

No. 892,901.

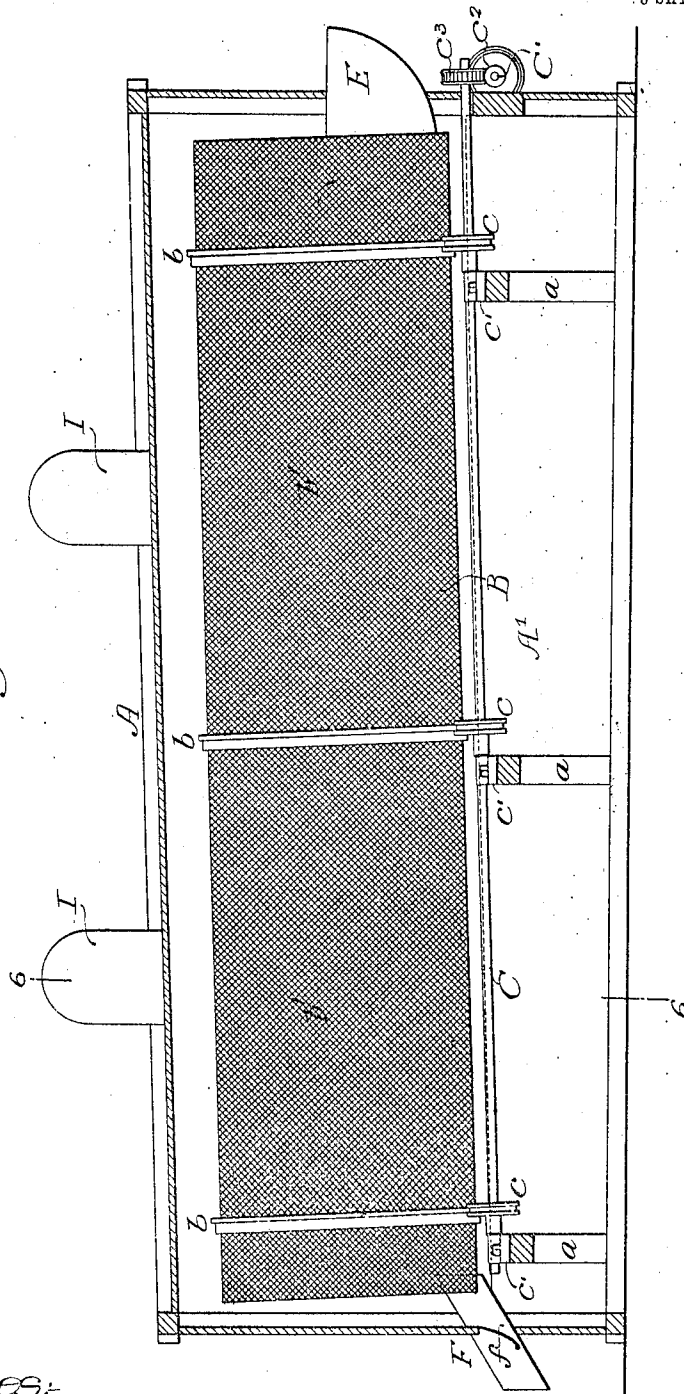
PATENTED JULY 7, 1908.

W. M. SCHWARTZ.
ROTARY DRYING MACHINE.

APPLICATION FILED NOV. 22, 1906.

3 SHEETS—SHEET 1:

Fig. 1.



Witnesses:
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L. H. Jones.

Inventor:
Walter M. Schwartz.
by his Attorneys,
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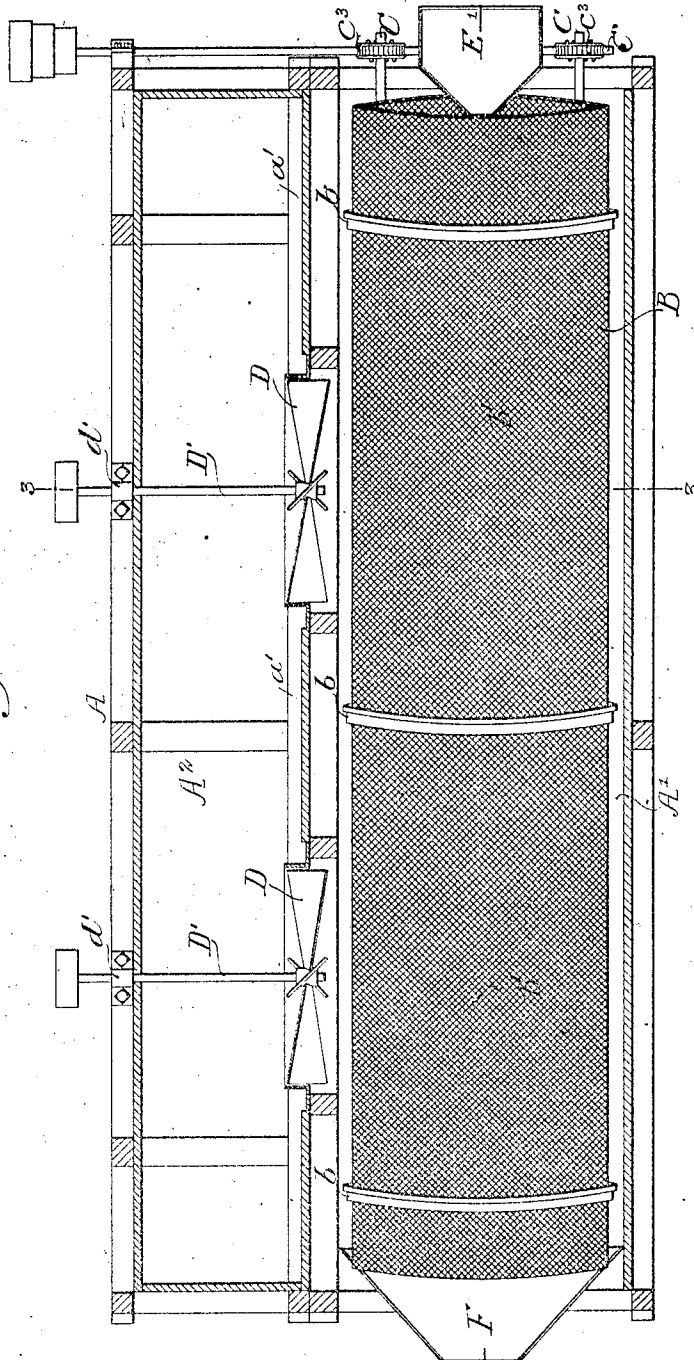
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3 SHEETS—SHEET 2.

Fig. 2.



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 ROTARY DRYING MACHINE.
 APPLICATION FILED NOV. 22, 1006.

3 SHEETS—SHEET 3.

Fig. 5.

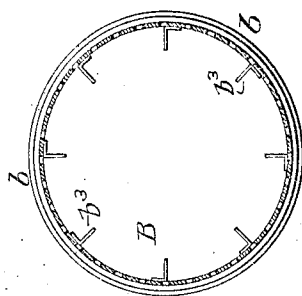


Fig. 4.

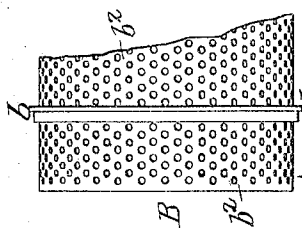
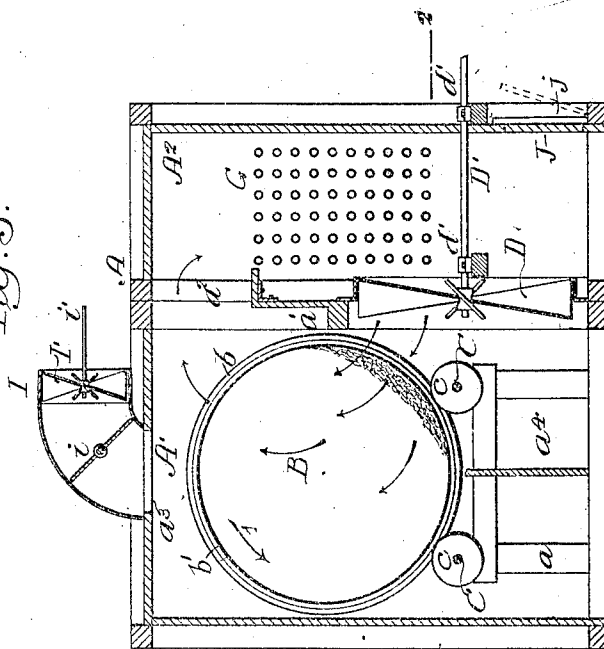


Fig. 3.



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UNITED STATES PATENT OFFICE.

WALTER M. SCHWARTZ, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE PHILADELPHIA TEXTILE MACHINERY COMPANY, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

ROTARY DRYING-MACHINE.

No. 892,901.

Specification of Letters Patent.

Patented July 7, 1908.

Application filed November 22, 1906. Serial No. 344,527.

To all whom it may concern:

Be it known that I, WALTER M. SCHWARTZ, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Rotary Drying-Machines, of which the following is a specification.

The object of my invention is to construct a rotary drying machine in such a manner that air will circulate transversely through the material as it passes through the cylinder of the drying machine.

My invention is particularly adapted for drying grain, wood chips for pulp manufacture, tobacco and other material which is capable of traveling over a perforated or a gauze surface.

In the accompanying drawings: Figure 1, is a longitudinal sectional view of my improved rotary drying machine on the line 1—1, Fig. 2, the cylinder being in elevation; Fig. 2, is a sectional plan view on the line 2—2, Fig. 3, the cylinder being in outside view; Fig. 3, is a transverse sectional view on the line 3—3, Fig. 2; Fig. 4, is a view showing part of a perforated cylinder; and Fig. 5, is a view of a modification showing the cylinder provided with a series of longitudinally arranged blades.

Heretofore in rotary drying machines, it has been usual to allow the material to flow by gravity through a cylinder having a solid wall or casing and the air was introduced into one end of the cylinder and allowed to escape at the opposite end. The great objection to this construction is that the moist air does not escape until it has traversed the entire length of the cylinder but by my invention the moist air can immediately escape if necessary or it can be reheated so that the material is subjected constantly to a current of air heated to any degree desired.

Referring now to the drawings, A is a casing made of any suitable material. B is the drying cylinder arranged at a slight incline. The incline will depend considerably upon the material being dried. The cylinder consists of a series of annular rings *b* flanged as shown in Fig. 1 and a cylindrical body *b'* of wire gauze, the mesh of the wire gauze being of such size as to prevent the material being dried from passing through it. In place of wire gauze the cylinder may be made up of perforated plates *b²* as shown in

Fig. 4, the perforations being of such size as to prevent the passage of the material, being dried, through the perforations.

C, C are two longitudinal shafts on which are rollers *c, c*. These rollers are grooved and the flanges of the rings *b* of the cylinders are mounted in the grooves of the rollers. The shafts C are mounted in bearings *c'* carried by the supports *a, a* forming part of the framework of the machine. The two shafts are placed a given distance apart so as to properly support the cylinder B and when motion is imparted to the shafts, the cylinder will be driven. The cylinder can be driven in either direction depending considerably upon the material being dried. In the present instance the two shafts C, C are geared to a driving shaft C' by means of a worm *c²*, and worm wheels *c³* so that the cylinder is rotated slowly.

E is the feed hopper for feeding the material into the cylinder and F is the discharge spout through which the material is discharged from the cylinder.

f is an apron depending from the frame and so arranged as to allow the material to escape but will prevent the ingress of air to the interior of the drier.

It will be noticed in referring to Figs. 2 and 3, that the drying cylinder is in the compartment A' of the casing A and the heating pipes for heating the air are in the compartment A² at one side of the compartment A'. G are heating pipes and D, D are circulating fans, each mounted on a shaft D' adapted to bearings *d'* in the frame of the machine. The fans are mounted in openings in the partition *a'* separating the drying compartment A' from the heating compartment A². The partition *a'* stops short of the top as indicated in Fig. 3, so as to allow a clear passage for the air to pass from one chamber to the other.

In the present instance I have shown a drying machine in which two sets of fans are used but it will be understood that my invention can be embodied in a machine in which a single fan or more than two fans can be used depending considerably upon the quantity of material to be dried.

In the roof of the drying chamber A' is an opening *a³* to carry off the moist air and this opening communicates with a flue I in which is a damper *i* to regulate the flow of the moist

air from the machine, and I' is an exhaust fan mounted on a driven shaft I².

J, J are air inlet openings provided with doors j to regulate the admission of fresh air to the drier.

As the air circulates in the machine, it is reheated and a certain proportion is allowed to escape through the flue I, fresh air being admitted through the opening J or through the ends of the cylinder.

I preferably arrange a vertical partition a' in the drying chamber A' directly under the drum B so as to direct the air to the drum. In the present instance the drum is driven in the direction indicated by the arrow 1, Fig. 3, so that the material will accumulate on the right side of the drum looking in the direction indicated by Fig. 3, allowing the air to pass through the body of material as it is carried up by the action of the drum.

It will be understood, however, that the direction of rotation of the drum may be reversed if desired and in which case, I may dispense with the vertical partition a'. In some instances also a drum may be used as indicated in Fig. 5, having series of longitudinally arranged blades b' either straight or spiral, which tend to carry the material up the side of the drum and allow it to fall in thin sheets as the air is blown through it.

The operation of the machine is as follows:—The material is fed to the hopper E preferably in a continuous stream and passes into the cylinder B, it is fed slowly forward in the cylinder and travels up its side as indicated in Fig. 3. The heated air is forced by the fans D into the compartment A' through the meshes or perforations in the cylinder B, and through the material, carrying off the moisture in the material, a portion of the air returning immediately to the compartment A² where it is re-heated, while a small percentage is drawn off by the exhaust fan I'. Thus the material to be dried is subject to a continuous blast of heated air and by the time it reaches the discharge end of the drum the material is thoroughly dried. By this means I am enabled to make a drum of any length desired without changing its efficiency, and the capacity increases in proportion to the length of the cylinder. In

this type of drier I can treat the material at a high temperature at first if desired and as the material loses its moisture I can reduce the temperature as it nears the outlet, or vice versa. This cannot be accomplished in the ordinary rotary drier.

I claim:—

1. The combination in a drying machine, of a longitudinal partition forming two compartments, heating mechanism in one compartment, a longitudinally arranged cylinder in the other compartment, said cylinder having a perforated shell, means for rotating the shell, an opening in the lower part of the partition at the side of the shell, an opening in the upper portion of the partition, a fan in the lower opening, said fan being situated close to the cylinder, means longitudinally disposed beneath said cylinder for directing the air through that portion of the shell carrying the body of material, the air having an uninterrupted flow from the fan directly to the cylinder so that its force will not be expended before reaching the material in the cylinder, substantially as described.

2. The combination in a drying machine, of a casing, a partition separating the casing into two compartments, heating mechanism in one compartment, a longitudinally arranged perforated cylinder in the other compartment, means for rotating the cylinder, an opening in the lower part of the partition and an opening in the upper part of the partition, whereby air will circulate through both compartments, a fan in the lower opening for circulating the air from the heating compartment into the lower portion of the drying compartment in which the cylinder is mounted, a vertically arranged longitudinal partition directly under the cylinder, whereby the air as it is forced into the drying compartment by the fan is caused to flow through that portion of the cylinder nearest the fan, substantially as described.

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

WALTER M. SCHWARTZ.

Witnesses:

JOS. H. KLEIN,
WM. A. BARR.