

G. F. WENTZ.
DRAINAGE MEANS FOR DRYING DRUMS.
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Fig. 1.

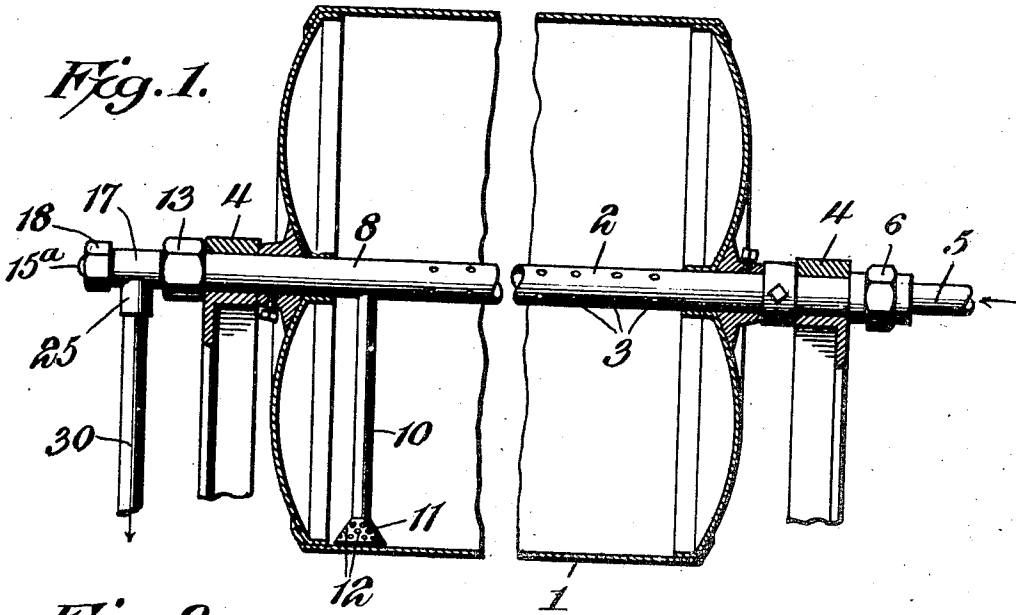


Fig. 2.

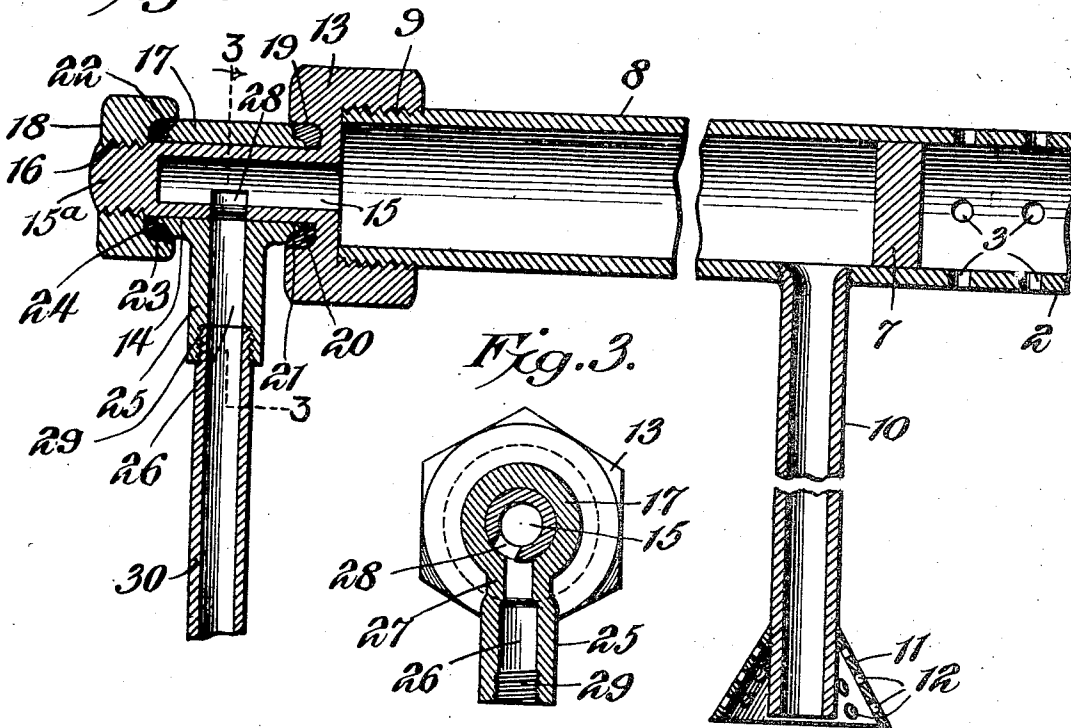
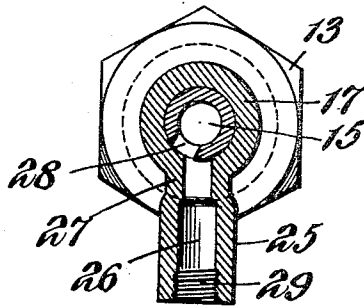


Fig. 3.



WITNESSES

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DRAINAGE MEANS FOR DRYING-DRUMS.

1,095,757.

Specification of Letters Patent.

Patented May 5, 1914.

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To all whom it may concern:

Be it known that I, GEORGE F. WENTZ, a citizen of the United States, residing at Lakewood, in the county of Cuyahoga and State of Ohio, have invented a new and useful Drainage Means for Drying-Drums, of which the following is a specification.

This invention has reference to improvements in drainage means for drying drums, and its object is to provide an automatic means which will keep a drying drum into which steam is introduced for heating purposes reasonably free from water of condensation, and this without any material waste of live steam.

In accordance with the present invention the drying drum is provided with means for the introduction of steam thereinto in order to produce the desired heat which is quite rapidly dissipated by the surface of the drum, and, therefore, there is considerable condensation of steam within the drum, and unless some means be provided for the escape of the water of condensation its accumulation would soon become a burden, as well as materially cutting down the efficiency of the device.

Various devices have been proposed for ridding the drum of the water of condensation, but these devices have either been inefficient or require sufficient mechanism to make them expensive to construct and more or less unreliable in operation.

In accordance with the present invention the steam pressure within the drum is utilized to force the water of condensation from the lowermost part of the drum to the axis of rotation, and from this the water finds escape through a suitable channel or duct, but since in operation the water of condensation does not accumulate to any great extent, the duct must be closed against communication with the interior of the drum except when the end of the duct within the drum is immersed in the accumulated water within the drum, thus shutting off any outflow of steam and thereby preventing waste. To accomplish this the present invention provides a duct within the drum rotating with the drum, and this duct is so constructed and so related to the exterior waste pipe that it is in communication with the latter only while traveling through an arc of comparatively few degrees, which

arc extends substantially equally on opposite sides of a radius extending from the axis of rotation downwardly in a vertical direction.

The invention will be best understood from a consideration of the following detailed description taken in connection with the accompanying drawings forming part of this specification, with the further understanding that while the drawings show a practical embodiment of the invention, the latter is not confined to any exact conformity with the showing of the drawings but may be changed and modified so long as such changes and modifications mark no material departure from the salient features of the invention.

In the drawings:—Figure 1 is an axial diametric section of a drying drum equipped with the present invention. Fig. 2 is a similar view drawn to a larger scale than Fig. 1, through the drainage end of the supporting shaft and the drainage structure connected therewith. Fig. 3 is a section on the line 3—3 of Fig. 2 with distant parts omitted.

Referring to the drawings there is shown a drum 1 which is usually made of sheet metal of a character which readily transmits heat and still is strong enough to permit various operations, especially with relation to cloth, for which drums of the character to which this invention relates are adapted.

Since the construction of the drum does not enter into the present invention no description thereof is deemed necessary, although it may be stated that the drum is customarily cylindrical without surface projections and is of a length and diameter suitable for the purpose.

The drum is mounted upon a hollow shaft 2 which for a portion of its length within the drum is perforated, as indicated at 3, and this shaft is mounted in bearings 4 at opposite ends exterior to the drum. At one end the shaft is coupled to a steam supply pipe 5 by means of a coupling 6 permitting the shaft to turn without it being necessary that the pipe 5 should turn with it. Swiveled joints suitable for the purpose of known and common construction and consequently need no description, since the manner of connecting up the shaft to the steam supply pipe forms no part of the present invention.

At a point within the drum 1 the shaft 2 is provided with a plug or division wall 7 dividing that end of the shaft remote from the steam receiving end from the perforated part of the shaft, and this plug or division wall may be steam tight within the shaft so that while steam finds ready entrance into the interior of the drum it will not pass the division wall or plug.

That end of the shaft 2 divided from the steam receiving end by the plug 7 is indicated at 8 and projects through the corresponding head of the drum 1 and through the corresponding bearing 4 and, at the extreme end is screw threaded, as indicated at 9.

Within the drum the end 8 of the shaft 2 receives one end of a pipe 10, which end opens into the interior of the shaft section 8, while this pipe 10 is of a length and is readily disposed with relation to the longitudinal axis of the shaft to extend to within a short distance of the inner peripheral wall of the drum, such distance being in practice approximately one-fourth of an inch, although the distance may be less or greater. The pipe 10 is freely open from end to end and at that end remote from the shaft, and which may therefore be called the outer end of the pipe, there is applied a shield or guard 11 preferably expanding from the pipe, and this guard may be made of any pervious material, such as perforated metal or gauze. In the drawing the shield 11 is shown as provided with a series of perforations 12, but this does not necessarily confine the invention to the use of perforated metal, for any kind of a shield which will guard the inlet end of the pipe 10 from the entrance of large particles will answer. The guard 11 may be brought even closer to the inner peripheral wall of the drum than the pipe 10.

Adapted to the threaded end 9 of the extension 8 of the shaft 2 is a nut 13 exteriorly shaped for the application of a suitable tool, the nut being customarily hexagonal on its exterior and is interiorly threaded to receive the shaft section 8. The exterior diameter of the nut is reduced at the end remote from that receiving the shaft extension 8 into an axially extended neck 14 having an internal axial bore 15 opening freely into the interior of the shaft extension 8, while that end of the neck 14 remote from the nut 13 is closed, as indicated at 15^a and exteriorly threaded as indicated at 16.

Applied to the stem 14 between the nut 13 and the threaded end 15^a of the stem is a sleeve 17 in which the stem may rotate, and applied to the threaded end 15^a of the stem is a nut 18. The nut 13 immediately about the stem 14 is undercut, as indicated at 19, to form a channel for the reception of a packing ring 20, and the corresponding end of

the sleeve 17 is formed with an axially projecting flange 21 entering the undercut channel 19 and engaging the packing ring 20. The other end of the sleeve 17 is formed with a similar axial flange 22 engaging a packing ring 23 lodged in an undercut channel 24 formed in the corresponding face of the nut 18. By this arrangement the sleeve 17 may be held against rotation, while the stem 14 rotates with the nut 13 and shaft 2, and the packing rings 20 and 23 effectually prevent leakage between the sleeve 17 and the stem 14.

Extending radially from the sleeve 17 is a neck 25 having a longitudinal bore 26 opening into the interior of the sleeve, and this neck where joining the sleeve is contracted, as indicated at 27, in Fig. 3, but may be elongated in the direction of the length of the sleeve.

Formed in the stem 14 is a port 28 which may be elongated in the direction of the length of the stem and comparatively narrow circumferentially, so as to match the shape of the passage through the neck 25 where joining the sleeve 17. The outer end of the neck 25 is threaded as indicated at 29 for the reception of a pipe 30 designed to serve as a discharge pipe for carrying water of condensation to any suitable place of disposal.

The port 28 is so related to the pipe 10 that when the latter has its open end lowermost the port 28 is coincident with the bore of the neck 25 and consequently there is a free passage from the interior of the drum at the lower portion thereof through the pipe 10 into the continuation 8 of the shaft 2, thence by the bore 15 in the stem 14 to the port 28, and by way of the latter into the bore 26 of the neck 25, and to the pipe 30, and under these circumstances the pressure of steam within the drum will cause water of condensation collected in the lower portion of the drum to flow out therefrom by the route described. As the drum rotates the port 28 is quickly brought out of coincidence with the bore of the neck 25 and communication between the interior of the drum and the exhaust pipe 30 is shut off, so that there is no escape of live steam from the drum. This condition continues during the major portion of the rotative movement of the drum, water of condensation accumulating in the meantime, and ultimately the pipe 10 is again brought with its free end downward and will dip into any water which may have accumulated in the drum, so that when the port 28 again opens to the bore 26 more water will be forced out of the drum. This operation is repeated each time the drum rotates, so that the drum is kept nearly free from water of condensation with little or no loss of live steam, while the time during which the exhaust pipe 30 is in communica-

tion with the interior of the drum marks but a small fraction of the rotative movement of the drum, but practice has demonstrated that this movement though covering but a few degrees of the rotative movement of the drum is ample to maintain the drum quite free from water of condensation.

What is claimed is:—

1. A rotatable steam drum having a sustaining shaft rotatable with the drum, said shaft having at one end a hollow chamber extending from the interior of the drum to the exterior thereof, a pipe extending radially from the hollow chamber within the drum to a point closely adjacent to the inner peripheral wall of the drum and there open, said pipe being also in free communication with the chamber within the shaft, an axially extended stem carried by the end of the shaft exterior to the drum, said stem having a bore closed at one end and at the other end open to the chamber within the shaft and also provided with a port between its ends, a sleeve surrounding the stem and provided with a neck having a bore communicating with the interior of the sleeve and in position to communicate with the interior of the stem through the port therein during the rotative movement of the stem, and means for securing the sleeve on the stem in fluid tight relation thereto and permitting rotative movements of the stem with the sleeve stationary.

2. A rotatable drum having a hollow shaft provided at one end with means for the introduction of steam, said shaft having passages therethrough for the flow of steam to the interior of the drum and also having one end formed into a chamber separate from the steam receiving portion of the shaft and extending to the exterior of the drum, an open ended pipe carried by the shaft and communicating at one end with the end chamber in the shaft and at the other end approaching closely to the inner peripheral wall of the drum, a nut applied to the chambered end of the shaft exterior to the drum, said nut being provided with an axially extended hollow stem closed at the end remote from the nut and said nut having an undercut channel formed therein about the stem, and the latter being threaded at its closed end, an undercut nut adapted to the threaded end of the stem, and a sleeve applied to the stem between the two nuts and having terminal flanges adapted to enter the undercut grooves of the nuts to confine packing therein, the sleeve having a laterally extended neck for the attachment of a drainage pipe, and the stem having a port therethrough in position to be brought into matching relation with the

neck during the rotative movement of the drum and shaft.

3. A rotatable drum having a hollow shaft provided at one end with means for the introduction of steam, said shaft having passages therethrough for the flow of steam to the interior of the drum and also having one end formed into a chamber separate from the steam receiving portion of the shaft and extending to the exterior of the drum, an open ended pipe carried by the shaft and communicating at one end with the end chamber in the shaft and at the other end approaching closely to the inner peripheral wall of the drum, a nut applied to the chambered end of the shaft exterior to the drum, said nut being provided with an axially extended hollow stem closed at the end remote from the nut and said nut having an undercut channel formed therein about the stem and the latter being threaded at its closed end, an undercut nut adapted to the threaded end of the stem, and a sleeve applied to the stem between the two nuts and having terminal flanges adapted to enter the undercut grooves of the nuts to confine packing therein, the sleeve having a laterally extended neck for the attachment of a drainage pipe, and the stem having a port therethrough in position to be brought into matching relation with the neck during the rotative movement of the drum and shaft, the pipe carried by the shaft within the drum having its free end provided with an exterior screen for preventing entrance of foreign bodies into the pipe.

4. A rotatable drum having means for the introduction of steam therein, a drainage pipe within the drum and rotatable therewith and extending from the axial portion of the drum into close relation with the inner peripheral wall of the drum, a fluid duct to which the pipe is connected and extending to the exterior of the drum, and drainage connections with said duct comprising spaced nuts, one of which is adapted to be applied to the drainage duct and provided with a hollow stem to which the other nut is applied, and a relatively fixed sleeve confined to the stem by the nuts, said sleeve having a duct leading therefrom and the stem being provided with a port movable by the rotative movements of the drum into and out of communication with the duct carried by the sleeve.

In testimony, that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

GEORGE F. WENTZ.

Witnesses:

HARVEY O. YODER,
L. E. SKEELL.