Jan. 26 , 1926. 1,571,076

A. W. WARREN

DRYING MACHINE

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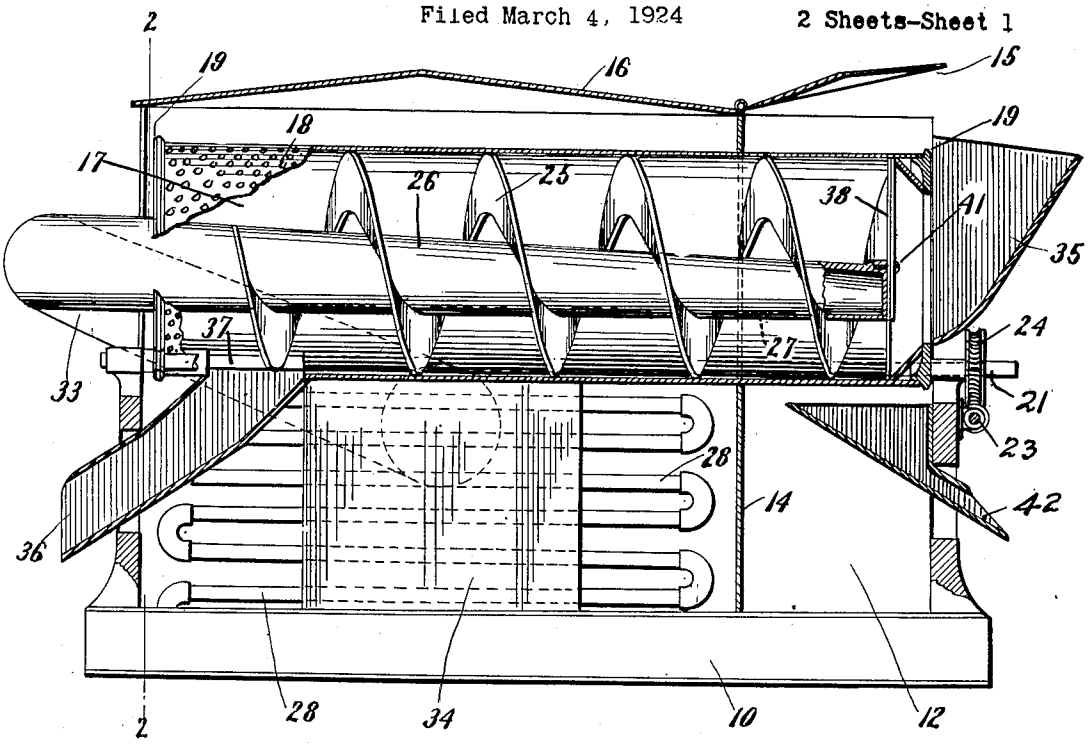

Fig. 1

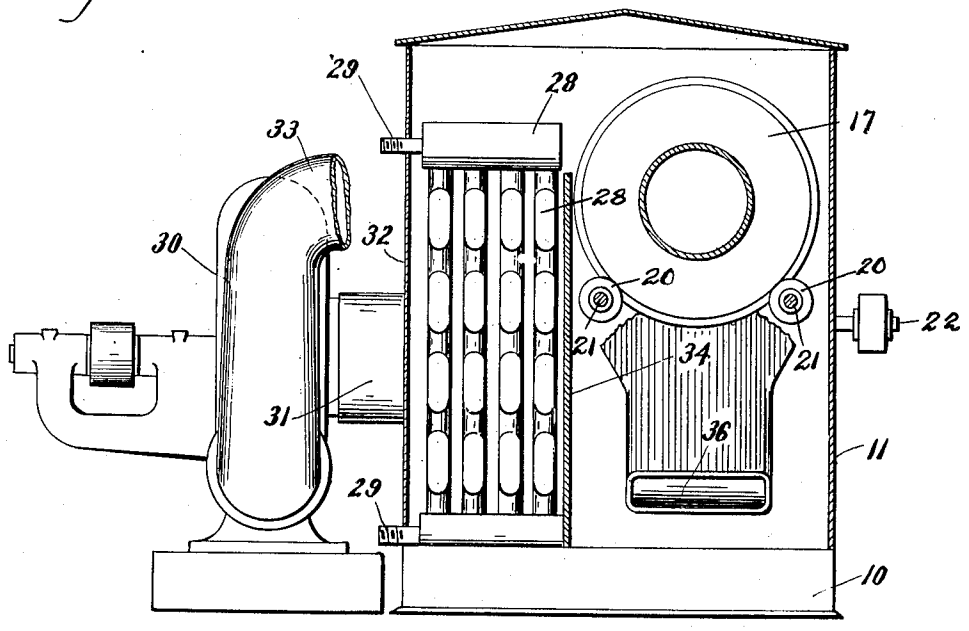

Fig. 2

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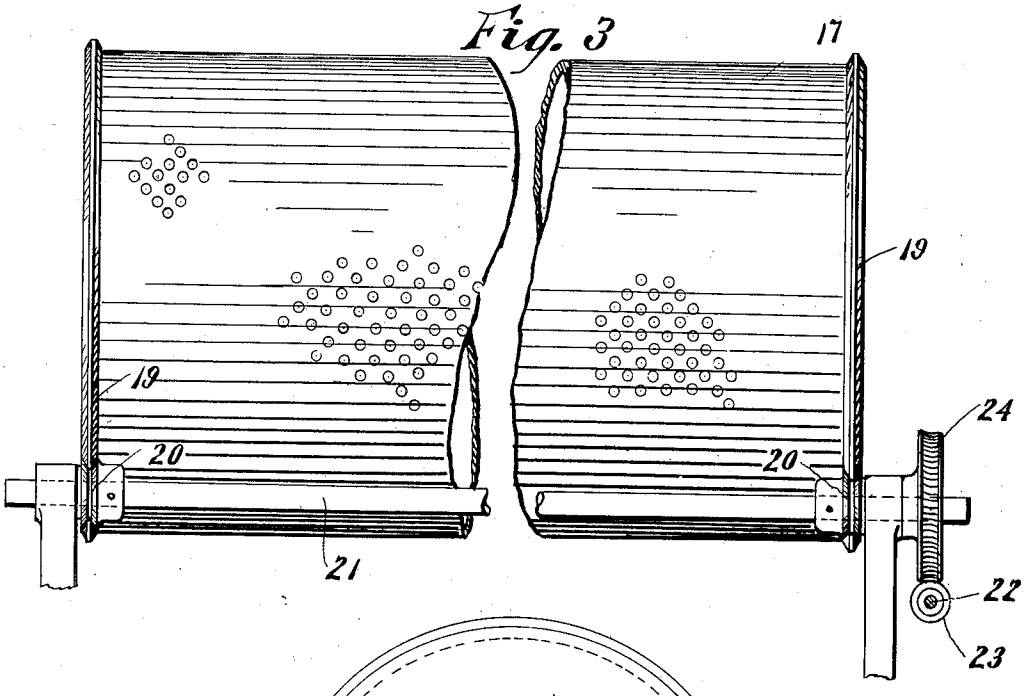
Fig. 3



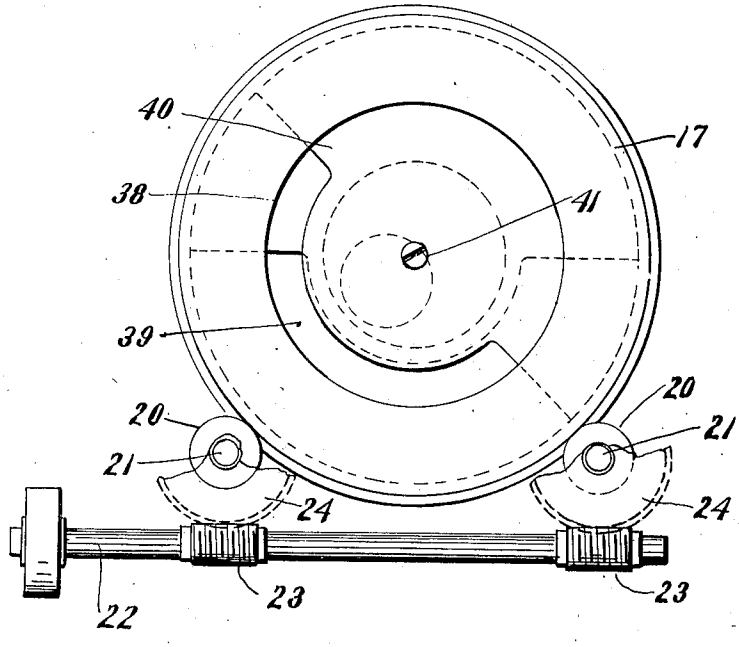


Fig. 4

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Patented Jan. 26, 1926. 1,571,076

UNITED STATES PATENT OFFICE.

ALBERT W. WARREN, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR TO NO-DUST DRYING MACHINE CO., OF PROVIDENCE, RHODE ISLAND, A CORPORATION OF RHODE ISLAND.

DRYING MACHINE.

Application filed March 4, 1924. Serial No. 696,869.

To all whom it may concern:

Be it known that I, ALBERT W. WARREN, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Drying Machines, of which the following is a specification.

This invention relates to improvements in machines for drying small metal parts after they have been subjected to a liquid bath such as chemicals and water, and has for its object to provide such a machine with a rotatable drum having means therein for advancing the work by the rotation of the drum.

A further object of this invention is to provide the machine with a plurality of compartments or chambers to facilitate the drying action upon the work, while the work is passing through the drum.

The invention further consists in the provision of a head at the entering end of the drum adapted to be adjusted for regulating the size of the entering opening for the work.

A still further object of the invention is the provision of a suitable frictional drive for rotating the drum from the exterior thereof so that if parts are jammed in the drum the driving would yield or slip and so prevent injury to the mechanism.

With these and other objects in view, the invention consists of certain novel features of construction, as will be more fully described, and particularly pointed out in the appended claims.

In the accompanying drawings,

Figure 1 is a sectional side elevation illustrating my improved drying machine.

Figure 2 is an end elevation showing a casing sectioned on line 2—2 of Figure 1.

Figure 3 is a side elevation showing the frictional driving means for the cylinder.

Figure 4 is an end view of the drum showing the adjustable head for controlling the size of the work-entering opening to the drum.

It is found in the construction and operation of drying machines of this character of advantage to provide a so-called moisture-collecting chamber at the entering end of the cylinder, which is separated by a partition from the so-called drying chamber of the casing, whereby excessive moisture is entirely removed from the parts before passing them into the drying chamber, also it is found of advantage to mount the work-carrying cylinder on a set of friction rolls for rotating the chamber to prevent injury to the parts if the work should become jammed in the chamber: and the following is a detailed description of one means by which these advantageous results may be obtained.

With reference to the drawings, 10 designates the base on which my improved machine is mounted. The machine comprises essentially a sheet metal casing 11 which is divided into two compartments or chambers along its length, a so-called moisture receiving chamber 12 being separated from the so-called drying chamber 13 by a partition 14. The moisture-removing chamber is provided with a cover 15 which may be raised and left partially open to permit the escape of moisture therethrough while the main heating chamber is provided with a suitable cover 16.

In this casing and extending the entire length of both of these chambers is a cylinder 17 having a perforated outer wall 18. At either end of this cylinder is located a circular track or ring 19 which rest upon two pairs of wheels 20 preferably grooved to receive the V-shaped rings. These wheels are mounted on shafts 21 on either side of the vertical center of the drum and both these shafts are driven from the worm shaft 22 through worms 23 and worm wheels 24, respectively, to rotate the drum at the required speed to pass the work therethrough.

By mounting these V-shaped rings of this drum on grooved pulleys or wheels the driving friction is not only increased but the drum is held against endways movement thereby.

In this drum is fixed a helix 25 to rotate with the drum, the helix being open through its center.

In order to produce a drying action on the parts as they pass through this drum, I have provided a tapering tube 26 which extends into the discharge end and through the drum, the bottom portion of this tube being provided with a set of openings 27 therein for discharging air therefrom onto the work as it lies on the bottom of the drum in passing therethrough, and the tapering of the

tube is for the purpose of distributing air pressure equally at the different points along its length.

In order to heat the air in the drying chamber 13, I have mounted steam coils 28 which may be connected through pipes 29 to any suitable source of steam supply. In order to circulate the heated air from this chamber through the tube 26 in the drum, I have mounted a blower 30 which is connected by pipe 31 through the side wall 32 of the casing and serves to draw the air from this chamber and force it up through the pipe 33 into the pipe 26 in the drum.

It is found in some instances of advantage to provide a baffle plate 34 on the opposite side of the heating coil, from that of the blower exhausting tube 31 so as to cause the air from the chamber to pass around this baffle plate and be drawn over the ends of the coil and along its length in order to expose the air to a greater heating surface along the coils before it is drawn from this chamber.

In operating this machine, I have provided a chute or hopper 35 through which the work enters to the drum and after passing through the drum by the action of the helix 25 as the drum rotates it is discharged through the discharge chute 36 at the opposite end of the drum, which is provided with a hole 37 to permit the work to drop therethrough into this chute.

In some cases, it is found of advantage to provide a head 38 in the drum which is supported on the end of the tube 26.

This plate is preferably formed with a large opening 39 through which the work may enter.

In some cases, it is found of advantage to shut off a portion of this opening so as to prevent too large a quantity of work from entering the drum at one time, and to accomplish this in a simple and effective way, I have mounted an adjustable plate 40 over the head plate 38 and on the central bolt 41, which plate may be rotated into the desired position to shut off a portion of the hole in the head plate and be locked in any set position by means of this central bolt 41.

The work just prior to being passed through this drying machine has usually been subjected to a pickling or washing operation and therefore is heavily charged with moisture and it is found of advantage to provide a partition to shut off a portion of the casing at the entering end thereof whereby a large portion of this moisture will be given time to drop through the openings in the cylinder into the discharge chute 42, a considerable portion of the moisture also passing out through the open lid 15 at the top of this chamber so that by the time the work has reached the drying chamber 13 the higher degree of heat therein will be much more effective to more speedily complete the drying operation as this portion of the air in the drying chamber will not be so heavily charged with moisture a large portion having already been drained therefrom.

My improved drying machine is very simple and practical in construction and effective in its operation and by its use large quantities of work may be continuously passed through the machine entering same, laden with moisture and coming out completely dry.

The foregoing description is directed solely towards the construction illustrated, but I desire it to be understood that I reserve the privilege of resorting to all the mechanical changes of which the device is susceptible, the invention being defined and limited only by the terms of the appended claims.

I claim:

1. A drying machine comprising a casing having a moisture-collecting chamber and a drying chamber, a rotatable work-carrying drum having portions located in each, and having an internal helically-disposed work feeding member, means for admitting the work to that portion of the drum in the moisture collecting chamber and discharging the work from the drum after the work has passed through that portion of the drum located in the heating chamber.

2. A drying machine comprising a casing having a moisture-collecting chamber and a drying chamber, a rotatable work-carrying drum having a portion located in each, and having an internal helically-disposed work-feeding member, means for admitting the work to that portion of the drum in the moisture-collecting chamber and discharging the work from the drum after the work has passed through that portion of the drum located in the heating chamber, and means for circulating heated air through said drum and heating chamber.

3. A drying machine comprising a casing having a heating chamber, heating coils in said chamber, a rotatable work carrying perforated drum mounted in said chamber, means for feeding the work through the drum, means for causing the heated air to circulate through said drum and chamber, and a baffle plate located adjacent said coil for distributing said air as drawn over said heating coils.

4. In a drying machine, an enclosing casing, a work-carrying member, means for admitting work to said member at one end of the casing and discharging it at the opposite end thereof, a heating compartment located at the discharge end and a moisture collecting compartment located at the entering end of said work carrying members, and means for conveying the collected moisture from the last said compartment.

5. In a drying machine, an enclosing casing, a work-carrying member, means for admitting work to said member at one end of the casing and discharging it at the opposite end thereof, and a heating compartment located at the discharge end and a moisture collecting compartment located at the entering end of said work-carrying member.

6. A drying machine comprising a rotatable work-carrying drum having an internal helically-disposed work-feeding member, means for admitting the work at one end and discharging it at the opposite end of said drum, and an adjustable head at the work-entering end of the drum for regulating the size of the entering opening thereto.

7. A drying machine comprising a rotatable work carrying drum, means in the drum for feeding the work longitudinally therethrough, annular bands having V-shaped bearing surfaces encircling the opposite ends of the drum, a set of driving rollers having correspondingly-shaped bearing surfaces to engage said bands for operatively supporting said drum, and means for rotating said rollers to frictionally drive said drum.

In testimony whereof I affix my signature.

ALBERT W. WARREN.