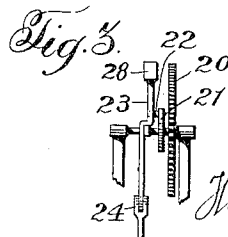
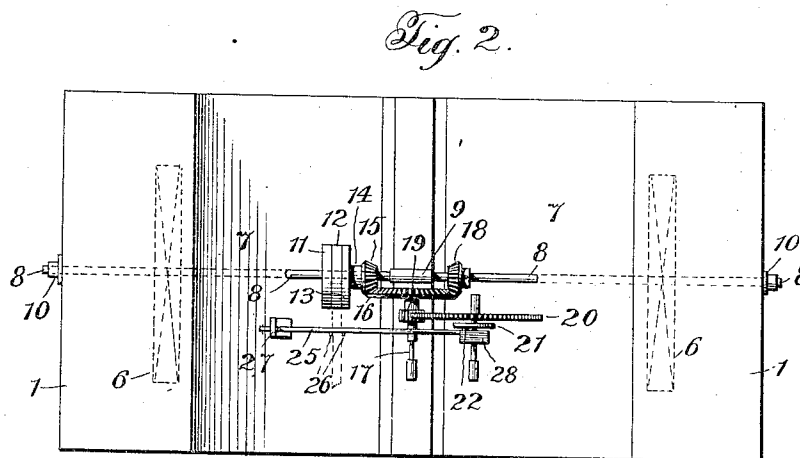
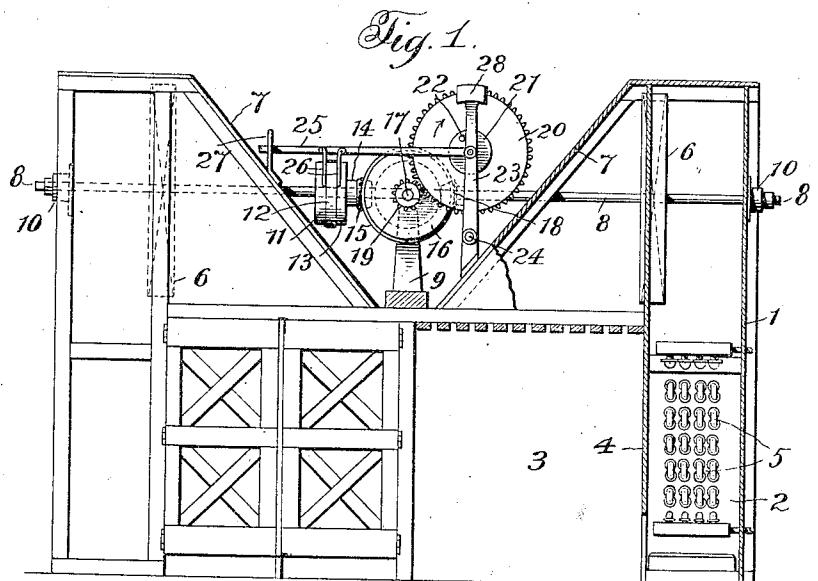


T. ALLSOP & W. W. SIBSON.
 AUTOMATIC AIR CURRENT REVERSEER FOR DRYING MACHINES.
 APPLICATION FILED SEPT. 14, 1908.

1,049,969.

Patented Jan. 7, 1913.



Witnesses:
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UNITED STATES PATENT OFFICE.

THOMAS ALLSOP AND WALTER W. SIBSON, OF PHILADELPHIA, PENNSYLVANIA,
ASSIGNORS TO THE PHILADELPHIA DRYING MACHINERY COMPANY, OF PHILA-
DELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

AUTOMATIC AIR-CURRENT REVERSER FOR DRYING-MACHINES.

1,049,969.

Specification of Letters Patent.

Patented Jan. 7, 1913.

Application filed September 14, 1908. Serial No. 452,893.

To all whom it may concern:

Be it known that we, THOMAS ALLSOP and
WALTER W. SIBSON, citizens of the United
States, residing at Philadelphia, in the
5 county of Philadelphia and State of Penn-
sylvania, have invented certain new and
useful Improvements in Automatic Air-Cur-
rent Reversers for Drying-Machines; and
we do hereby declare the following to be a
10 full, clear, and exact description of the in-
vention, such as will enable others skilled
in the art to which it appertains to make and
use the same.

This invention relates to improvements in
15 drying machines, and more particularly re-
lates to an automatic air-current reverser
therefor.

In that type of machines designed for dry-
ing yarns, and especially where the yarns
20 are suspended from trucks, it is exceedingly
difficult to obtain a uniform drying of the
yarn. This is due to the fact that the
skeins are hung in tiers or rows, and when
assembled upon the truck the skeins present
25 a wet mass through which it is difficult to
circulate the air. The yarn dries much
more quickly in some portions of the truck
load than in others, so that it is not in-
frequent that the workmen withdraw the
30 trucks from the machine, turn the same
end-for-end, and replace the trucks in the
machine to finish drying those portions of
the yarn not previously sufficiently dried.
Unless the yarn is thoroughly dried the dye-
35 liquor naturally gravitates to the bottom of
the suspended skeins, and impairs the value
thereof. Furthermore, the most rapid dry-
ing of the yarn occurs where the air circula-
tion is the strongest, permitting the other
40 portions to remain damp, and necessitating
an extended and tedious operation to dry
the entire mass.

It is, therefore, the object of the present
invention to provide means by which the
45 drying of yarn is greatly facilitated and
the same accomplished with most uniform
results, thereby shortening the drying pro-
cess, and effecting a material saving in the
expense of the drying.

50 The invention also seeks to provide means
for accomplishing the drying by recircula-

tion of the air, thus economizing in the use
of the heat.

With these general objects in view, and
others that will appear as the nature of the 55
improvements is better understood, the in-
vention consists substantially in the novel
construction, combination and arrangement
of parts hereinafter fully described, illus-
trated in the accompanying drawings, and 60
pointed out in the appended claims.

In the drawings—Figure 1 is an end ele-
vation, partly in section, of a drying ma-
chine equipped with the present invention.
Fig. 2 is a top plan view thereof. Fig. 3 65
is a detail elevation of a portion of the
mechanism for effecting reversal of the fans.

Referring in detail to the drawings, the
numeral 1 designates the casing of a dry-
ing machine, having, as usual, a heating 70
chamber 2 for each of the drying chambers
3, these chambers being separated by a par-
tition 4, and communication is afforded be-
tween said chambers by a passageway at
the bottom of said partition. The heating 75
chamber 2 is provided with a bank of heat-
ing coils 5, whereby the air, in passing
through the chamber 2, is heated to the re-
quired degree. The parts thus far described
are of the usual construction. 80

In the top of the partition 4 is arranged
an opening or openings, determined by the
size of the machine as to their number, and
in this opening or openings is arranged a
fan or fans 6 for the purpose of circulating 85
the air between the chambers 2 and 3. In
machines where a plurality of the drying
chambers 3 are employed, as illustrated in
the present instance, the fans 6 are ar-
ranged in opposite relation, or in pairs, and 90
are preferably mounted upon the same shaft,
and when arranged in this manner the fans
of each pair are right and left hand fans,
thus adapting the same to blow in opposite
directions. 95

For directing the air in a fixed path in
relation to the material to be dried, which
material is supported upon trucks (not
shown), the roof of the casing 1 is provided
with a V-shaped depression that extends 100
lengthwise of the casing, and thus inclined
deflectors 7 are formed in the same hori-

zontal plane with the fans 6, and the shafts 8 of the fans project through said deflectors, being supported therebetween by a bearing standard 9, while the ends of the shafts are supported in bearings 10 located at the exterior of the sides of the casing 1. The bearings for the shafts are, therefore, disposed at the exterior of the casing, and liability to fire by reason of heated bearings is thereby reduced to a minimum.

When the shaft of each pair of the fans 6 is rotating in the direction by which the fans blow inwardly, the blast from the fans strikes against the deflectors 7 and is directed by the latter in a downward direction upon the material carried by the trucks in the chambers 3, but in the reverse rotation of the fans, or that wherein they blow outwardly, the air is drawn upwardly from the chambers 3 against the deflectors 7 and directed by the latter to the fans 6, whence the air is blown into the upper portion of the chambers 2 and descends through the latter to the heating coils, issuing from the bottom of the chambers 2, beneath the lower ends of the partitions 4, into the chambers 3. The air, therefore, in either direction, circulates in a substantially vertical path, and across the material being dried.

Were the fans 6 to rotate continuously in but one direction, or in a direction wherein the blast therefrom is directed inwardly, the material being dried would be acted upon to a greater extent where the blast is the strongest, and this, obviously, would be at a point immediately below the lower ends of the deflectors 7, and in the region adjacent thereto. Hence, the material nearest the partitions 4 would remain damp, and the operation of drying the same would be an extended and tedious one. That the material nearest the partitions 4 may be acted upon with the same uniformity of results as that nearest the middle portion of the machine, provision is made for automatically and periodically reversing the direction of rotation of the fans 6, by which reversal the material at the middle portion of the machine is first acted upon by the strongest portion of the blast, after which this part of the material receives the weaker portion of the blast, or action of the air, while that portion next to the partitions 4 receives the action of the stronger portion of the circulation, and this reversal of the air in its circulation is continued until the material has been fully dried. To accomplish this end a pulley 11 is tightly mounted upon the fan shaft 8, adjacent to which pulley is a loose pulley 12, and adjacent to said pulley 12 is a third pulley 13 that is carried by a sleeve 14, the latter being loosely mounted upon the shaft 8 and having connected thereto a bevel pinion 15. This pinion

meshes with a bevel gear 16, said gear being mounted on a shaft 17. A bevel pinion 18, reversely arranged to the pinion 15 is fixedly connected to the shaft 8, said pinion being arranged to mesh with the teeth of the gear 16 at the side of the latter opposite to that at which the pinion 15 is mounted.

Carried by the shaft 17 is a pinion 19 that meshes with a spur gear 20, the latter being journaled in proximity to the bevel gear 16, and said gear 20 actuates a stud plate 21 having a stud 22 projecting therefrom. This stud 22 is designed to engage the upper end of a bent lever 23 that is pivoted at 24 to the machine casing in order to shift said lever in opposite directions, and connected to said lever 23 is rod 25 having belt shifting fingers 26 designed to engage a belt that works upon the faces of the pulleys 11, 12 and 13. The free end of the rod 25 is mounted in a guide 27, whereby movement of the rod 25 is assured, and as the lever 23 is shifted in alternate directions, it will be observed that the rod 25 will respond thereto, thus shifting the belt over the faces of the pulleys 11, 12 and 13.

In the operation of the herein described machine, the yarn to be dried, if this is the material to be acted on by the machine, is placed upon the usual supporting trucks, and the latter are introduced to the drying chambers 3. When the driving belt is upon the loose pulley 12, it will be understood that the fan shaft is at rest. When, however, the belt is shifted to the tight pulley 11 the fan shaft operates in one direction, and if this direction be such as to cause the fans to blow inwardly, the blast will be directed against the deflectors 7, as previously described. During this movement of the shaft 8 the bevel gear 18 actuates the gear 16, and this gear, through the medium of the gears 19 and 20, rotates the stud plate 21, and carries the stud 22 into engagement with one side of the upper end of the lever 23. When this engagement is effected the lever 23 is swung upon its pivot, operating the rod 25 to shift the belt across the faces of the pulleys 12 and 13, and positions the belt upon the latter pulley. The pulley 13 therefore moves with the driving belt, rotating the sleeve 14 and the pinion 15, and power is now applied from the pinion 15 to the gear 16, the direction of rotation of which is now reversed, and in turn reversing the direction of rotation of the gears 19 and 20, and also the direction of rotation of the stud plate 21. In this movement the stud 22 is carried around to the other side of the lever 23, reversing this lever, and thus moving the rod 25 in such a direction as to carry the driving belt back to the tight pulley 11, whereupon movement of the respective elements is again reversed, and the direction of the blast of the fans likewise

reversed. Until the driving belt is positioned upon the loose pulley 12, it is perfectly obvious that the alternate reversal in the direction of rotation of the fans will occur; and with each reversal thereof the circulation of the air within the machine will be reversed, the air passing alternately up and down through the yarn being dried, and uniformly acting upon the latter to extract the moisture therefrom. That the lever 23 may be shifted with the least expenditure of force the upper end of said lever is provided with a weight 28, and when said weight has passed the center of movement of the lever 23, in either direction, it will be apparent that the weight has a tendency to throw the lever 23 in the direction in which it is moving.

It will be observed that by means of the foregoing arrangement the air within the machine is continuously recirculated during the drying operation, and this economizes in the use of the heat, so that the machine operates at minimum expense in the consumption of the heat. Furthermore, the yarn or other material that is being dried is acted upon with a uniform distribution of the air, thereby materially shortening the drying operation, and subjecting all portions of the mass to the strongest portion of the blast periodically incident to the reversal of the direction of the blast of the fans.

The invention is illustrated as embodied in a drying machine containing a plurality of drying chambers, but it will be understood that the same is capable of embodiment in a machine having but one drying chamber, and also in a machine wherein only one fan is employed. Where a plurality of fans is employed, and the same are arranged in pairs, as illustrated in the accompanying drawings, each fan shaft is

equipped with the reversing mechanism described, and thus the respective fans will be periodically reversed.

Having thus described the invention, what is claimed as new, and desired to be secured by Letters Patent, is:

1. In a drying machine, a rotary fan, means for periodically actuating said fan in opposite directions, an inclined deflector associated with said fan for directing the air in a fixed path of movement relatively to said fan and the material to be dried, and means for automatically changing the direction of rotation of the fan at determinate periods.

2. In a drying machine, the combination with a fan, and its shaft, said fan being arranged to circulate the air in a substantially vertical path across the material being dried, of means for driving said shaft, and means actuated by said driving means and said shaft for automatically reversing the movement of said shaft at determinate periods.

3. In a drying machine, the combination with a fan, and its shaft, said fan being arranged to circulate the air in a substantially vertical path across the material being dried, of belt-driving connections associated with said shaft, a belt-shifter, and means associated with said belt-shifter and actuated by said driving connections and said shaft for automatically reversing the movement of said shaft at determinate periods.

In testimony whereof we affix our signatures, in the presence of two witnesses.

THOMAS ALLSOP.
WALTER W. SIBSON.

Witnesses:

HENRY P. HARPER,
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