March 29, 1927. G. W. CHRISTOPH 1,623,017

DRYING APPARATUS

Filed Dec. 14, 1925

Fig. 1.

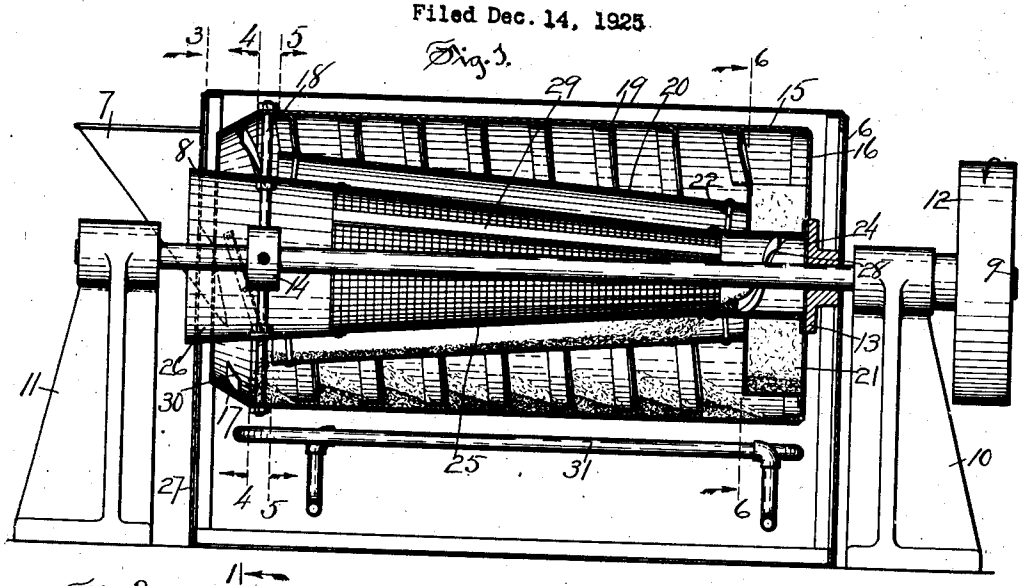



Fig. 2.

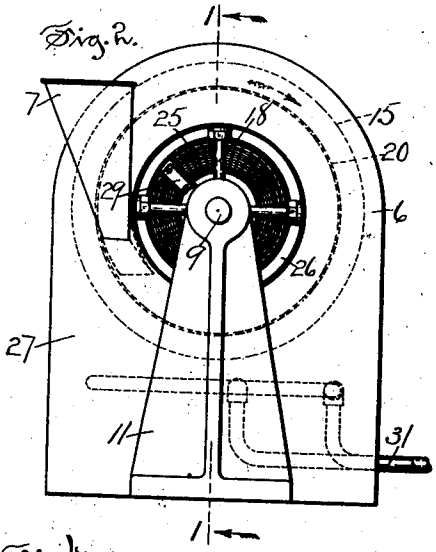



Fig. 3.

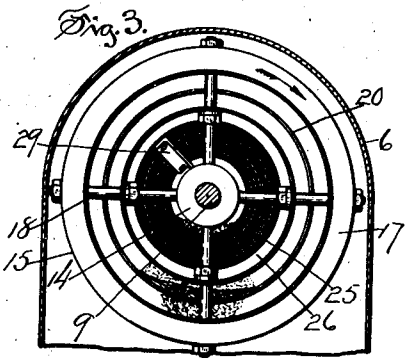



Fig. 4.

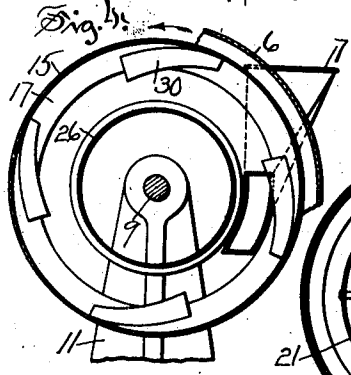



Fig. 5.

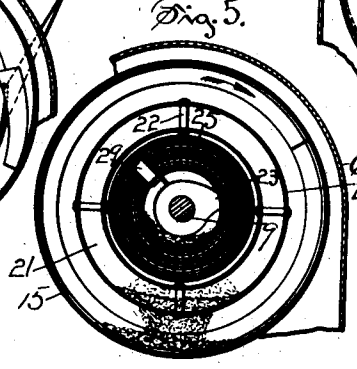
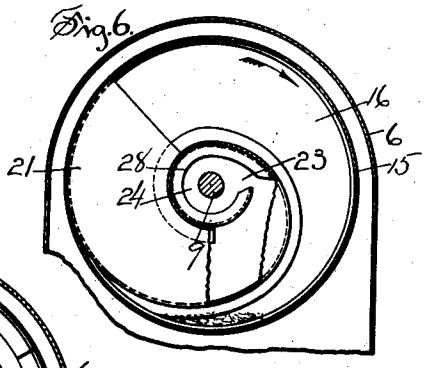



Fig. 6.




INVENTOR
George W. Christoph.
By
Arthur B. Jenkins,
ATTORNEY

Patented Mar. 29, 1927. 1,623,017

# UNITED STATES PATENT OFFICE.

GEORGE W. CHRISTOPH, OF WAREHOUSE POINT, CONNECTICUT, ASSIGNOR OF ONE-HALF TO THE AMERICAN HARDWARE CORPORATION, OF NEW BRITAIN, CONNECTICUT, A CORPORATION OF CONNECTICUT, AND ONE-HALF TO THE STERLING BLOWER COMPANY, OF HARTFORD, CONNECTICUT, A CORPORATION OF CONNECTICUT.

## DRYING APPARATUS.

Application filed December 14, 1925. Serial No. 75,220.

My invention relates to the class of machines employed more particularly for removing moisture from metallic articles of various sorts that have been wet during the process of manufacture or in finishing, and an object of my invention, among others, is is the provision of a machine of this class that shall be particularly efficient in operation and that shall rapidly effect its purpose.

One form of machine embodying my invention and in the construction and use of which the objects herein set out, as well as others, may be attained, is illustrated in the accompanying drawings, in which—

Figure 1 is a view in central lengthwise section through a machine embodying my invention, and on a plane denoted by the dotted line 1—1 of Figure 2.

Figure 2 is an end view looking at the machine from the left as seen in Figure 1.

Figure 3 is a view in cross-section of the upper portion on a plane denoted by the dotted line 3—3 of Figure 1.

Figure 4 is a similar view on a plane denoted by the dotted line 4—4 of Figure 1.

Figure 5 is another similar view on a plane denoted by the dotted line 5—5 of Figure 1.

Figure 6 is still another similar view on a plane denoted by the dotted line 6—6 of Figure 1, with parts broken away.

In the accompanying drawings the numeral 6 denotes a case that may be of any desired shape and composed of any suitable material, said case being enclosed except for an inlet opening provided with a hopper 7 and an outlet opening 8 at its front end, the inlet opening being located at one side of the center of the end of the case and the outlet opening at the center thereof, and as shown in Fig. 2 of the drawings.

A supporting shaft 9 extends through and out at each end of the case, said shaft being mounted in bearings in standards 10, 11, and having means, as a driving pulley 12, secured to one end thereof and adapted to receive a belt connected with any suitable source of power. A supporting plate 13 is secured to the shaft at the back of and within the case 6, and a supporting collar 14 is secured to said shaft near the front end of the case.

As a means for receiving the articles to be dried, for moving them from end to end of the case, and for discharging them at the front end of the case, I provide three drums that are secured to rotate with the shaft 9. The outer drum 15 is preferably cylindrical as to the greater part of its length, being closed at its back end, and such end being secured to the plate 13. The front end of this outer drum is provided with a tapered flange 17 within which the inner end of the hopper 7 is located, for the delivery of articles into said outer drum. This drum is supported at its front end on supporting rods 18 secured to and projecting outwardly from the collar 14. A feed worm 19 secured to the inner surface of the outer drum is arranged to cause movement of articles and material from the front to the back end of the drum, and as shown in Fig. 1.

The intermediate drum 20 is preferably tapered from a larger diameter at its front end to a smaller diameter at its back end and is of a size to provide a suitable space between its outer surface and the inner surface of the drum 15 for the travel of articles and material between said drums. This intermediate drum is open at its front end that terminates preferably back of the tapered flange 17, and as shown in Fig. 1 of the drawings. The back end of this intermediate drum is closed by the front wall of a transferrer 21 and said drum is supported as by means of short rods 22 at its front and rear ends, said rods being secured to and projecting from an inner drum to be hereinafter described.

The transferrer occupies a space between the rear end of the intermediate drum 20 and the end wall 16 of the outer drum and is of sufficient width to freely receive and transfer the articles and material delivered thereto from the outer drum. This transferrer is of spiral form, its outer end starting at the inner wall of the outer drum, and its inner end terminating at an opening 23 into a receiving chamber 24 comprising the back end of the inner drum hereinbefore referred to. This chamber 24 is preferably of cylindrical form, extending from the end wall 16 of the outer drum to a point within the rear end of the intermediate drum, the wall of this chamber, as well as those of the outer and intermediate drums, being preferably imperforate. The wall of the central portion 25 of the inner drum is perforated

and is preferably composed of wire netting. It is tapered from a smaller diameter at its back end to a larger diameter at its front end, and the outer or discharge portion 26 of this inner drum extends from the central portion 25 of the inner drum out through the front wall 27 of the case 6, and as shown in Fig. 1 of the drawings. The front end of this inner drum is supported by the rods 18, and the back end of said drum is supported against the inner surface of the end 16 of the outer drum 15. The outer portion 26 of the inner drum is tapered preferably to conform to the taper of the central portion 25 thereof, and the wall of this outer portion is imperforate.

The chamber 24 is provided with a feed device 28 of spiral form secured to its inner wall to direct movement of articles and material from the chamber 24 to the central portion 25 of the inner drum, and the latter is provided with a shelf or shelves 29 extending longitudinally thereof and acting to carry the articles and material, as sawdust, upwardly within the drum and then cause them to fall to the bottom of said central portion of the inner drum.

Feeders 30 in the form of comparatively short strips are disposed in an oblique direction on the inner wall of the tapered flange 17 and in a manner to direct travel of articles into the outer drum. Any suitable means, as steam pipes 31, may be employed for supplying heat within the interior of the case 6.

The operation of my improved machine is as follows:

A drying substance or material, as sawdust, is placed within the outer drum 15, and the articles to be dried are introduced through the hopper 7 from which they fall within the flange 17. The several drums being rotated and heat being supplied within the case, the articles together with the material and sawdust is caused, by the feed worm 19, to travel to the back end of the outer drum where they are scooped up by the scoop-transferrer 21. The rotation of this outer drum causes the articles to travel toward the center of said scoop and to be delivered through the opening 23 into the receiving chamber 24. From this chamber the feed device 28 causes the articles and material to travel into the central portion 25 of the inner drum and the rotation of the latter causes said articles and material to be carried toward the front end of the inner drum. The sawdust or other drying material passes through the meshes of the inner drum into the interior of the intermediate drum, the articles being thus separated from such drying material, and said articles passing out at the end of the outer portion 26 of the inner drum. The material, owing to the rotation of the intermediate drum, is carried along its tapered surface and is delivered out of the end thereof into the interior of the outer drum in condition for a repetition of the operation.

In accordance with the provisions of the patent statutes I have described the principles of operation of my invention, together with the apparatus which I now consider to represent the best embodiment thereof, but I desire to have it understood that the apparatus shown is only illustrative and that the invention may be carried out by other means and applied to uses other than those above set out.

I claim—

1. A drying apparatus including a plurality of concentrically arranged drums located one within another, one of said drums being adapted to receive articles to be dried and drying material, another of said drums being perforated to screen said material and deliver it to another of said drums, and the latter drum operating to return said material to the first mentioned drum, and means for rotating said drums.

2. A drying apparatus including an outer drum to receive and convey articles and drying material, an inner perforated drum to receive said articles and drying material, an intermediate drum to receive said material screened by the inner drum, means for transferring said articles and material from the outer to the inner drum, and means for rotating said drums.

3. A drying apparatus including an outer drum to receive and convey articles and drying material, an inner perforated drum, a spirally formed transferrer for delivering articles and material from the outer to the inner drum, and means for rotating said drums.

4. A drying apparatus including an outer drum to receive and convey articles and drying material, an inner perforated drum, a spirally formed transferrer for delivering articles and material from the outer to the inner drum, an intermediate drum to receive material screened by the inner drum, and means for rotating said drums.

5. A drying apparatus including an outer drum to receive and convey articles and drying material, an inner tapered perforated drum to receive said articles and drying material, means for transferring said articles and material from the outer to the inner drum, an intermediate drum of tapered form to receive said material screened by the inner drum, and means for rotating said drums.

6. A drying apparatus including an enclosing case, a plurality of concentrically arranged rotatably mounted drums located one within another in said case, one of said drums having its end projecting through the wall of said case for the delivery of articles

from said drums, means at the discharge end of the structure for delivering articles to one of said drums, and means for rotating said drums.

7. A drying apparatus including an enclosing case, a plurality of concentrically arranged drums located one within another in said case, the end of the inner drum projecting through the wall of the case for delivery of articles from within the case, means for supplying articles to the outer drum, and means for rotating said drums.

8. A drying apparatus including an outer drum to receive and convey articles, said drum having a beveled flange at its receiving end, an inner perforated drum to receive said articles and also drying material, means for transferring said articles and drying material from the outer to the inner drum, an intermediate drum to receive said material screened by the inner drum, and means for rotating said drums.

9. A drying apparatus including an outer drum, an inner drum having tapered walls and with its delivery end projecting beyond the end of the outer drum, an intermediate drum having its delivery end terminating within the outer drum, said delivery drum being tapered in form and arranged to receive material screened from the inner drum, means for delivering articles and material from the outer to the inner drum, and means for rotating said drums.

10. A drying apparatus including a rotatably mounted drum, means for introducing material to said drum at the inlet end thereof, an inner, rotatably mounted, perforated, cone-shaped drum having its larger end extending beyond the inlet end of the outer drum, said inner drum being concentrically arranged within the outer drum, and means for lifting material from the outer drum and delivering it to the inner drum at that end opposite the outlet end thereof.

GEORGE W. CHRISTOPH.