

UNITED STATES PATENT OFFICE

2,261,559

TUYÈRE

William H. Osborn, New York, N. Y., assignor to
Phelps Dodge Corporation, New York, N. Y., a
corporation of New York

Application August 2, 1940, Serial No. 349,467

8 Claims. (Cl. 266—41)

This invention relates to a improved nozzle or tuyère and particularly to a tuyère adapted for use in a tin converter.

In the separation of tin from other metals with which it is commonly associated, sulfur or preferably sulfur containing substances, such as pyrites, is blown, in finely divided condition through the molten mixture of metals or metal compounds, together with a reducing gas, which may be the combustion product of oil in air in such proportions as to give a reducing atmosphere. By this operation, the tin compounds are reduced and sulfidized and are blown off as stannous sulfide.

It is an object of the present invention to provide an improved nozzle or tuyère for the introduction of solids and gases. A further and more specific object is to provide an improved tuyère through which sulfur containing solids, oil and air may be introduced into a tin converter. Another object is to provide an improved means for cleaning the tuyère without stopping its operation. It is also an object to provide means for cooling and thus preventing burning of the tuyère. Other objects will become apparent.

In describing the invention, reference will be made to the drawings, in which Figure 1 is a side elevation of a tin converter including tuyères embodying the invention. Figure 2 is an end elevation of the converter shown in Figure 1 and Figure 3 is an enlarged fractional sectional view of a portion of the converter including one of the tuyères, taken on the line 3—3 of Figure 1, with certain portions shown in elevation.

The numeral 1 indicates the shell of the converter which may be of steel or other suitable material. The numeral 2 indicates the lining material for the converter, which may be made up of a layer or brickwork of dolomite or of other suitable refractory converter lining material.

The tuyère pipe 3 is a 1 inch extra heavy standard steel pipe extending through the brickwork 2 and the shell 1. The outer end of this pipe is screwed or otherwise attached to the block 4, which may be clamped to the plate 5 by means of cap screws or stud bolts 6. The plate 5 is welded or riveted or otherwise fastened to the shell 1.

The block 4 is provided with a cylindrical conduit 7 which is a continuation of the inside diameter of the pipe 3. Inside the pipe 3 and extending into the block 4 there is a 1/2-inch standard steel pipe 8 positioned to leave an

annular space between it and the pipe 3. This annular space communicates through an outlet 9 in the block 4 with a conduit 10, which may be a bent pipe, rubber hose or other rigid or flexible section, preferably with easily detachable fastenings, connected to a 1 inch standard pipe 11 for supplying air to the tuyère. A suitable valve for controlling the flow of air through the detachable conduit 10 may be provided, if desired.

The outer end of the block 4 is cut out to receive a block 12 which may be held in place by means of set screws 12a or by other suitable means. This block 12 is provided with a Y-shaped conduit communicating with the inside of the pipe 8. The Y-shaped conduit has one branch 13 that connects with a detachable conduit 14, which may be similar to the conduit 10, having a pet cock 14a and leading to a 1/2 inch pipe 15 through which powdered sulfur or pyrites may be supplied, for example, by blowing with air. The other branch 16 of the Y-shaped conduit communicates with a detachable conduit 17, which also may be similar to the conduit 10, having a needle valve 17a and connected to a 1/2 inch pipe 18 for supplying oil under pressure to the tuyère. A spray nozzle or atomizer 19 is positioned within the conduit 16 in order that the oil may be introduced into the stream of air and sulfur containing substance in a finely divided condition.

The conduits 13 and 16 are each positioned at an angle of about 30° from the center line of the tuyère and the block 12 is provided with a conduit 20 of the same size and serving as an extension of the stem of the Y-shaped conduit beyond the confluence of the conduit 13 and 16.

A cleaning rod 21 is provided, having a head 22 enlarged substantially to the size of the conduit 20 so as to provide a fit in that conduit and in the tuyère pipe 8 such as to permit it to be pushed through them easily (for example .01" to .015" clearance). The head 22 is normally positioned in the conduit 20 and the stem of the rod extends outwardly through a packing gland and has a handle 23 fixed to its outer end. The packing gland is made up of a member 24 and a member 25 between which there is positioned a suitable packing material 26 around the stem of the clean-out bar 21. This packing material 26 may be of asbestos (Garlite packing) or of other suitable packing material. It is compressed against the packing gland member 25 by the packing gland member 24, which latter may