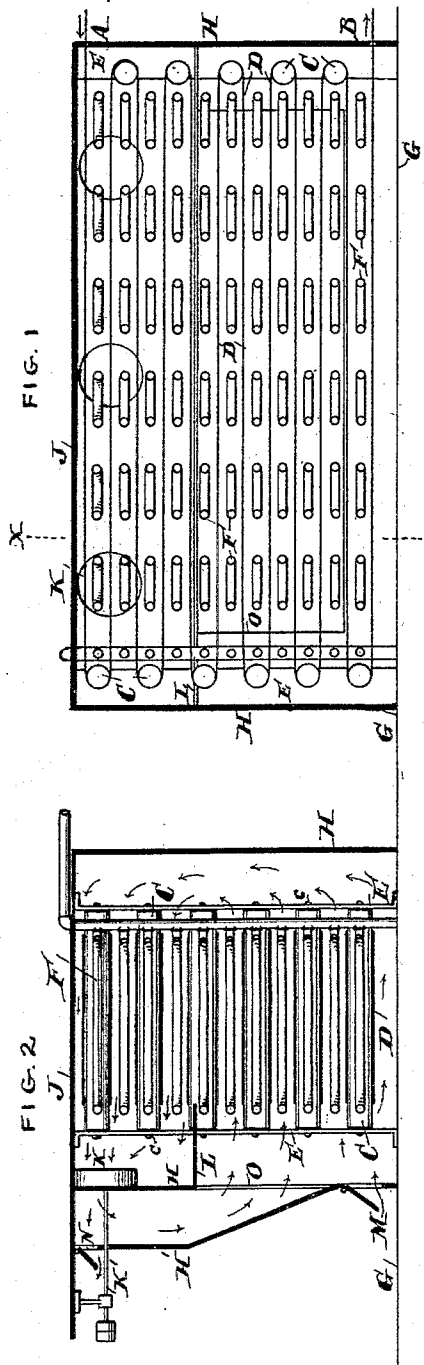


FIG. 2

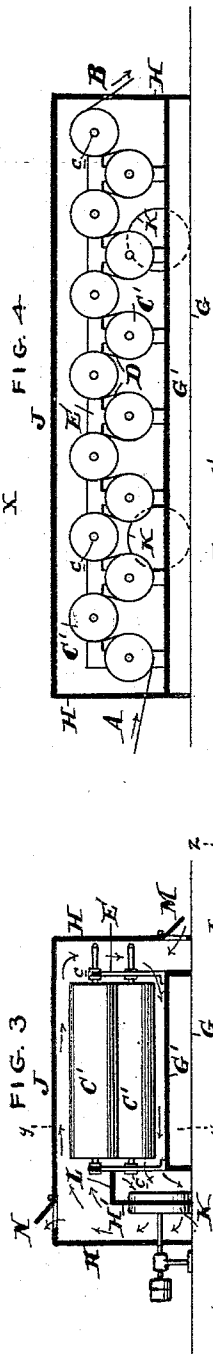


FIG. 3

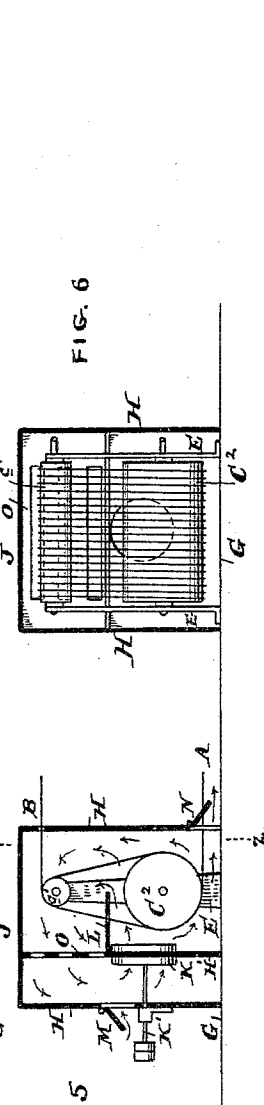


FIG. 4

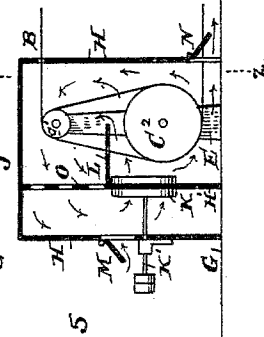


FIG. 5

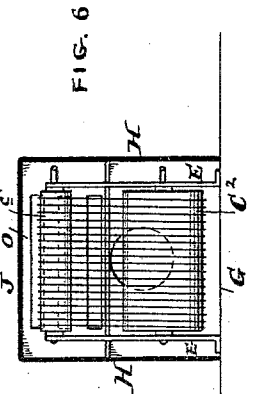


FIG. 6

WITNESSES:

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INVENTORS:

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AND
J. H. KNOWLES
by their Atty.

[Signature]

UNITED STATES PATENT OFFICE.

JOSIAH K. PROCTOR AND JOHN HENRY KNOWLES, OF PHILADELPHIA,
PENNSYLVANIA, ASSIGNORS TO THE PHILADELPHIA TEXTILE MA-
CHINERY COMPANY.

DRYING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 411,836, dated October 1, 1889.

Application filed December 13, 1888. Serial No. 293,465. (No model.)

To all whom it may concern:

Be it known that we, JOSIAH K. PROCTOR and JOHN HENRY KNOWLES, 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 has reference to drying-machines; and it consists of certain improvements which are fully set forth in the following specification and shown in the accompanying drawings, which form part thereof.

This invention relates more particularly to that class of drying-machines in which the material to be dried is moved through a drying-inclosure, and is subjected while moving to heat furnished by radiating-surfaces, and in which currents of air are employed for the purpose of diffusing and mixing the heated air.

Our invention is not confined to the drying of any particular kind of material, but relates with equal force to any material which may be moved or carried continuously through the drying-room, entering it at one point and issuing from it at another.

The object of this invention is to subject the material while it is moving through the drying-room to heated currents of air, which are caused to pass through or across the moving material in one direction on one side of a deflector arranged within the drying-inclosure, and in the opposite direction on the other side of the deflector, and to enable a recirculation of the air by means of the fan or other air-moving device employed, and by means of inlet and outlet passages to regulate the temperature and humidity of the air thus employed.

Our invention is adapted to use upon a variety of drying-machines, some of which are illustrated in the drawings, in which—

Figure 1 is a longitudinal sectional view of a cloth-drying machine embodying the principles of our invention. Fig. 2 is a transverse sectional view of the same on the line *xx* of Fig. 1. Fig. 3 is a transverse vertical sectional view of a cloth or warp sizing machine

embodying the principles of our invention. Fig. 4 is a longitudinal sectional view of the same on the line *yy* of Fig. 3. Fig. 5 is a transverse vertical section of a cordage sizing and drying machine embodying the principles of our invention, and Fig. 6 is a longitudinal sectional view of the same on line *zz* of Fig. 5.

In all the drawings the same letters of reference refer to similar parts.

It is not necessary here to enter into a description of these machines themselves, except so far as may be necessary to explain the nature of our improvements, which are substantially the same to whatever machines they may happen to be applied.

In Figs. 1 and 2 the cloth to be dried enters the machines at the opening A and after repeatedly traversing the length of the machine passes out at the opening B. C are the rollers over which the cloth is guided in traversing the machine. D is the cloth. E is the frame-work, which supports the bearings of the rollers *c c*. F are rows of steam-pipes, above and below which the cloth passes in traversing the machine.

In Figs. 3 and 4 the cloth or warp to be dried in traversing the machine passes about hollow drums *C' C'*, to which steam is supplied internally, and in Figs. 5 and 6 the cordage is wound continuously about a large drum *C'*, supplied internally with a steam, and about a smaller guide-roller *c'*.

Each of the machines is inclosed in a drying room or inclosure having openings A and B for the passage in and out of the goods being treated, and inlet and outlet openings for the currents of air, but otherwise closed to the external atmosphere.

G is the floor of the drying-room, H the side or end walls, and J the top of the same.

In Figs. 1, 2, 5, and 6 the floor G forms the bottom of the air-chamber; but in Figs. 3 and 4 a sub-floor *G'* is provided above the true floor G, for the purpose of limiting the air-chamber or drying-room as nearly as possible to the exact space occupied by the goods in their passage through the machine.

K is the fan or other air-moving device, and K' the shaft-bearing and pulley for supporting and driving the same.

L is a deflector or guide-board extending inward toward the machine from the wall or partition in which the fan is located. This deflector or guide-board is so placed and must be of such length as to divide the incoming from the outgoing currents and prevent them from intermingling. The air-currents enter on one side of this guide-board, and are caused by the operation of the fan to circulate through the drying-room, entirely traversing the material in one direction, and then traversing it again in the other direction, passing out on the other side of the guide-board, and are recirculated again in a similar manner. As the material is constantly moving through the machine, it will be seen that each portion of it is subjected to the air-currents passing through it first in one direction and then in the other. The currents may be either sucked or forced through the room, and may circulate in either direction, as may be desired; but in the particular instance illustrated in the drawings we prefer the courses as indicated by the arrows in Figs. 2, 3, and 5.

In some cases, as in Fig. 2, it will be more convenient to place the fan in one of the walls H of the room, and to provide an auxiliary partition H' outside of the true room, for the purpose of confining and directing the currents. In other cases, as in Figs. 3 and 5, it will be more convenient to place the fan in an auxiliary partition H', located inside of the walls H, when the partition H' serves the purpose of confining and directing the currents.

Were the currents to circulate around continuously, as described, without any change of air, they would finally become so charged with moisture as to be of no further use as a drying medium; hence we provide an inlet-passage M and an outlet-passage N for the entrance of dry and the discharge of damp air. These inlet and outlet passages may be in any convenient place, observing only that the passages are located in position so related to the fan that the pressure of the air inside of the inclosure shall be less in the region of the inlet and greater in the region of the outlet passages than the pressure of the external atmosphere. The passages M N are provided with doors or gates by a proper adjustment of which the temperature and humidity of the air within the room may be regulated at the will of the operator. As the goods to be dried are constantly traversing the drying-room, it is not necessary to manipulate these doors when the same kind of goods is continuously being passed through the machine, for the doors being once adjusted to secure the best result would forever be maintained in the same position while the same goods were being operated upon. The purpose

of the gates over the passages M N is to regulate the temperature and humidity when the material to be treated is changed, one kind of goods requiring a different temperature or a different degree of humidity from another to secure the best result. One fan K or more may be used, according to the size of the machine and the rapidity with which it is desired to accomplish the drying.

Whenever desired, the currents of air passing through the inclosure may be broken up and diffused by causing them to pass through perforated partitions O.

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

1. In a drying apparatus in which the material or goods to be treated traverse or are moved in a circuitous course, the combination of rollers or drums for guiding the material or goods through the drying-room in a circuitous course, with a fan to circulate the air through the room, a deflector located within said room to cause the air-currents being circulated to pass horizontally through or across the moving material in one direction on one side of the deflector, and to return in an opposite direction on the other side of the deflector, and a passage opening from the room and leading to the fan, for the purpose of enabling a recirculation of the air.

2. In a drying apparatus, the combination of a closed air-chamber, through which the material or goods to be treated are passed in a circuitous course, provided with openings for the entrance and exit of said materials or goods, rollers or drums for guiding the material through said chamber in a circuitous course, inlet and outlet passages in said chamber for the entrance of dry and the discharge of damp air, a fan to circulate air through said chamber, and a deflector located within said chamber to cause the air being circulated to pass horizontally through or across the moving material in one direction on one side of the deflector and to return in an opposite direction on the other side of the deflector, and a passage opening from the room and leading to the fan, for the purpose of enabling a recirculation of the air.

3. In a drying apparatus, the combination of a closed air-chamber, through which the material or goods to be treated are passed in a circuitous course, provided with openings for the entrance and exit of said material or goods, rollers or drums for guiding the material through said chamber in a circuitous course, inlet and outlet passages in said chamber for the entrance of dry and the discharge of damp air, provided with doors by adjusting which the temperature and humidity of the air may be regulated, radiators about which the material to be treated passes in traversing said chamber, a fan to circulate the air through said chamber, and a deflector

located within said chamber to cause the air
being circulated to pass horizontally through
or across the moving material in one direction
on one side of the deflector and to return in
5 an opposite direction on the other side of the
deflector, and a passage from said chamber
leading to the fan, for the purpose of enabling
a recirculation of the air.

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

JOSIAH K. PROCTOR.
JOHN HENRY KNOWLES.

Witnesses:

EDWARD J. MCIVOR,
ROBT. J. DUNGAN.