April 1, 1924. 1,489,223

C. H. REUMANN ET AL.

DRYING MACHINE

Filed Dec. 24, 1920 2 Sheets-Sheet 1

FIG. I.

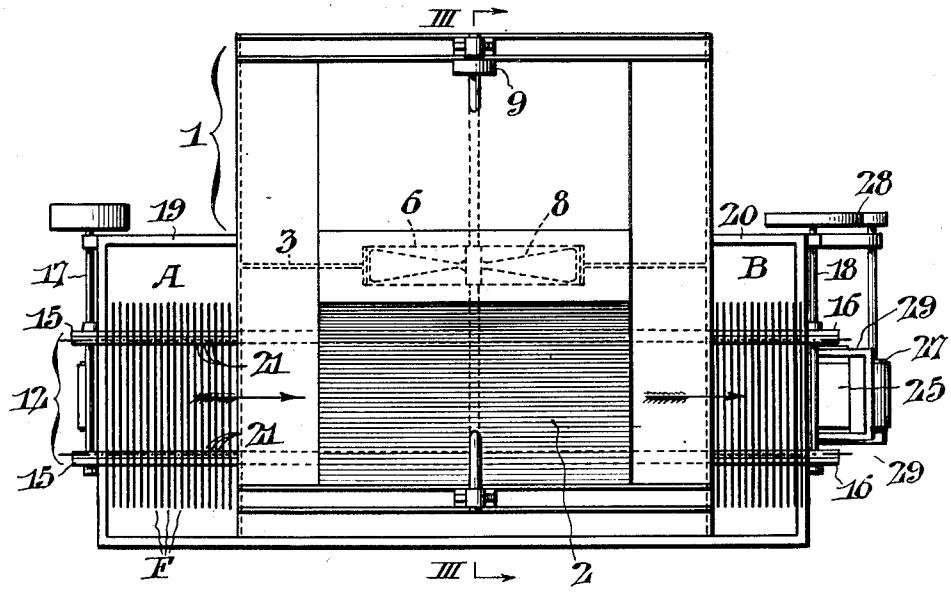
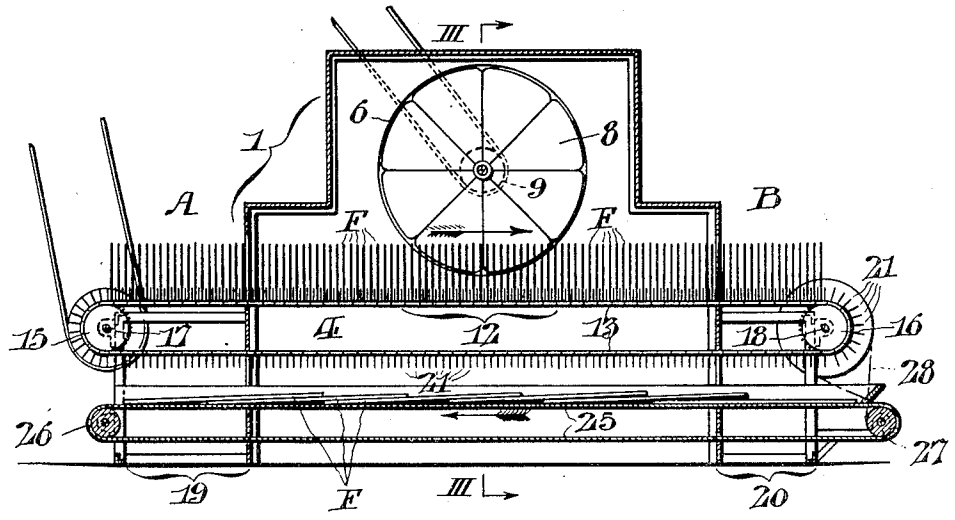


FIG. II.



WITNESSES:

John C. Bergner

James H. Bell

INVENTORS:

Christian H. Reumann

& Harold O. Kaufmann,

By Tilney & Paul

ATTORNEYS.

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FIG. III.

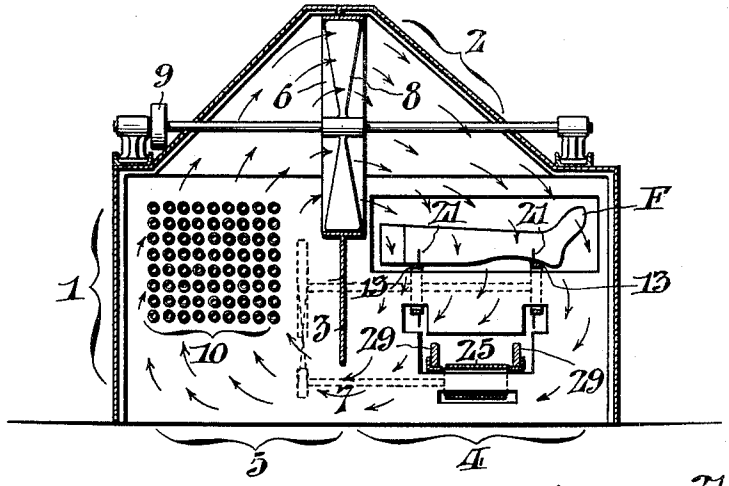


FIG. V.

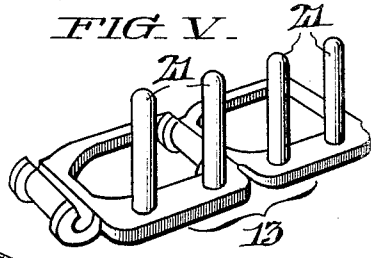
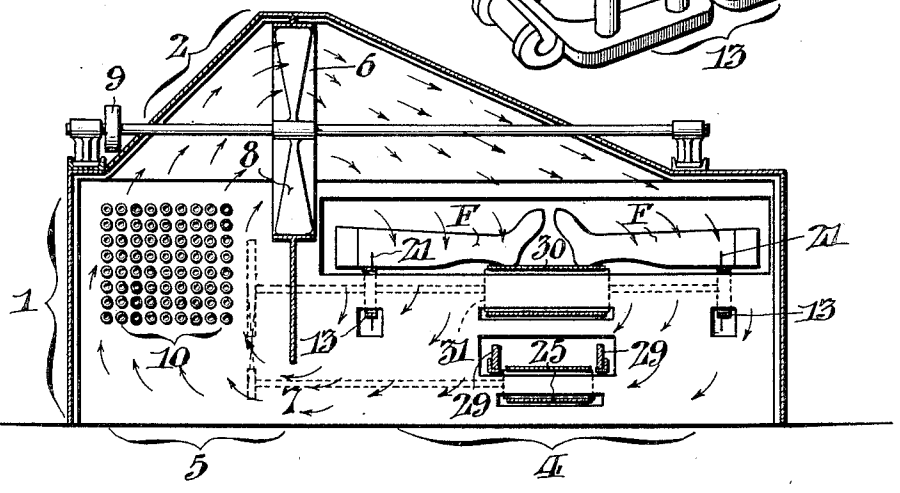


FIG. IV.



WITNESSES:

John C. Berguer

James H. Bell

INVENTORS:

Christian H. Reumann

& Harold O. Kaufmann,

By Fraley & Paul

ATTORNEYS.

Patented Apr. 1, 1924. 1,489,223

UNITED STATES PATENT OFFICE.

CHRISTIAN H. REUMANN AND HAROLD O. KAUFMANN, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNORS TO THE PHILADELPHIA DRYING MACHINERY COMPANY, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

DRYING MACHINE.

Application filed December 24, 1920. Serial No. 432,991.

To all whom it may concern:

Be it known that we, CHRISTIAN H. REUMANN and HAROLD O. KAUFMANN, citizens of the United States, residing in the city of Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented certain new and useful Improvements in Drying Machines, whereof the following is a specification, reference being had to the accompanying drawings.

The invention relates to drying machines more particularly of the type useful in drying textile manufactures capable of being stretched upon suitable shaping or drying forms, such for example, as hosiery or the like.

The object of our invention is to render a drying machine especially adapted for the stated purpose, continuous in operation and capable of accommodating at one time, forms of different sizes and configurations, without regard to order, and without requiring any rearrangement or readjustment whatever of any of its parts.

A further object of our invention is to provide for the preheating of the forms for reuse, and also for their return to the feeding end of the machine, after having been stripped of their charges.

Other objects and advantages of our invention will become apparent from the detailed description which follows:

In the drawings, Fig. I is a plan view, representing more or less diagrammatically, a drying machine conveniently embodying our invention.

Fig. II is a longitudinal sectional elevation of the same.

Fig. III shows a central cross section of the structure along the line III—III in Figs. I and II.

Fig. IV is a view similar to Fig. III, of a slightly modified form of our invention; and

Fig. V is a detail illustration in perspective of a portion of one of the conveyor sprocket chains which may be used in either form of our invention.

Referring more particularly to Figs. I, II and III, it will be observed that the drying machine there represented is in the form of an enclosure 1 having a peaked roof 2, and which in practice is wholly constructed preferably of suitable fire proof materials. This enclosure is subdivided by a longitudinally extending, vertical partition 3 into a drying chamber 4 and a heating compartment 5. The subdivisions 4 and 5 communicate at their tops through a circular opening 6 in the partition 3, and at their bottoms, through a coextensive opening 7 beneath said partition. A fan 8, adapted to be driven continuously by a pulley 9 on its mounting shaft, rotates within the circular opening 6 of the partition 3, and serves to propel the air heated by the coils 10 in the compartment 4, over a lateral circuit within the structure in the manner suggested by the arrows in Fig. III.

Moving continuously through the chamber 4 in a longitudinal direction, is a conveyor which is comprehensively indicated at 12, and, as will be seen, comprises a pair of endless sprocket chains 13—13. These chains are relatively spaced as shown in Figs. I and III, and run about cooperative sprockets 15—15 and 16—16 respectively mounted upon shafts 17—18. Said shafts are journalled in suitable bearings respectively attached to protruding end portions 19—20 of the skeleton frame of the machine. By this arrangement, it will be seen that the conveyor is rendered accessible at the exterior for loading and unloading at respectively opposite ends of the machine. The chains 13—13 carry, as shown diagrammatically in Figs. I, II and III, and in detail in Fig. V, a series of closely spaced perpendicular projections 21 which are cooperative in pairs in supporting between them, flat forms "F" upon which the articles to be dried are stretched. For convenience of illustration, we have represented in the drawings, forms of the type ordinarily used in drying stockings, but it will be obvious from further description that the machine of our invention is, with equal facility, capable of accommodating forms of other configurations. According to the showing herein, it will be noted that the forms are sustained at their opposite ends by relatively coordinated pairs of the projections 21 of the two conveyor chains 13—13. The forms, in being thus bridged between the two chains, are disposed transversely of the conveyor and consequently aligned in the direction of the air flow in the drying chamber 4. By reason of such disposal, the air stream is subdivided or channeled to flow through the in-

tervals between adjacent forms of the series with a result that the supported articles are quickly and uniformly dried.

For the purpose of rendering the machine capable of accommodating forms of different sizes, the chains 13—13 are so spaced or gauged initially that they may be readily bridged by forms of the shortest length that are likely to be met with in practice. The larger sizes will, under this arrangement, be supported equally as well, except that their ends will project beyond the chains to a greater extent.

In the course of the operation of the machine, the forms with the articles to be dried stretched thereon, are placed upon the upper run of the conveyor at the station "A" in the manner previously described, from whence they are slowly and continuously progressed through the drying chamber under the support of the conveyor in the direction of the arrows in Figs. I and II. After emerging from within the enclosure at the opposite end of the machine, the forms are removed by an operative at the station "B" and there stripped of the dried articles which are then stacked in piles in readiness for packing.

Experience has taught that knitted articles such as stockings, etc., when wet or damp, may be mounted upon the drying forms with greater facility when the latter are warm or hot. In order to utilize this principle in practice, we provide for the return of the stripped forms through the drying chamber, so that they may be delivered in a preheated condition for reuse at the charging end of the machine. This office is relegated to an auxiliary conveyor in the form of an endless belt 25 which underlies the main conveyor 12 within the drying chamber 4, and moves at a somewhat faster rate in a direction counter to that of the movement of the main conveyor. The belt 25 is supported on rolls 26—27 of which the latter is directly driven from the sprocket shaft 18 by a belt connection 28. Longitudinally extending rails 29—29 are disposed adjacent the edges of the auxiliary conveyor belt 25 (see Figs. II and III) and serve, by cooperation, to afford a guide channel for the retainment of stripped forms en route to the feeding end of the structure through the drying chamber.

Referring now to the modified embodiment shown in Fig. IV, it will be seen that the machine there represented does not differ in general arrangement from the form previously described, except that in this case the drying chamber 4 is considerably wider so that two series of forms "F", arranged end to end, may be accommodated at the one time. The main conveyor comprises, in addition to the sprocket chains 13—13, a rather broad, endless belt or apron 30 which is disposed centrally between said chains and moves in synchronism therewith under drive of rollers or drums 31 mounted on the same shafts with the chain sprockets. As in the first described embodiment, the chains 13 carry projections or pins 21 which are functional in pairs, as already understood, in supporting the forms in upright position. However, in the modification, the forms "F" are held at one end only, while their opposite ends merely rest upon the synchronously moving apron 30, and are thereby carried along without necessity for aid of any special holding means. This type of machine will obviously be more efficient than the first described form on account of its greater capacity. The auxiliary conveyor belt 25 serves in this instance as before, as a means for returning the stripped forms in a preheated condition to the charging end of the machine.

From the characteristic aspects of our invention as above disclosed, it will be apparent that since the drying forms are not permanently attached to the conveyor, no adjustments or changes are required to render the machine adaptable to drying different sizes and styles of manufactured articles of the class described. Moreover, the machine is capable of accommodating different sized forms indiscriminately, i. e., regardless of any predetermined ordering or sequence. Furthermore, since the articles to be dried are mounted upon the forms previous to being charged upon the conveyor, necessity for any dwells or pauses in the motion of the latter, as is ordinarily necessary in machines where the forms are directly attached to the conveyor, is entirely eliminated. As a consequence of this, the efficiency of the machine is obviously enhanced to a very appreciable extent.

Having thus described our invention, we claim:

1. A drying machine of the character described comprising in combination, a drying chamber; a traversing conveyor carrying a series of closely spaced projections adapted for cooperation in pairs, to support between them, forms upon which the articles to be dried are mounted, and an auxiliary conveyor for returning the forms to the feed end of the machine.

2. A drying machine of the character described comprising in combination, a drying chamber; a traversing conveying means moving continuously in a horizontal direction, said conveying means carrying a series of spaced projections adapted for cooperation in pairs, to support in upright position between them, forms upon which the articles to be dried are mounted and an auxiliary conveyor for returning the forms to the feed end of the machine.

3. A drying machine of the characted de-

scribed comprising in combination, a drying chamber; a continuously moving, endless traversing conveyor carrying a series of closely spaced projections adapted for cooperation in pairs, to support between them, forms upon which the articles to be dried are mounted and an auxiliary conveyor for returning the forms to the feed end of the machine.

4. A drying machine of the character described comprising in combination, a drying chamber; an endless conveyor moving continuously over a horizontally disposed course through the drying chamber and carrying a series of closely spaced projections adapted for cooperation in pairs, in supporting between them, forms upon which the articles to be dried are mounted, and an auxiliary conveyor for returning the forms to the feed end of the machine.

5. A drying machine of the character described comprising in combination, a drying chamber; and a traversing conveyor consisting of two relatively spaced, endless sprocket chains, each carrying a series of projections, the corresponding pairs of projections of the respective chains being adapted, in supporting between them, the ends of forms upon which the articles to be dried are mounted.

6. A drying machine of the character described comprising in combination, a drying chamber; an endless conveyor adapted to move horizontally through the drying chamber and adapted to sustain, in vertical positions and in spaced relation, a series of forms upon which the articles to be dried are mounted; and an auxiliary conveyor also traversing the drying chamber, and serviceable in returning the forms, after being stripped of the dried charges at the terminal end of the first mentioned conveyor, to the feed end of the machine for reuse.

7. A drying machine of the character described comprising in combination, a drying chamber; a conveyor traversing said drying chamber and adapted to sustain, in vertical positions and in spaced relation, a series of forms upon which the articles to be dried are mounted; and a co-extensive, auxiliary conveyor, underlying the first mentioned conveyor, adapted to traverse the drying chamber in the opposite direction to return the forms, after being stripped of the dried charges at the terminal end of the first conveyor, in a preheated condition to the feed end of the machine for reuse.

8. A drying machine of the character described comprising in combination, a drying chamber; a traversing conveyor consisting of a chain carrying a series of projections adapted for cooperation in pairs in sustaining in upright position between them, forms upon which the articles to be dried are mounted, said projections engaging the forms at one end only; and a synchronously moving belt adapted to sustain the opposite ends of said forms.

9. A drying machine of the character described comprising a drying chamber, in combination with a conveyor consisting of a pair of relatively spaced, endless chains moving horizontally through the chamber, each of said chains carrying a series of projections adapted for cooperation in pairs, in sustaining in upright position between them, forms upon which the articles to be dried are mounted, said projections engaging the forms at one end only; and a synchronously moving belt disposed in the interval between the conveyor chains and adapted to sustain the opposite ends of said forms.

10. A drying machine of the character described comprising in combination, a drying chamber; means for propelling heated air over a lateral course within the drying chamber; a conveyor traversing said drying chamber longitudinally and adapted to sustain, in vertical positions and spaced relation, forms upon which the articles to be dried are mounted, said forms being disposed transversely of the conveyor so as to be aligned in the direction of flow of the circulated air.

In testimony whereof, we have hereunto signed our names at Philadelphia, Pennsylvania, this 21st day of December, 1920.

CHRISTIAN H. REUMANN.
HAROLD O. KAUFMANN.

Witnesses:
JAMES H. BELL,
E. L. FULLERTON.