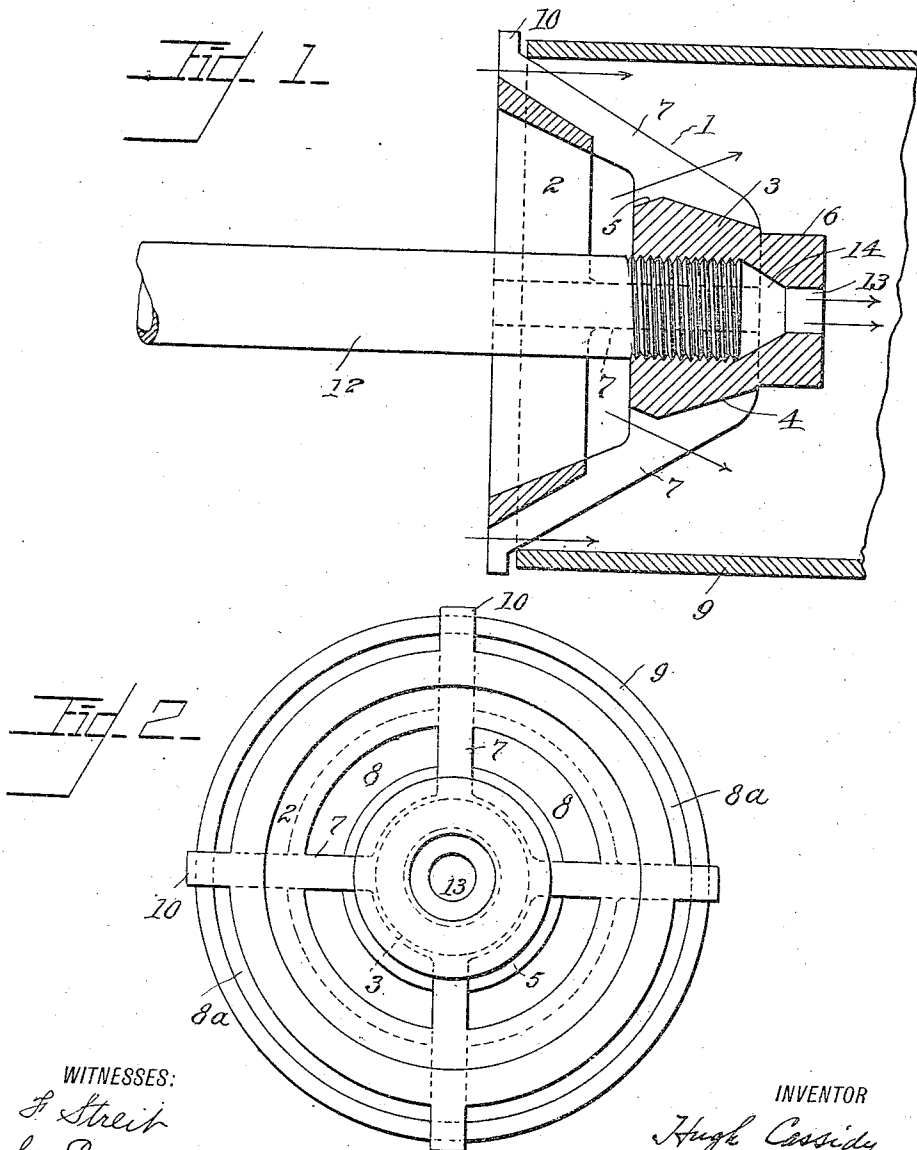


H. CASSIDY.
BOILER TUBE CLEANER NOZZLE.
APPLICATION FILED MAR. 27, 1912.

1,057,707.

Patented Apr. 1, 1913.



WITNESSES:
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UNITED STATES PATENT OFFICE

HUGH CASSIDY, OF BROOKLYN, NEW YORK.

BOILER-TUBE-CLEANER NOZZLE.

1,057,707.

Specification of Letters Patent.

Patented Apr. 1, 1913.

Application filed March 27, 1912. Serial No. 686,610.

To all whom it may concern:

Be it known that I, HUGH CASSIDY, a citizen of the United States, and resident of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Boiler-Tube-Cleaner Nozzles, of which the following is a specification.

This invention relates to a nozzle for blowing out boiler tubes with steam and air in the manner described in my Patent No. 1,020,635 issued to me March 19, 1912.

The object of the present invention is to provide a nozzle having a very simple construction enabling it to be readily manufactured, and having a special form facilitating the entraining of air into the tube to which the nozzle is applied by the force of a central jet of steam. The construction of the nozzle is such as to insure an adequate supply of air, and furthermore the air openings are arranged so that the incoming air is directed along the wall of the tube.

A further object of the invention is to construct the nozzle so as to insure a plentiful supply of air around the lip of the tube.

The invention consists in the construction and combination of parts to be more fully described hereinafter, and particularly set forth in the claims.

In the drawing which fully illustrates my invention, Figure 1 is a longitudinal central section through a nozzle constructed according to my invention and through the end of the tube to which the device is represented as being applied. Fig. 2 is an elevation looking into the nozzle from the rear with the steam supply tube removed.

Referring more particularly to the parts, 1 represents the nozzle which is of conical outline, presenting a conical base ring or open conical shell 2 and a central hub 3. This central hub 3 has a conical face 4 on its inner or forward side and its butt end is formed with a conical face 5 which tapers in a reverse direction, that is, the conical wall 5 diverges toward the small end of the nozzle. The inner end of the nozzle is formed into a tip or circular boss 6 which is of slightly smaller diameter than the forward end of the conical hub 3. The ring 2 is connected with the hub 3 by longitudinal ribs 7 which extend back from the sides of the hub 3 and unite integrally with the hub. These ribs also extend on the

outside of the ring 2 to which they unite integrally. The ring 2 is displaced considerably toward the rear of the nozzle with respect to the hub 3, so that a plurality of arc shaped openings 8 are formed between the ribs as indicated in Fig. 2. I have illustrated four of these ribs 7, but there may be three ribs or any other number desired. There should be, however, at least three ribs to insure a perfect centering of the nozzle when applied to the end of the tube. The extreme outside diameter of the ring 2 is preferably less than the diameter of the tube 9, so that the ends of the ribs 7 form the only obstruction in the annular passage which is formed into the tube around the edge of the nozzle. In order to prevent any possibility of the nozzle tipping in such a way that the butt edge thereof might pass into the interior of the tube, I provide the extremities of the ribs 7 with outwardly projecting toes or guards 10, which lie adjacent to the ends of the tube.

The hub 3 is internally threaded so as to receive a steam supply tube 12 and the tip 6 is formed with an orifice 13 communicating with a conical chamber 14 which directs the steam from the pipe 12 in an axial direction down the tube. When the nozzle is in use, the force of the incoming steam entrains air through the openings 8 and through the arc shaped openings 8^a, which are formed around the outer edge of the ring 2. This air tends to take the direction indicated by the arrows near the hub in Fig. 1, that is, the part of the air current which strikes the cone 5 is deflected outwardly as indicated by arrows. And an annular air current is developed through the openings 8^a passing parallel to and near the inner face of the tube as indicated by the arrows at this point. These air currents are very effective in scouring the sides of the tubes to which the nozzle is applied.

What I claim and desire to secure by Letters Patent is:—

1. A nozzle of the class described having a circumferentially continuous conical body, open at its large end, having outwardly disposed projections adjacent to the large end adapted to seat against the end of the tube, and a hub on the central axis of said nozzle at the forward end thereof for attaching the same to a supply pipe.

2. A nozzle of the class described, having a substantially conical base with projections

near the outer edge thereof adapted to seat against the mouth of the tube to which said nozzle is applied, a hub connected with said base at the inner end of said nozzle, and
 5 having a threaded connection for attaching said nozzle to a steam supply pipe, said nozzle having openings between said hub and said base, through which the entrained air may pass, said hub having an opening
 10 on the central axis thereof communicating with said threaded connection and forward of said openings.

3. A nozzle for cleaning boiler tubes, comprising a substantially conical base ring and
 15 a substantially conical hub, said hub having threads to receive a steam supply pipe and a plurality of longitudinally disposed ribs on the forward and outer faces of said hub and said base ring adapted to engage the lip of
 20 the tube to which the nozzle is applied, said hub being disposed forward of said ring whereby openings are formed between said ribs and between said ring and said hub to admit air.

25 4. A nozzle for cleaning out boiler tubes having a substantially conical base ring, the

outer diameter whereof is smaller than the diameter of the tube to which the nozzle is applied, said base ring having projections on the outer face thereof adapted to seat on
 30 the lip of the tube, and guards forming extensions of said projections adapted to prevent the edge of said base ring from passing into the interior of the tube.

5. A nozzle for cleaning out boiler tubes
 35 having a substantially conical body open at its large end and having a hub at its small end with an opening at the central axis thereof through which the steam may pass and adapted to be attached at said hub to a
 40 steam-supply tube, said body having a plurality of arch-shaped openings on the lateral surface thereof through which air may be entrained by the steam flowing through
 45 said central opening.

Signed at New York, in the county of New York and State of New York this 23rd day of March A. D. 1912.

HUGH CASSIDY.

Witnesses:

A. M. PALMER,
 MERLE I. ST. JOHN.