TORCH FOR MELTING PRECIOUS METALS.

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Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

Fig. 7.

Fig. 8.

Inventor:

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By his Attorney,

C. W. Mack.
To all whom it may concern:

Be it known that I, SAM W. HOKE, a citizen of the United States, and a resident of Palisade, Bergen County, and State of New Jersey, have invented certain new and useful Improvements in Torches for Melting Precious Metals, of which the following is a specification.

My improvements relate to the torches, so called, used by jewelers and others for the reduction of gold, platinum, iridium, palladium, and other precious metals, and for fusing silica, and for other purposes where high temperatures and accurate and facile control are desirable.

The invention consists in the specific construction, arrangement and combination of parts and appurtenances herein described and claimed,—distinctive features being the dispensing with a mixing chamber by the formulating of the nozzle in such manner as to attain an opposed gyratory admixture of the oxygen or compressed air and the inflammable gas, to insure perfect combustion; the means provided for compensating for inequality of expansion of the tubing involved; the means for effecting and regulating the relative supplies of the gases used, etc., all as hereinafter fully set forth.

In the accompanying drawings,

Fig. 1, is a side elevation on a reduced scale, of my improved construction and arrangement of melting torch, broken away in part medially;

Fig. 2, is a central longitudinal sectional elevation of the parts shown in Fig. 1;

Fig. 3, is a front end view, full size, of my gyralf deflector or swirler, before insertion in the nozzle of the torch;

Fig. 4, is a section thereof taken upon plane of line 4—4, Fig. 3;

Fig. 5, is an elevation, full size, of the oxygen tube centralizing collar;

Fig. 6, is a side elevation of my gyralf deflector, or swirler;

Fig. 7, is an end view of the nozzle, full size;

Fig. 8, is a full size transverse section taken upon plane of line 9—9, Fig. 2.

What may be designated as the handle-section h, of the torch, considered as a unitary structure, consists of a cylindrical tube to the rear end of which is attached the elbow e, upon which are mounted the control valves, consisting of the oxygen needle-valve a, and the combustible-gas valve c. The latter is attached, by a screw coupling pipe e', to the protrubent portion e', of the said elbow e, and is provided with an externally corrugated nipple c', for engagement with rubber tubing by means of which connection is made with a source of supply of the combustible gas to be used. The oxygen needle valve a, is also connected (indirectly) by means of a screw coupling a', with the elbow e, the said screw coupling a', in this case engaging the threaded protrubent rear end o', of the oxygen tube a, as shown more particularly in Fig. 2, of the drawings,—the rear nipple n', of the needle valve a, being also threaded for engagement with a nozzle and hose pipe leading to the oxygen gas supply.

The forward extremity of the handle section h, is provided with a screw cap h', which forms the basic support for the extension tube a, upon the outer end of which is secured the nozzle-socket-elbow s, the forward portion s', of which is inclined laterally at a suitable angle as related to the extension tube a, to facilitate the direction of impingement of the flame in accordance with the requirements of the work to be accomplished.

The said inclined forward portion s', of the nozzle-socket elbow s, is screw-threaded internally (preferably) for the reception of the correspondingly threaded basic portion of the nozzle-shell z, which is formed externally with flat wrench-surfaces a', a'', by means of which said nozzle shell may be adjusted as related to the gyralf deflector or swirler d, as and for the purpose hereinafter set forth.

b, is a reticulated bearing disc positioned in the nozzle socket elbow s, for the purpose of centralizing and supporting the forward portion of the oxygen tube a, which latter extends through the elbow e, the handle section h, the extension tube a, and the nozzle socket elbow s, to and in part through the nozzle shell z, to approximately the outer end of the latter, as shown in Fig. 2. My gyralf deflector or swirler d, is mounted upon the forward extremity of said oxygen tube a, and the nozzle shell z, is made adjustable with relation thereto to vary, regulate, and
prescribe the mixing area m, (Fig. 2) between the outer edge 2*, of said nozzle shell 2, and the outer face of the swirler d.

The latter is cylindrical in general con-

figuration, and screw tapped at the rear for engagement with the correspondingly threaded end of the oxygen pipe 0; and is formed with a transverse chamber d', for the delivery of oxygen gas to and through the concentric series of jet orifices d, d', formed for the purpose in the outer or face end of the gyral swirler d. These oxygen jet orifices d, d', are each bored in the face of the swirler d, preferably (although not necessarily) at an obtuse angle as related to the longitudinal axis thereof, so as to eject the oxygen gas into the mixing area m, aforesaid, at a corresponding angle of inclination as related to the common central longitudinal axis of the torch shell s, and its swirler insert d',—it being understood of course that said concentric series of jet orifices d, d', are all inclined at the same angle progressively around the circle, so as to im-

part a gyrotary motion in the same direction to all the oxygen ejected, causing said gas to impinge more or less transversely against the concentric discharge of combustible gas effected peripherally around the oxygen-

spout d.

I do not wish however to confine myself strictly to this inclined arrangement of the oxygen jet apertures d, d', as the same may be formed to extend in parallelism with the central longitudinal axis of the nozzle without departing from the spirit and intent of my invention in this respect.

The cylindrical body of the oxygen spout d, is of less diameter than the internal di-

meter of the nozzle shell s, and is central-

ized therein by means of a plurality of three or more peripheral spacing ribs d, shown in the drawings as forming part of the spout insert d', although obviously the equivalent thereof might be formed on the inner sur-

face of the shell s, or consist of separate ribs positioned between the shell s, and spout d', with like result, the object being to cen-

tralize the spout d', within the shell s, while creating an annular combustible gas deliv-

ery area g, around said spout d'.

These spacing ribs d, d', are preferably (although not necessarily) inclined as re-

lated to the central longitudinal axis of the nozzle, so as to direct and deliver the com-

bustible gas into the mixing space m, at an angle sufficient to impart to said gas a gyra-

tory or swirling motion. When the oxygen jet orifices d, d', are likewise inclined with-

relation to the central longitudinal axis of the nozzle as hereinbefore stated, the angle of inclination of said oxygen gas jet orifices d, is opposite to that of the inclination of the spacing ribs d', so that the oxygen is in-

jected into the gyrotary ejection of com-

combustible gas as a cross swirl, thereby insur-

ing an intimate admixture of the gases, and the perfect combustion thereof.

My new and improved melting torch in operation is essentially a blow pipe adapted to the reduction of metals and other refrac-
tory substances. By constructing the nozzle in such manner that the gases impinge and mix at the outlet of the nozzle as herein set forth I not only attain perfect combustion but obviate the need of a mixing chamber, and at the same time prevent back fire and pressure. In this connection the inlet control valves c, and n, afford adequate means for regulating and adjusting the relative proportions of gases projected into and through the torch, considered as a unitary structure.

For the purpose of disposing of the torch when not in use the socket elbow s, is formed with a hook s1, by which it may be suspend-
ed. The heat attained in certain uses of the torch is so great as to render this necessary in order to promote cooling without danger to extraneous objects.

It is to be understood that by the term "spout" as used in the following claims I mean to designate the central swirler d, before described. Also, that I do not limit myself to the identical form of parts shown, minor details in the construction of which may be resorted to without deviating from the spirit and intent of my invention in this respect.

Owing to the intense heat generated in and by the torch under and incidental to certain conditions of use, the tubing enter-
ing into the construction of the torch is sub-

dject to extremes of expansion and contraction, and for this reason, and to compensate for inequality in this respect between the outer tubular casing and the inner parts thereof, I bend the portion of said oxygen tube a, within the holder tube h, laterally in the form of a sigmo'd as shown in Fig. 2, of the drawings, the curvature thereof compensating for variations in tension and obviating undue strain between the parts.

What I claim as my invention and de-

sire to secure by Letters Patent is,

1. A torch of the character designated, formed with a nozzle consisting of an outer shell communicating with the combustible gas supply and a spout positioned therein and connected with the oxygen supply, said spout being formed with a plurality of centralizing peripheral ribs fitting within the nozzle shell and with a plurality of oxygen jet orifices arranged in a concentric circle as related to the longitudinal axis of said nozzle, for the purpose described.

2. A torch of the character designated, formed with a nozzle consisting of an outer shell communicating with the combustible gas supply and a spout positioned therein
and connected with the oxygen supply, said spout being formed with a plurality of centralizing peripheral ribs fitting within the nozzle shell and with a plurality of oxygen jet orifices arranged in a concentric circle and angularly related to the central longitudinal axis of said nozzle, for the purpose described.

3. A torch of the character designated, formed with a nozzle consisting of an outer shell communicating with the combustible gas supply and a spout positioned therein and connected with the oxygen supply, said spout being formed with a plurality of centralizing peripheral ribs fitting within the nozzle shell and inclined with relation to the central longitudinal axis thereof, and also with a plurality of oxygen jet orifices arranged in a concentric circle as related to the longitudinal axis of said nozzle, for the purpose described.

4. A torch of the character designated, formed with a nozzle consisting of an outer shell communicating with the combustible gas supply and a spout positioned therein and connected with the oxygen supply, said spout being formed with a plurality of centralizing peripheral ribs fitting within the nozzle shell and inclined with relation to the central longitudinal axis thereof, and also forming with a plurality of oxygen jet orifices arranged in a concentric circle and angularly as related to the central longitudinal axis of said nozzle, for the purpose described.

5. A torch of the character designated, formed with a nozzle consisting of an outer shell communicating with the combustible gas supply and a spout positioned therein and connected with the oxygen supply, said spout being formed with a plurality of centralizing peripheral ribs fitting within the nozzle shell and inclined with relation to the central longitudinal axis thereof, and also forming with a plurality of oxygen jet orifices arranged in a concentric circle and angularly as related to the central longitudinal axis of said nozzle, for the purpose described.

6. A torch of the character designated, formed with a nozzle consisting of an outer shell communicating with the combustible gas supply, and with a spout connected with the oxygen supply and positioned in said shell by means which centralize said spout with relation thereto while admitting of the passage of combustible gas through said shell, a pipe connecting said spout with the oxygen supply and formed in part with a sigmoidal bend to compensate for expansion and contraction, and a tubular handle section surrounding said sigmoidal portion of the oxygen supply pipe, for the purpose, and substantially in the manner set forth.

7. A torch of the character designated, comprising a nozzle shell communicating with the combustion gas supply, a spout connected with the oxygen supply and positioned in said shell by means which centralize said spout with relation thereto while admitting of the passage of combustible gas through said shell, a pipe connecting said spout with the oxygen supply and formed in part with a sigmoidal bend to compensate for expansion and contraction, and a tubular handle section surrounding said sigmoidal portion of the oxygen supply pipe, for the purpose, and substantially in the manner set forth.

8. A torch of the character designated, formed with a nozzle consisting of an outer shell communicating with the combustible gas supply and a spout positioned therein and connected with the oxygen supply, said spout being formed with a plurality of centralizing peripheral ribs fitting within the nozzle shell and with a plurality of oxygen jet orifices arranged in a concentric circle and angularly as related to the central longitudinal axis of said nozzle, together with means for adjusting the relative positions of said shell and spout, substantially in the manner and for the purpose set forth.

9. A torch of the character designated, formed with a nozzle consisting of an outer shell communicating with the combustible gas supply and a spout positioned therein and connected with the oxygen supply, said spout being formed with a plurality of centralizing peripheral ribs fitting within the nozzle shell and with a plurality of oxygen jet orifices arranged in a concentric circle and angularly as related to the central longitudinal axis of said nozzle, said shell being adjustable with relation to said oxygen spout, substantially in the manner and for the purpose described.

10. In a torch of the character designated, the combination of a socket elbow communicating with the combustible gas supply, and screw threaded for engagement with a nozzle shell, said nozzle shell adjustably attached to said socket elbow by screw thread connection therewith, an oxygen pipe fixedly mounted in said socket elbow, and a spout mounted on the end of said oxygen pipe and positioned in said nozzle shell and formed with a plurality of centralizing peripheral ribs fitting within the said shell and with a plurality of oxygen jet orifices arranged in a concentric circle as related to the central longitudinal axis of the nozzle, substantially in the manner and for the purpose described.

11. In a torch of the character designated, the combination of a socket elbow communicating with the combustible gas supply and screw threaded for engagement with a nozzle shell, said nozzle shell adjustably at-
tached to said socket elbow by screw thread connection therewith, a reticulated bearing disc in said socket elbow, an oxygen pipe fixedly mounted in said reticulated bearing disc, and a spout mounted on the end of said oxygen pipe and positioned in said nozzle shell, said spout being formed with a plurality of centralizing peripheral ribs fitting within the nozzle shell and inclined with relation to the central longitudinal axis thereof, and also with a plurality of oxygen jet orifices arranged in a concentric circle as related to the longitudinal axis of said nozzle, substantially in the manner and for the purpose described.

SAM W. HOKE.

Witnesses:
DOROTHY MIATT,
Geo. WM. MIATT.