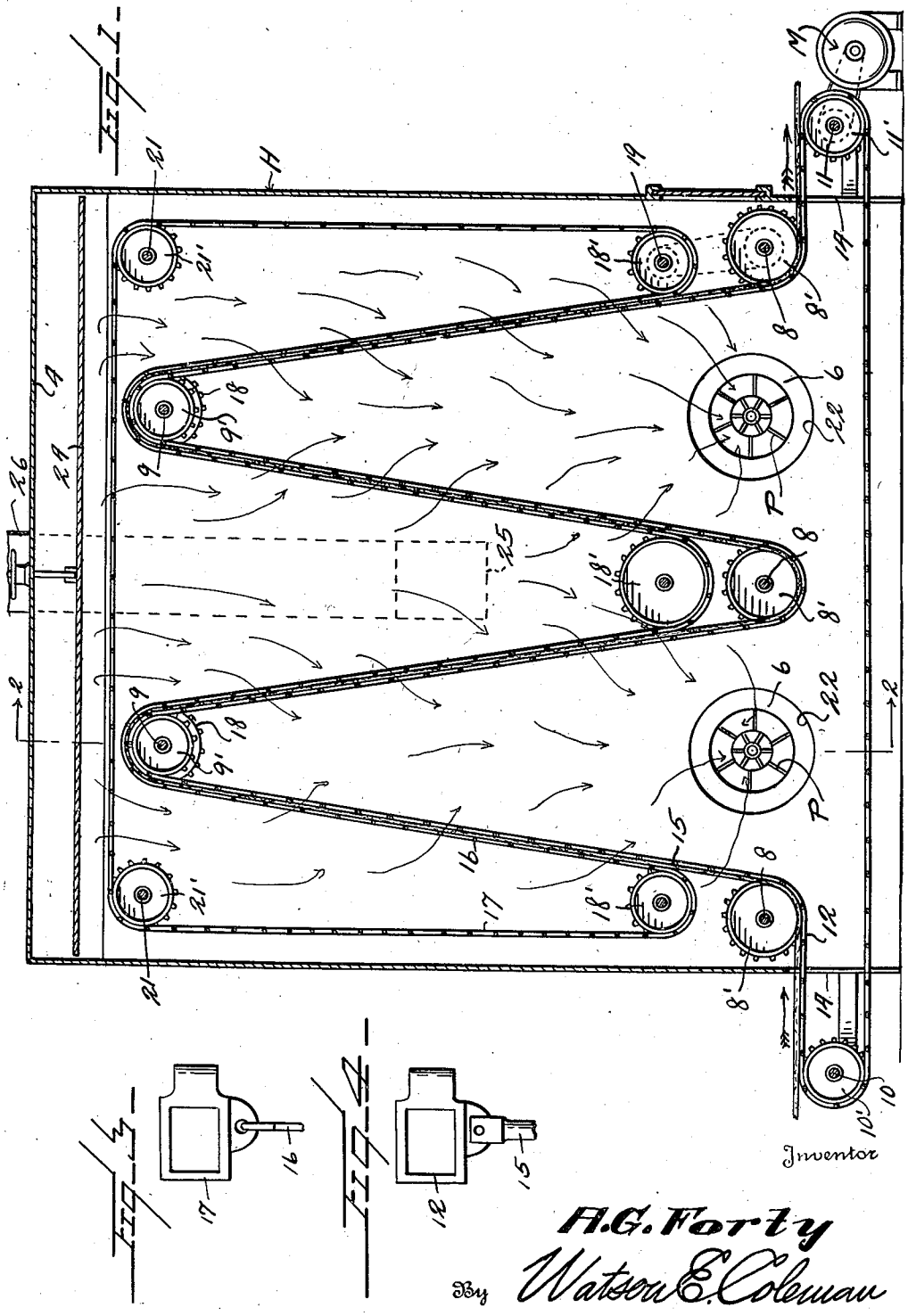
May 14, 1935. A. G. FORTY 2,001,345

DRIER

Filed Jan. 18, 1934 2 Sheets-Sheet 1



Inventor

A. G. Forty

By Watson E. Coleman

Attorney

May 14, 1935. A. G. FORTY 2,001,345

DRIER

Filed Jan. 18, 1934 2 Sheets-Sheet 2

Fig. 4.

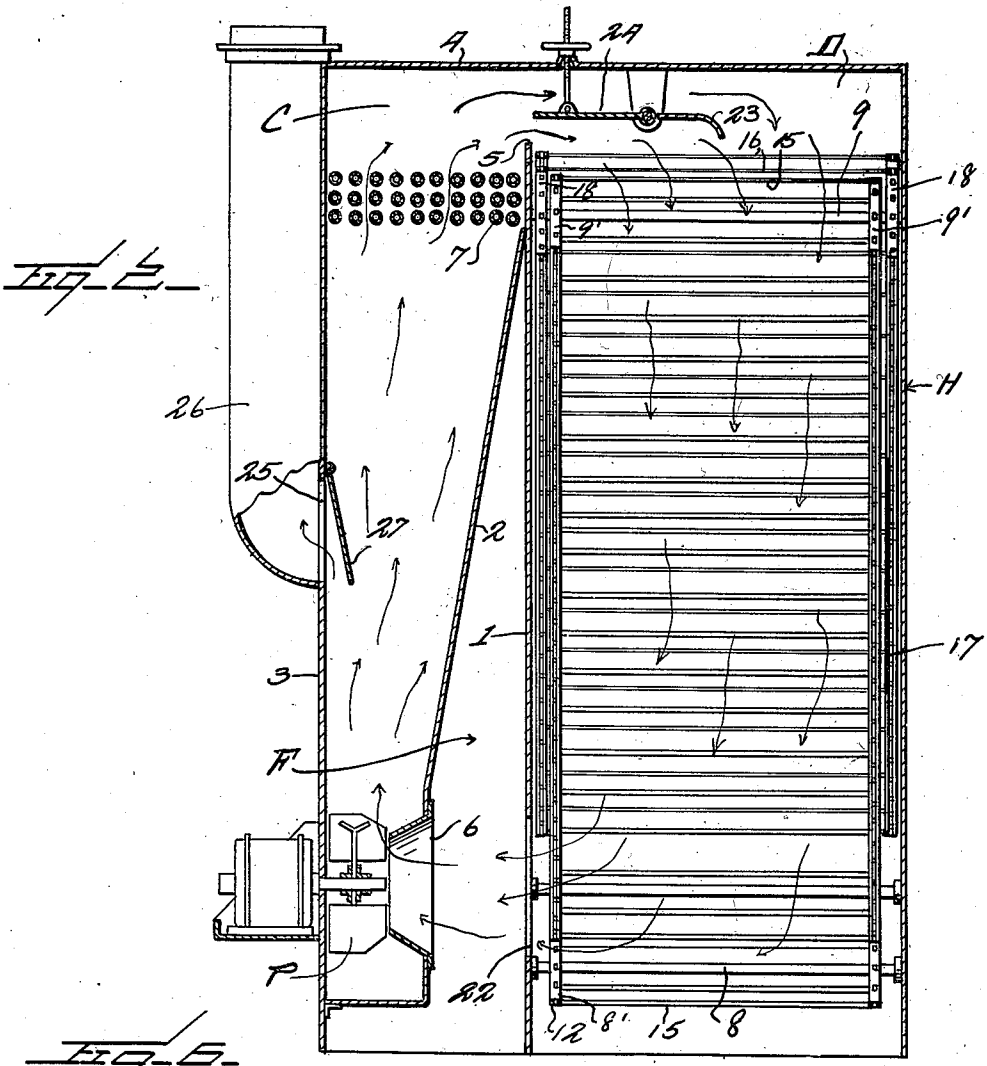


Fig. 6.

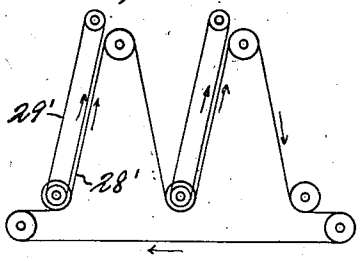
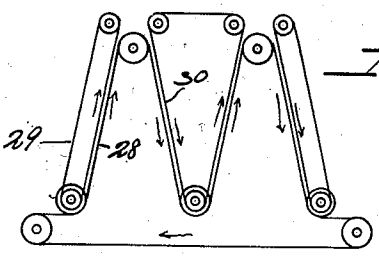


Fig. 5.



Inventor

A. G. Forty

By Watson E. Coleman

Attorney

Patented May 14, 1935 2,001,345

UNITED STATES PATENT OFFICE

2,001,345

DRIER

Albert G. Forty, Graniteville, Mass., assignor to C. G. Sargent's Sons Corporation, Graniteville, Mass., a corporation of Massachusetts

Application January 18, 1934, Serial No. 707,184

1 Claim. (Cl. 34—12)

This invention relates to driers, and it is primarily an object of the invention to provide an apparatus of this kind especially designed and adapted for use in the drying of material in lengths, such as worsted top which is in rope form or various materials made in web form such as cloth, etc.

It is also an object of the invention to provide a machine of this kind wherein the material to be treated is caused to traverse a tortuous path through the drying chamber and wherein the conveyor for carrying the material is of a type to effectively hold the material while passing through the drying chamber.

An additional object of the invention is to provide an apparatus of this kind wherein the material to be treated is carried through the drying chamber in what may be termed up and down paths, together with means for effectively subjecting said material as it travels up and down within the drying chamber to the action of the drying medium.

The invention consists in the details of construction and in the combination and arrangement of the several parts of my improved drier whereby certain important advantages are attained and the device rendered simpler, less expensive and otherwise more convenient and advantageous for use, as will be hereinafter more fully set forth.

The novel features of my invention will hereinafter be definitely claimed.

In order that my invention may be the better understood, I will now proceed to describe the same with reference to the accompanying drawings, wherein:—

Figure 1 is a vertical sectional view taken through a drying apparatus constructed in accordance with an embodiment of my invention and of a somewhat diagrammatic character;

Figure 2 is a transverse sectional view taken substantially on the line 2—2 of Figure 1 and also of a somewhat diagrammatic character;

Figure 3 is a fragmentary view in plan of the top conveyor;

Figure 4 is a fragmentary view in plan of the bottom conveyor;

Figure 5 is a diagrammatic view in elevation illustrating a further embodiment of my invention;

Figure 6 is a diagrammatic view in elevation illustrating another embodiment of the invention.

As disclosed in the accompanying drawings, H denotes a housing of desired dimensions and configuration and which is divided by the vertically disposed partition 1 into a drying chamber D at one side thereof and at the opposite side to provide a fan chamber F and the heating chamber C. These chambers F and C are separated one from the other by the partition 2 extending from the lower portion of the adjacent side wall 3 to the upper portion of the partition 1 at a desired point below the top wall 4 of the housing. The upper edge of the partition 1 also terminates below the top wall 4 of the housing to provide therealong an opening 5 co-extensive with the length of chamber D affording communication between the upper portions of the chambers D and C. The lower portion of the partition 2 is provided with horizontally spaced openings 6 and rearwardly of each opening and within the chamber F is arranged a power operated fan P which operates to draw air downward through the chamber D and through the material or stock passing through said chamber D and back into the upper portion of the chamber D through the opening 5.

Positioned within the upper portion of the chamber C and below the opening 5 are the heating pipes 7 extending lengthwise of the chamber C whereby the air just before it passes through the opening 5 into the upper portion of the chamber D is heated to the desired temperature. Steam is preferably coursed through the pipes 7 to attain the desired heating action although, of course, any other medium may be employed as may be effectively used.

Disposed transversely of the lower portion of the chamber D and preferably equidistantly spaced are the parallel shafts 8 substantially coplanar and uneven in number. Disposed transversely of the upper portion of the chamber D and substantially medially positioned with respect to adjacent shafts 8 are shafts 9. The shafts 9 are even in number thus assuring the proper positioning of a shaft 9 with respect to each two adjacent shafts 8.

Exteriorly of the housing H and in close proximity to the lower portion thereof are rotatably supported the shafts 10 and 11, the shaft 11 constituting the operating shaft and being in driven connection with a source of power herein generally indicated as the motor M of an electric type. However, any means may be employed to effect the desired rotation of the shaft 11. The shafts 8 adjacent the ends thereof carry the sprocket wheels 8' while the extremities of the shafts 9 carry the sprockets 9' and operatively engaged successively with the sprockets 8' and 9' are the side chains 12 of an endless conveyor. Each of

these chains 12 is extended outwardly of the housing H through the suitably formed openings 14 provided in the end walls of the housing or more particularly the chamber D so that each of said side chains 12 may be operatively engaged with the sprockets 10' and 11' carried respectively by the shafts 10 and 11.

As the sprockets 11' are mounted for rotation with the shaft 11 as this shaft is rotated the chains 12 will be drawn through the chamber D at desired speed with the upper stretches of the chains 12 preferably traveling in the direction of the shaft 11 so that the conveyor in which the chains are comprised together with the material on such conveyor will be pulled through the chamber.

The links of the chains 12 are connected by the cross rods 15 and which provide supports for the material to be treated and which material may be worsted top which is in rope form or kindred material or other materials made in web form, such as cloth. This material is effectively held to the rise and fall portions of the conveyor for travel therewith by the cross rods 16 which preferably are considerably lighter than the rods 15. Each of these rods 16 has its extremities suitably anchored to the links of the endless chains 17 and these chains 17 are positioned outwardly of but in relatively close proximity to a chain 12 of the conveyor hereinbefore referred to. Each of these chains 17 passes around the sprocket wheels 18 loosely mounted on the shafts 9 to the outer side of the sprocket wheels 9' at said end portions of the shafts 9. Each of the chains 17 also passes around the sprockets 18' mounted on the shafts 19 positioned in close proximity to but above the lower sprocket wheels 8' on the shafts 8. Each of the chains 17 also passes over the guide sprockets 21' carried by the shafts 21 arranged within the upper portion of the chamber D adjacent to the ends thereof so that an upper stretch of each of the chains 17 will travel above the top sprockets 9'.

In order that each of the fans P shall have desired effective action within the drying chamber the lower portion of the partition 1 in horizontal alignment with each of the openings 6 in the partition 2 is provided with an opening 22, and the effective circulation of the air through the drying chamber is further assured by the stationary deflector 23 and the movable or adjustable deflector 24 mounted within the top portion of the chamber D in a position with respect to the eduction opening 5 as will secure an even distribution of the heated air upon the stock carried through the drying chamber by the conveyor. Aside from the general use in connection with the improved conveying mechanism the deflectors 23 and 24 form no part of the present invention.

The wall 3 of the housing H at a point substantially midway of the fans P and between said fans and the heating pipes 7 is provided with an opening 25 affording communication between the chamber C and an upstanding flue 26. This flue 26 is of desired height and allows for an air exhaust for the chamber C and the flow through the flue 26 is under control of a valve 27.

In the embodiment of the invention as diagrammatically illustrated in Figure 5, the first rising portion and the last descending portion of the conveyor 28 have associated therewith the endless holding chains 29 each being of a structure substantially similar to the chains 17 and cross rods 16 hereinbefore referred to, while the adjacent descending and ascending portions of the conveyor 28 have associated therewith an endless holding chain 30 travelling in what might be termed a "V path" so that portions of the chain 30 will provide proper stretches for effective coaction with said adjacent descending and ascending portions.

In the embodiment of the invention as diagrammatically illustrated in Figure 6, the rising portions 28' of the stock carrying conveyor each has associated therewith an endless travelling holding chain 29' preferably of a structure such as hereinbefore described with respect to the chains 17 and connecting rods 16.

It will be noted from Figure 1 that the air inlet opening 5 extends the full length of the drying chamber H so that the air passes downward on both sides of each pair of upwardly converging chain flights and that the eduction openings, with the eduction fans are disposed adjacent the lower ends of these flights and between the lower ends of the upwardly converging flights so that the air is drawn downward through the material on the chains throughout the hole extent thereof and that the air so drawn downward acts to assist in holding the material against the endless sprocket chain 12 instead of tending as it would do if the blasts of air were upward to lift the material off of the chains. Of course, the material is held upon these conveyor chains by the outer chain 17 but even if this outer chain 17 were not used, the air moving downward will act to hold the material against the upper faces of the conveyor chain 12.

Attention is also called to the particular manner in which I train the chain 17. It is impossible to carry the chain 17 down around the sprockets 8' or down around sprockets mounted upon the wheel shafts 8 of the sprocket wheels 8' because if this were attempted the sprocket chain or conveyor 17 would have to pass through the inner chain 15, the conveyor 17 having to pass over the upper sprocket wheels and under the lower sprocket wheels. If it was attempted to have both chain conveyors pass over the same sprocket wheels there would be a differential movement between the two conveyors that would act to shred the material supported between the two conveyors and this would have a deleterious effect upon the material. It is, therefore, necessary to use the sprocket wheels 18' which are disposed immediately above the sprocket wheels 8.

From the foregoing description it is thought to be obvious that a drier constructed in accordance with my invention is particularly well adapted for use by reason of the convenience and facility with which it may be assembled and operated, and it will also be obvious that my invention is susceptible of some change and modification without departing from the principles and spirit thereof and for this reason I do not wish to be understood as limiting myself to the precise arrangement and formation of the several parts herein shown in carrying out my invention in practice except as hereinafter claimed.

I claim:—

In a drier, a drying chamber, a chain conveyor entering the lower portion of the chamber through one end wall thereof and leaving through the lower portion of the opposite end wall, a series of sprocket wheels disposed at spaced points at the lower end of the chamber between the entrance and exit opening, a series of sprocket wheels adjacent the upper portion of the chamber, the chain conveyor being trained beneath the first named sprocket wheels and over the second named

sprocket wheels to provide a series of ascending and descending flights, sprocket wheels concentric to but larger than the upper sprocket wheels, sprocket wheels disposed above but in line with the first named sprocket wheels and an endless chain conveyor travelling around the third and fourth named sprocket wheels and bearing against the material on the upper surface of the first named conveyor and travelling therewith.

ALBERT G. FORTY.