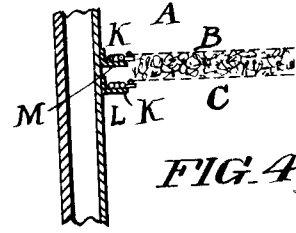
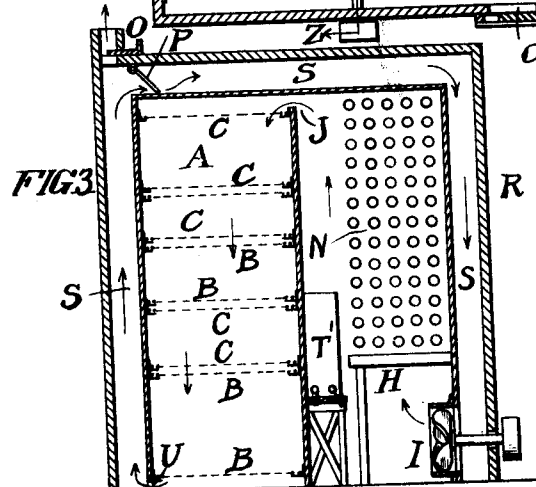
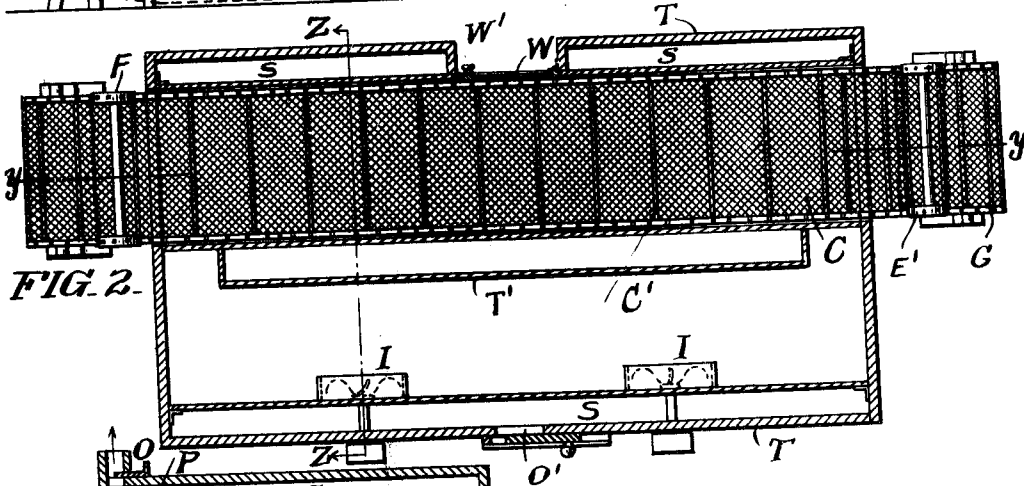
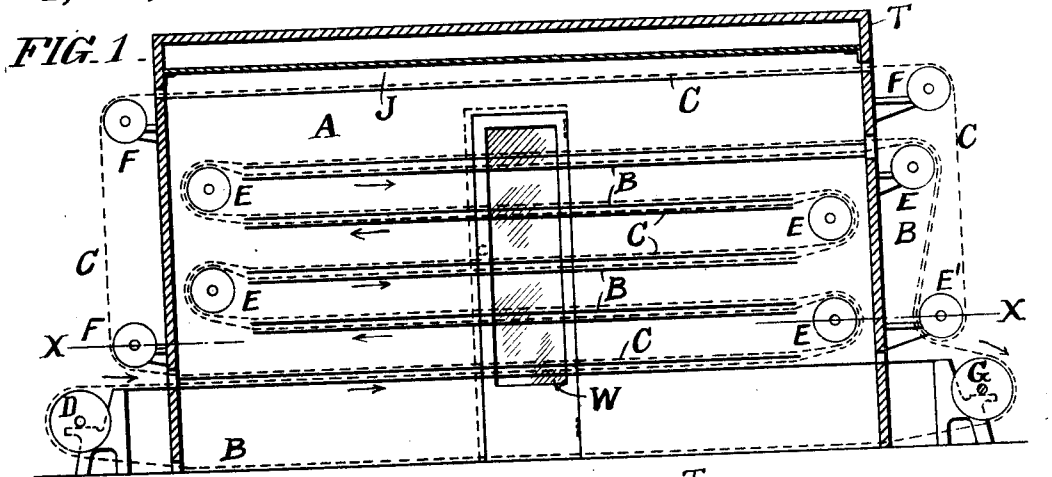


Patented Aug. 5, 1913.

1,069,342.



Witnesses
 Daniel Webster, Jr.
 A. M. Kelly

Inventor
 John H. Lorimer
 Attorney

UNITED STATES PATENT OFFICE.

JOHN H. LORIMER, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO WILLIAM S. LORIMER, TRUSTEE, OF PHILADELPHIA, PENNSYLVANIA.

DRYING-MACHINE.

1,069,342.

Specification of Letters Patent.

Patented Aug. 5, 1913.

Application filed August 10, 1910. Serial No. 576,528.

To all whom it may concern:

Be it known that I, JOHN H. LORIMER, a citizen of the United States, and resident 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.

My invention has reference to drying machines for textile or other materials and consists of certain improvements which are fully set forth in the following specification and shown in the accompanying drawings which form a part thereof.

The object of my invention is to provide a machine for drying and humidifying yarn or loose fibrous materials of any kind and the invention is so constructed that positive control of the character and direction of the drying air currents may be had as well as of the temperature and relative humidity.

My invention consists of certain features of construction whereby the above objects are secured, said features of construction being fully described hereinafter and more specifically defined in the claims.

Referring to the drawings, Figure 1 is a sectional elevation of my improved drying machine taken on line $y-y$ of Fig. 2; Fig. 2 is a sectional plan view of the same taken on line $x-x$ of Fig. 1; Fig. 3 is a cross sectional view of the same taken on line $z-z$ of Fig. 2; and Fig. 4 is a cross section at one side of the drying chamber showing the manner of supporting the conveyers.

A is the drying chamber through which the endless aprons B, C, are caused to travel and by which the materials to be treated are conveyed through the drying chamber.

H is a heating chamber and arranged to one side of the drying chamber and communicating with it at the top by a longitudinal opening J. This chamber H is provided with steam heating coils N for heating the air to be circulated through the drying chamber A and is also provided with one or more circulating fans or blowers I which force air into the chamber H near the bottom.

Inclosing the drying chamber A and the heating chamber H is an outer case R forming an outer chamber S, said chamber preferably extending over the top and the two opposite sides. The bottom of the drying chamber A communicates with the bottom of

one side of the outer chamber S as shown at U and the bottom of the other side of the outer chamber opens into the bottom of the heating chamber through the fans or blowers I. In this way the air not only circulates through the drying chamber A and heating chamber H, but also around them, the case R for causing said circulation constituting a virtual jacket about the said drying and heating chambers.

The outer chamber S may have a valved outlet O at the top open to the atmosphere to permit the escape of more or less of the air from said chamber and also a valved inlet O' at the bottom near the fans or blowers I for permitting fresh air to enter the circulation to compensate for the air allowed to escape therefrom through the valved outlet O.

A valve P may be employed to control the recirculation of the air through the outer chamber S and to insure, in a positive manner, more or less of the air passing out of circulation into the atmosphere, such as would be advisable when the materials being dried were very moist or damp in which case it is desirable to remove the moist air from the machine. It is preferable that the valve P be located near the valved outlet O, but this is not essential.

The endless aprons B and C are caused to travel close together for a portion of the circuit and then separate at the feeding and delivery ends. These aprons are guided about guide-wheels E, E' and F at the ends of the machine and apron B is guided also about the drums G and D, the former being at the delivery end and the latter at the feeding end. More specifically, the apron B is guided about the drums G and D, whereas the apron C is guided about the guide wheels F, and both aprons B and C are guided about the remaining guide-wheels E and E'. The arrows indicate the direction of travel of the aprons through the drying chamber A.

The aprons may be driven in any suitable manner and are preferably formed with side sprocket chains K which are supported and guided by the angle iron guides L and M as more fully shown in Fig. 4. The aprons are formed of open or meshed metals with cross bars at intervals, but this construction may be modified if desired. The wheels E,

E, D and G are preferably sprocket wheels so as to mesh with the sprocket chain K of the aprons.

As it is desirable to be able to examine the material during its passage through the machine, I provide a door W having a glass panel through which to examine all of the aprons and contents as they pass the said glass panel. To enable the operator to have access to the said materials in progress of treatment the said door W is made to open to provide access to the chamber A and is arranged within a passage or alcove in the side of the outer chamber S as clearly shown at W' in Fig. 2. The width of this door is only just sufficient to permit of the proper manipulations of the operator, so as not to remove more of the outer chamber S than is absolutely necessary.

The operation will now be understood. The aprons being put into motion with the materials to be dried conveyed between them, they are caused to pass back and forth through the drying chamber a number of times before being finally discharged. During the travel of the material and aprons in this manner, the air is put into circulation by the fans or blowers I. The air is forced through the heating coils N and in heated condition passes through the aperture J into the top of the chamber A. The heated air then passes downward through the aprons and material conveyed thereby, and passes out at the bottom of the chamber A by the outlet U. The air then passes upward through the outer chamber S, then over the top of the chambers A and H and then downward to the circulating fans or blowers I. In this manner the same heated air may be recirculated, but it is customary to allow some of the air to escape by the valved passage O and a corresponding quantity of fresh air to enter the circulation by the inlet valved passage O'. By this arrangement the moisture laden air escapes after leaving the drying chamber whereas the fresh air enters adjacent to the fans or blowers I.

It will be observed that by jacketing the chambers A and H by the chamber S a more uniform temperature within the chamber A may be had and the machine may be operated with a given temperature at a materially less consumption of steam. The machine may be operated with a substantially constant temperature with less care than heretofore with machines of this class where there was no jacketing of the drying chamber with the circulating heated air. In those cases when the materials are required to be conditioned as by giving to them the desired humidity, I may provide the heating chamber H with a humidifier T' by which the air may be maintained at the desired relative humidity, and this humidifier may be of any suitable construction, the

particular form of it being immaterial to my invention.

While in most cases of the use of my invention the conveyers will be in the form of aprons so as to hold loose fibrous material such as cotton in the raw state, or textile or other materials in unconnected condition, it is to be understood that the conveyers may be modified in form suitable for yarn or other character of materials to be dried. The use of such poles and conveyers in drying machines being well known it will not be necessary to further illustrate or describe them.

My invention is not restricted to any particular means for conveying the materials to be dried through the drying chamber and what is shown and described for this purpose is by way of example only and not as a limitation of the scope of such details.

The essential feature of my invention resides in the employment of the outer or jacketing compartment through which preferably the air which passes through the drying compartment is caused to pass. The general shape of the apparatus may be changed and the materials may be conveyed one or more times back and forth through the drying chamber as desired.

While I have shown my invention in the form I prefer, I do not restrict myself to the details thereof as these may be modified without departing from the spirit of the invention.

Having now described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a drying machine, a drying chamber combined with endless conveyers for conveying the material to be dried through the drying chamber, means for recirculating air through the drying chamber in a direction transversely to the direction of travel of the conveyers, an inclosing chamber extending over the sides and top of the drying chamber and through which the air is caused to circulate after leaving the drying chamber, means for heating the circulating air before it is admitted to the drying chamber, means for removing part of the circulating air, and means for admitting fresh air into the circulation.

2. In a drying machine, a drying chamber combined with endless conveyers for conveying the material to be dried through the drying chamber, means for circulating air through the drying chamber in a vertical direction transversely to the direction of travel of the conveyers, an inclosing chamber extending over the sides and top of the drying chamber and through which the air is caused to circulate after leaving the drying chamber, communication between the inclosing chamber and the drying chamber being at the lower part and side of the

drying chamber, means for guiding the air and admitting it to the upper side portion of the drying chamber, mechanical means for circulating the air, means for heating the circulating air before it is admitted to the drying chamber, means for removing part of the circulating air, means for admitting fresh air into the circulation, and means for regulating the relative humidity of the circulating air.

3. In a drying machine, the combination of a drying chamber and a heating chamber arranged side by side and in open communication at the upper portion, conveyers for conveying the material to be treated transversely through the drying chamber and across the path of the air currents, an inclosing circulating chamber extending over the drying and heating chambers and in communication with the bottom of the drying chamber, and a fan for circulating air from the inclosing circulating chamber into the heating chamber.

4. In a drying machine, the combination of a drying chamber and a heating chamber arranged side by side and in open communication at the upper portion at one side of the drying chamber, conveyers for conveying the material to be treated transversely through the drying chamber and across the path of the air currents, an inclosing circulating chamber extending over the drying and heating chambers and in communication with the bottom of the drying chamber on the other side thereof, means for circulating air from the inclosing circulating chamber into the heating chamber, means for gradually removing a portion of the circulating air, and means for introducing a quantity of fresh air into the circulation corresponding to that removed.

5. In a drying machine, the combination of a drying chamber and a heating chamber arranged side by side and in open communication at the upper side portion of the drying chamber, conveyers for conveying the material to be treated transversely through the drying chamber and across the path of the air currents, an inclosing circulating chamber extending over the top and side of the drying and heating chambers and in communication with the bottom portion of the drying chamber at the side thereof opposite to the communication therewith from the heating chamber, means for circulating air from the inclosing circulating chamber into the lower part of the heating chamber, means for gradually removing a portion of the circulating air, means for introducing a quantity of fresh air into the circulation corresponding to that removed, and means arranged in the path of the

circulating air for regulating the humidity thereof.

6. In a drying machine, the combination of a drying chamber and a heating chamber arranged side by side and in open communication at the upper portion of said drying chamber at one side thereof, conveyers for conveying the material to be treated transversely through the drying chamber and across the path of the air currents, an inclosing circulating chamber extending over both the drying and heating chambers and in communication with the bottom of the drying chamber, means for circulating air from the lower portion of the inclosing circulating chamber on the other side of the drying chamber into the heating chamber, and a door for providing access from outside of the machine into the drying chamber.

7. In a drying machine, the combination of a drying chamber and a heating chamber arranged side by side and in open communication at the upper portion only, conveyers for conveying the material to be treated transversely through the drying chamber and across the path of the air currents, an inclosing circulating chamber extending over the drying and heating chambers at top and sides and in communication with the bottom of the drying chamber only, means for circulating air from the inclosing circulating chamber into the heating chamber, and a transparent door providing access through the side of the drying chamber from outside of the inclosing chamber whereby the materials being conveyed in the drying chamber may be examined and sampled during the normal operation of the machine.

8. In a drying machine, the combination of a drying chamber, a heating chamber having an inlet communication with the drying chamber at one level, an outer inclosing chamber extending over the drying chamber and having an outlet communication with it at a different level from the communication with the heating chamber, conveyers arranged to travel transversely through the drying chamber between the inlet and outlet communications therewith, and means for drawing the air out of the outer inclosing chamber at a distance from the outlet communication of the drying chamber and forcing it into the heating chamber.

In testimony of which invention, I hereto set my hand.

JOHN H. LORIMER.

Witnesses:

R. M. KELLY,
E. H. BARLOW.