

March 8, 1932.

T. W. MURPHY ET AL

1,848,645

QUENCHING SYSTEM

Filed June 18, 1928

2 Sheets-Sheet 1

FIG. 1 .

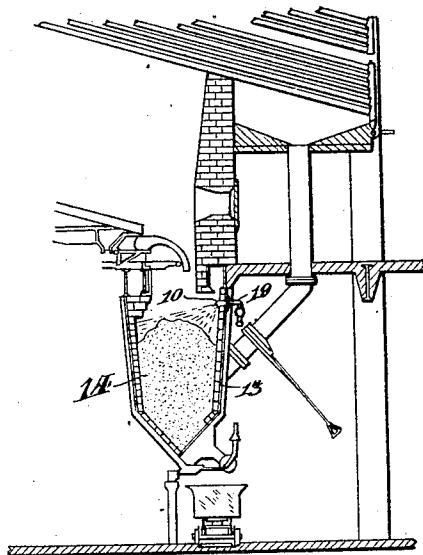
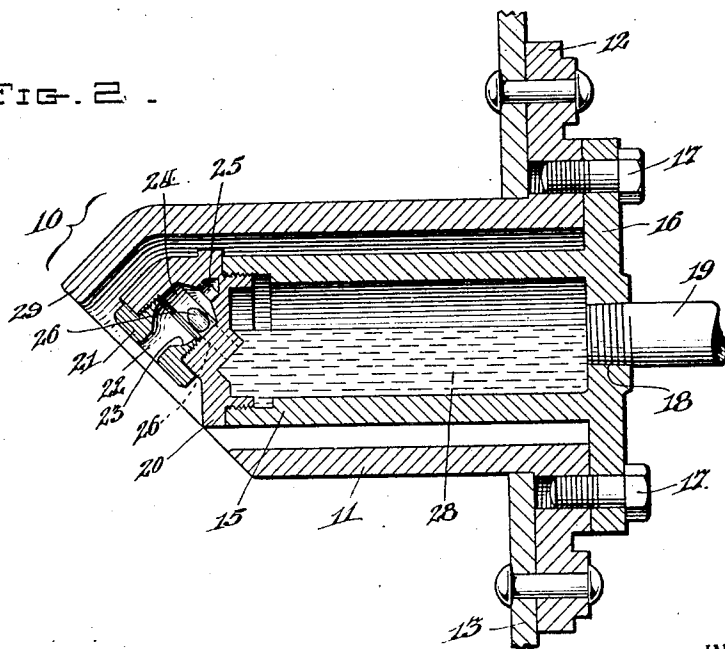


FIG. 2 .



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FIG. 3.

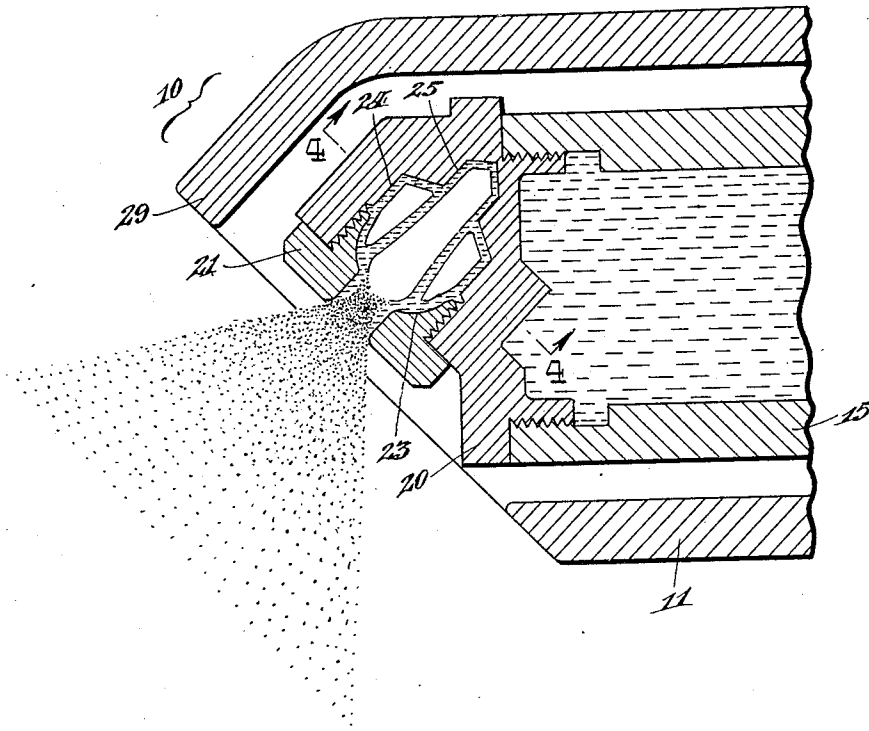
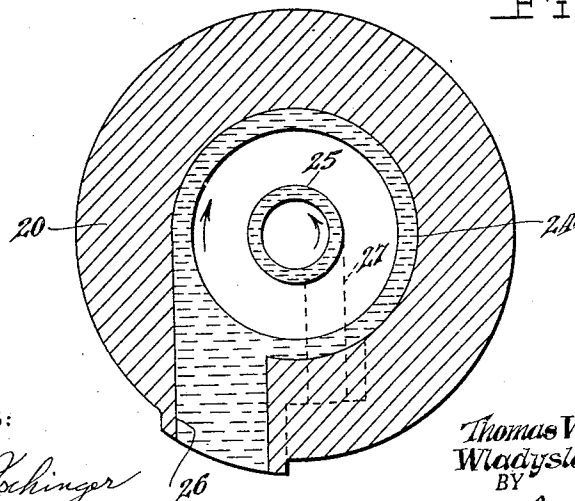


FIG. 4.



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QUENCHING SYSTEM

Application filed June 18, 1928. Serial No. 286,467.

Our invention relates to quenching systems such as are used for wetting down or quenching ashes under large boilers.

The quenching systems now in use are usually so constructed as to produce a hollow conical spray which leaves dry or comparatively dry areas in which the ashes are unquenched. While various attempts have been made to provide for replacement of parts which are subject to excessive heat and consequent erosion, such attempts, so far as we are aware, have not resulted in satisfying the long existent demand for simple and easily operated means for making such replacement, nor has provision been made for interchange of nozzle tips with different sized orifices for varying the capacity of the quenchers, or for protecting the nozzles and their tips from excessive radiant heat.

The objects of our invention are to provide a nozzle construction which will spray the liquid uniformly over the entire area of the ash hopper; to provide a nozzle construction which may be readily removed from the ash hopper from the outside regardless of the ash content of the hopper; to provide a nozzle construction which permits of quick interchange of nozzle tips; to provide means for protecting the nozzle from damage due to impact of heavy bodies, and to provide means for protecting the working parts of our mechanism from direct radiant heat.

Our invention consists in the hereinafter described mechanism and combination and arrangement of mechanism for attaining the above mentioned objects.

In the drawings:

Figure 1 shows, in cross-section, an ash hopper upon which our improved quencher has been installed.

Figure 2 is a central vertical longitudinal section through a quencher constructed according to our invention, showing the height of the liquid in the nozzle body when the quencher is not in operation.

Figure 3, an enlarged fragmentary section, taken in the same plane as Figure 2 but showing the quencher in operation, and

Figure 4, a cross-section taken in the plane of line 4-4 on Figure 3.

The quencher shown in Figures 1 to 4, and indicated generally by the reference numeral 10, has a sleeve 11 provided on its rear end with a flange 12 adapted to be secured to the outside of the wall 13 of an ash hopper 14. A nozzle body 15, enclosed in sleeve 11 and spaced from its interior wall, is provided on its rear end with a flange 16 adapted to be secured to the outside of flange 12, as by tap bolts 17, and is provided with a threaded aperture 18 for receiving the end of a conduit 19 connected to a source of supply of liquid under pressure.

A nozzle head 20 is removably secured to the delivery end of the nozzle body, preferably by being threaded therein, and a nozzle tip 21, having a discharge orifice 22, is secured in its outer end, preferably by being threaded therein. The body of the tip is of large diameter compared with the discharge orifice and its interior has a bell-shaped wall 23, the mouth of which registers with a shoulder in the wall of a concavity in the nozzle head. This concavity is of comparatively large diameter at its front end 24 and of comparatively small diameter at its rear end 25, both parts being circular in cross-section. The bell mouth wall of the tip and the wall of the concavity in the head form a chamber which is closed at the front, except for the discharge. Inlet passages 26 and 27 lead from the interior of the nozzle body and enter tangentially the large and small parts of the chamber, the inlets being disposed at opposite sides of the chamber and enter their respective parts of the chambers at tangencies of opposite clockwise directions to the peripheries of the chambers. As shown in the present embodiment, the passages are in parallelism and the flow of fluid of both passages is in the same direction (see Figure 4 of the drawings). However, when the fluid has entered the chambers the flow in one will be in a clockwise direction and that in the other in a counter-clockwise direction.

When a single jet of liquid under pressure enters a pipe tangentially, it forms a cylindrical stream of swirling liquid within the periphery of the pipe.

In this case, liquid under pressure enters the larger part of the chamber tangentially and forms a cylindrical stream within its periphery swirling in one direction and another jet of liquid enters the smaller part of the chamber and forms a cylindrical stream swirling in the opposite direction. The counter streams or currents meet at an angle, near the discharge orifice, and a part of both streams are broken into globules which separate from the centrifugally driven streams and are discharged from the nozzle into that part of the cone of spray which would usually be hollow, thereby producing a much more uniform distribution of spray than would otherwise be had.

In practice we find it advantageous to make part 24 of the concavity in the nozzle head of considerably larger diameter than part 25 so that the stream from part 25 meets that from part 24 upon the bell mouth of the tip and not far from the discharge orifice, as shown in Figure 3.

The body of the nozzle is preferably of larger diameter than the inlet pipe 19 and the nozzle tip so disposed that, when the flow of liquid through pipe 19 is shut off, a pool of liquid 28 is left in the lower part of the nozzle body, as shown in Figure 2. This is gradually evaporated by heat from the ashes and produces a vapor which passes through the outlet orifice and protects the nozzle tip from the full effect of the heat radiated by the ashes.

The upper front end of sleeve 11 extends beyond the nozzle tip to protect the operative parts of the nozzle from the injury from clinkers or other hard objects which may be dumped into the ash hopper, and the space between the sleeve and the nozzle body provides an air chamber which protects the nozzle parts against the full effect of the heat in the ash hopper. When the nozzle discharges at a downward angle, as shown in Figures 1 to 3, the upper front 29 of the sleeve is preferably inclined downwardly.

Conduit 19 is preferably provided with a union (not shown) adjacent the quencher so that the nozzle may be removed from the sleeve by simply disconnecting the union and removing bolts 17.

While we have shown and described our invention as applied to a particular use, it may be applied to other uses without departing from the spirit thereof, and we do not wish to limit ourselves to the precise construction set forth, but consider that we are at liberty to make such changes and alterations as fairly come within the scope of the appended claims.

We claim:—

1. In a quenching installation a nozzle comprising a cylindrical housing, means closing one end of the housing, said means having a chamber therein communicating with

the housing wholly above the axis of said housing and with an outlet orifice wholly below the said inlet, and means to admit fluid into the housing.

2. In a quenching installation a nozzle comprising a cylindrical housing, means to maintain the housing with the axis in a horizontal plane, means closing one end of the housing, said means having a chamber therein communicating with the housing wholly above the axis of said housing and with an outlet orifice wholly below the said inlet, and means to admit fluid into the housing.

3. In a quenching installation a nozzle comprising a cylindrical housing, means closing one end of the housing, said means having a chamber therein declined to the axis of the housing communicating with the housing wholly above the axis of said housing and with an outlet orifice wholly below the said inlet, and means to admit fluid into the housing.

4. In a quenching installation a nozzle comprising a cylindrical housing, means closing one end of the housing, said means having a chamber therein communicating with the housing wholly above the axis of said housing and with an outlet orifice wholly below the said inlet, a shield enclosing and spaced from said housing and closing means, and means to admit fluid into the housing.

5. In a quenching installation a nozzle comprising a cylindrical housing, means closing one end of the housing, said means having a chamber therein communicating with the housing wholly above the axis of said housing and with an outlet orifice wholly below the said inlet, and means opposite the closing means to admit fluid into the housing.

6. In a quenching installation a nozzle comprising a cylindrical housing, means to maintain the housing with the axis in a horizontal plane, means closing one end of the housing, said means having a chamber therein declined to the axis of the housing communicating with the housing wholly above the axis of said housing and with an outlet orifice wholly below the said inlet, and means to admit fluid into the housing.

7. In a quenching installation a nozzle comprising a cylindrical housing, means to maintain the housing with the axis in a horizontal plane, means closing one end of the housing, said means having a chamber therein communicating with the housing wholly above the axis of said housing and with an outlet orifice wholly below the said inlet, a shield enclosing and spaced from said housing and closing means and means opposite the closing means to admit fluid into the housing.

8. In a quenching installation a nozzle comprising a cylindrical housing, means closing one end of the housing, said means having a chamber therein declined to the axis

of the housing communicating with the housing wholly above the axis of said housing and with an outlet orifice wholly below the said inlet, a shield enclosing and spaced from said housing and closing means, and means opposite the closing means to admit fluid into the housing.

9. In a quenching installation a nozzle comprising a cylindrical housing, means to maintain the housing with the axis in a horizontal plane, means closing one end of the housing, said means having a chamber therein declined to the axis of the housing communicating with the housing wholly above the axis of said housing and with an outlet orifice wholly below the said inlet, a shield enclosing and spaced from said housing and closing means, and means opposite the closing means to admit fluid into the housing.

In testimony whereof we have signed our names to this specification.

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