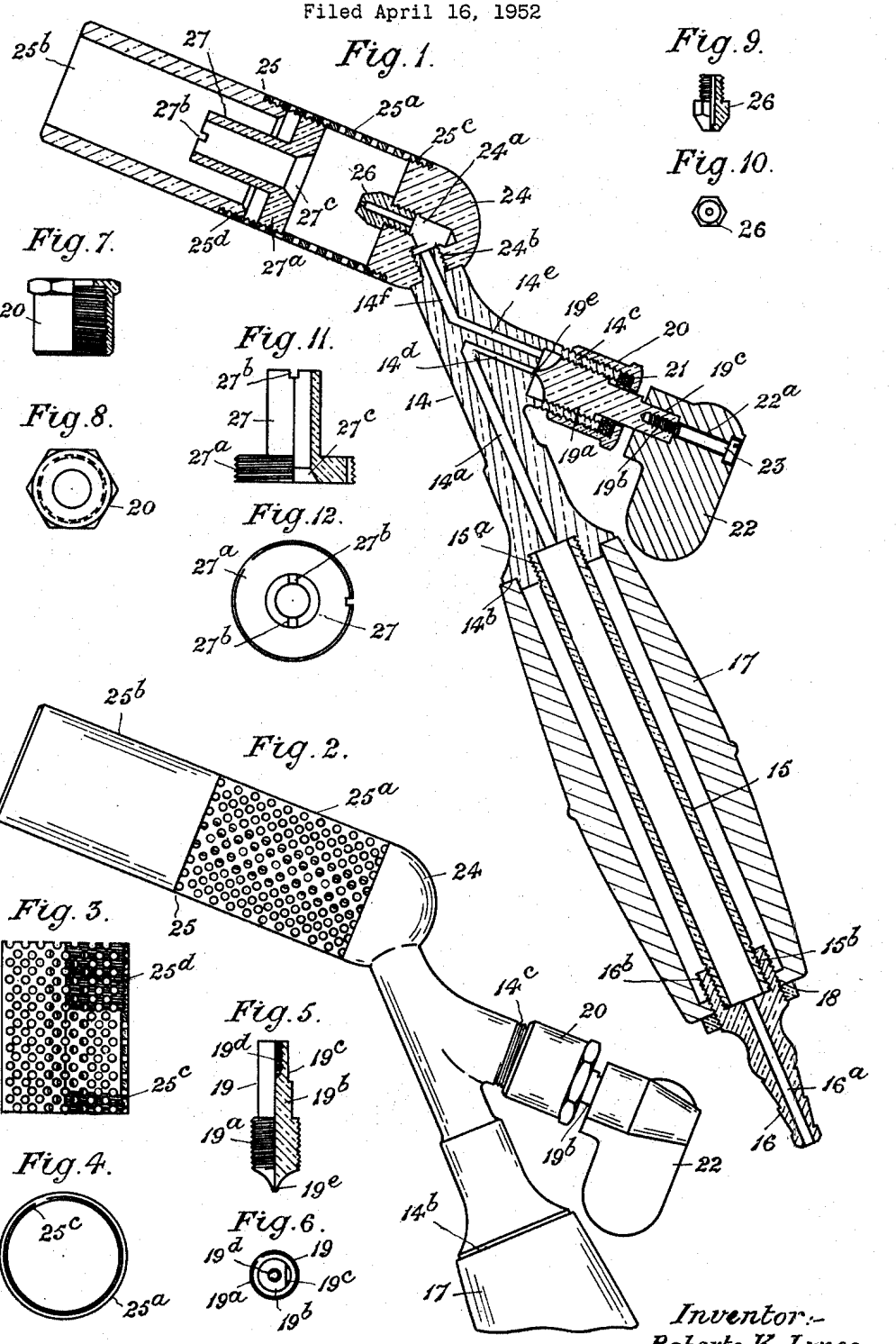
Oct. 11, 1955 R. K. LYNES 2,720,257

GAS BURNING TORCHES

Filed April 16, 1952



United States Patent Office 2,720,257 Patented Oct. 11, 1955

2,720,257

GAS BURNING TORCHES

Roberts Kitchener Lynes, Birmingham, England

Application April 16, 1952, Serial No. 282,524

1 Claim. (Cl. 158—99)

This invention relates to improvements in blow-pipes or torches designed for use, for example, in effecting gas flame soldering or brazing operations on metals and is applicable more particularly, but not exclusively, to torches for use where the gas supplied to the torch is a liquified gas such as butane, methane or like volatile hydrocarbon which is put up for convenience of transit, storage and use in cylinders or bottles with which the torch when in use is adapted for connection by a flexible hose or other suitable conduit, and also as supplied in mains both pure and mixed with manufactured gases.

Torches provided for such purposes as aforesaid are ordinarily designed to operate on the well known Bunsen burner principle by the provision at the head or fore end of the main body of the torch of a tubular member, hereinafter referred to as the ignition tube, into which the stream of gas is admitted through a jet arranged axially therein at the end adjoining the main body, the wall of the said ignition tube having in the part thereof adjoining the jet a plurality of holes through which, under the action of the stream of gas flowing into the ignition tube from the jet, air is induced into the tube wherein it mixes with the gas to provide a combustible mixture which can be ignited at the outflow end of the ignition tube in the manner well understood.

The bottled gases employed in such operations as aforesaid have a relative high calorific value and a very vigorous and turbulent injection of air into the ignition tube is necessary to produce efficient combustion of the mixture of gas and air and furthermore the mixture and the turbulence requisite for obtaining optimum efficiency varies somewhat with the different compositions of the bottled gases which may be available for use in conjunction with the torch, or which may be selected according to the operation to be performed.

The present invention has for its object to provide a blow-pipe or torch of the kind or type and for the purposes aforesaid, incorporating means whereby the air admission into the ignition tube and turbulence in the mixture of gas and air therein may be regulated with great nicety and according to requirements.

A torch in accordance with the present invention is characterised primarily in that the wall of the ignition tube is formed or provided in the portion thereof which adjoins the main body and into which the jet opens, with a series of circumferentially disposed rows of comparatively fine holes or perforations for the admission of air into the said tube, this perforated portion of the tube being of sufficient length to permit an adjustable mounting therein of a Venturi tube the bore of which is in axial alignment with the ignition tube and with the bore in the jet through which the gas enters the said tube, and by the setting of which Venturi tube relative to the gas inlet jet and the perforations in the ignition tube, both the air admission and turbulence can be adjusted to meet requirements.

A convenient embodiment of my invention will be

further and more particularly described with reference to the accompanying drawing, wherein:

Figure 1 represents in sectional side elevation a blow-pipe or torch incorporating improvements in accordance with my invention.

Figure 2 shows a fragmentary portion of the same in side elevation.

Figure 3 represents, half in elevation and half in longitudinal section, the perforated portion of the ignition tube detached.

Figure 4 is an end view of the said perforated portion of the ignition tube; and

Figures 5 and 6, Figures 7 and 8, Figures 9 and 10, and Figures 11 and 12 are respectively similar views to Figures 3 and 4, of other parts detached and hereinafter more particularly referred to.

The same numerals of reference indicate the same parts in the several figures of the drawing.

In the convenient embodiment of the invention illustrated the torch incorporates a main body, denoted generally by the reference **14**, into the bore **14a** of which the gas is introduced through a tubular member **15** one end of which is attached as, for example, by a screw thread connection as shown at **15a** to the main body **14**, the other end of the said tubular member being adapted for a screw connection therewith, as shown at **15b**, of a nozzle **16** which has a comparatively fine bore **16a**, the said nozzle being designed for the connection therewith of a flexible hose or conduit through which gas is passed from the gas containing bottle or cylinder as is well understood.

The screw connections at **15a** and **15b** are preferably welded after assembly of the parts to effect their permanent connection.

The tube **15** is surrounded by a tubular member or sleeve **17**, preferably made from an insulating material such as a suitable thermo-setting plastic, and designed as usual to afford a handle for the manipulation of the torch when in use, one end of the said sleeve **17** being located on the adjoining end of the main body **14** of the torch and taking an abutment against a shoulder **14b** thereon, its other end having a sliding fit on an externally screw threaded part **16b** provided on the nozzle **16**, the said end having a bearing on an adjustable screw collar **18** furnished on the threaded part **16b** of the nozzle and by the tightening up of which the sleeve is firmly pressed to its abutment with the shoulder **14b** on the body of the torch.

The main body **14** of the torch is formed on one side thereof with a tubular lug **14c** which provides a housing for a regulating valve of the needle type, denoted generally by the reference **19**, and shown detached half in elevation and half in section in Figure 5 and in end view in Figure 6.

The lug **14c** is furnished with an internal screw thread to receive and permit the axial adjustment therein of the screw threaded portion, marked **19a**, of the said valve, and its external periphery is screw threaded for the screwing thereon of a gland nut **20** through which the stem **19b** of the valve passes from the housing, the said gland nut which is shown detached, half in elevation and half in section in Figure 7 and in end view in Figure 8, being provided, as is customary, with a suitable packing, marked **21**, disposed in the inner end thereof.

The end of the stem **19b** of the valve which projects from the housing is formed with a flat **19c** thereon to provide for a non-rotatable mounting on the said end of a valve operating handle **22**, preferably moulded from a suitable thermo-setting plastic, and which is secured on the stem by a headed screw pin **23** which passes through a bore **22a** in the handle, its screwed end engaging in

a screw threaded bore **19d** provided for its reception in the stem of the valve.

The inner end of the regulating valve **19** has a conical pin or projection **19e** thereon adapted, when the valve is screwed down, to close a fine bore **14d** through which, when the torch is in use, the gas admitted to the axial bore **14a** in the main body **14** flows into the inner end of the housing **14c** from which it passes, through a second fine bore, marked **14e**, into a bore **14f** which is a virtual continuation of the axial bore **14a** in the main body **14** and extends to the fore end of the said body at which it opens into a cavity or bore **24a** provided in a block **24** which is formed separately from the main body and may as shown at **24b** be adapted for a screw threaded attachment to the said main body; or it may be otherwise secured thereon as for example by brazing.

The said block **24** constitutes the upper or closed end of the ignition tube, denoted generally by the reference **25**, which is provided as usual at the fore end of the blow-pipe body **14**, the block serving for the mounting of the tube on the body and also for the mounting in the inner end of the said tube of the jet **26**, shown detached half in elevation and half in section in Figure 9 and in front end view in Figure 10, and through which jet the gas introduced under pressure as usual into the body of the torch, is admitted into the perforated portion **25a** of the tube **25**, in a stream having sufficient force to induce a flow of air into the interior of this part, technically known as the mixing chamber, and to carry the resultant mixture of gas and air into the front or imperforated part, marked **25b**, of the tube at the open mouth of which the mixture is ignited as is well understood.

In accordance with the present invention the two parts or sections **25a** and **25b** comprising the wall of the ignition tube **25** are preferably made separate from each other and the part **25a** thereof, which part is shown detached, half in elevation and half in longitudinal section in Figure 3, and in end view in Figure 4, is made of a somewhat less gauge than the imperforated front portion of the tube and the perforations provided on the said part **25a**, which as aforesaid constitutes the mixing chamber, are of small diameter and arranged in a series of rows preferably equidistantly spaced apart and extending circumferentially around the tube.

The perforated section **25a** of the ignition tube is provided with an internal screw threaded portion at each end thereof the threaded portion, marked **25c**, at one end serving for the attachment of the said section to an externally screw threaded part provided to receive it on the block **24** which closes this end of the tube and from the face of which block the jet **26** projects into the tube with its orifice disposed in the axis thereof.

The internal screw thread provided at the other end of the perforated section **25a** and denoted by the reference **25d**, extends a sufficient length along the said section as not only to permit the engagement thereon of an externally screwed part on the inner end of the imperforated section **25b** for effecting its conection with the said perforated section but also to permit an adjustable mounting in the tube of a Venturi tube, denoted generally by the reference **27**, and shown detached half in elevation and half in longitudinal section in Figure 11 and in front end view in Figure 12, the said Venturi tube being formed at its inner or rear end with a flange **27a** of appropriate diameter and having an external screw thread thereon to adapt it for a screw engagement with and adjustment in the said screw threaded portion **25d** of the perforated section.

The front end of the Venturi tube **27** extends axially into the imperforated section of the ignition tube and the said end is preferably notched at diametrically opposite parts therein as shown at **27b**, **27b** to receive a screw driver or like tool for facilitating the desired setting of the Venturi in the injection tube when the parts are assembled.

It will be appreciated that by the axial adjustment of the Venturi tube thus provided for the ratio between the number of perforations through which air is induced into the portion of the mixing chamber **25a** behind the rear face of the flange **27a** on the Venturi tube and the number of perforations through which air is induced through the perforations in the part of the mixing tube at the front face of the said flange can be varied with great nicety to ensure a correct mixture and turbulence of the gases in the imperforated part of the ignition tube for permitting the use of the torch with maximum efficiency with gases which may vary even but slightly in their calorific value.

Although the preferred embodiment only of the invention has been described and illustrated in the drawing it will be appreciated that variations in the construction or shape of certain of the parts may be made without departing from the invention, for example, the Venturi tube **27** may, instead of being mainly of cylindrical formation with a trumpet mouth **27c** at its inner or upper end as shown, be given a slightly tapering formation throughout its whole length.

The perforations which would be seen in Figure 1 extending over the wall of the mixing chamber **25a** have been omitted for the sake of clarity.

I claim:

A blow-pipe or torch comprising an ignition tube having a fuel mixing chamber in its rear portion and a combustion chamber in its forward portion, the peripheral wall of the mixing chamber being provided with axially spaced perforations which communicate with the mixing chamber and the wall of the mixing chamber having screw-threads which extend around the interior surface thereof and intersect perforations in said wall, a jet alined axially with the ignition tube for injecting fuel into the mixing chamber to induce flow of air through said perforations into the mixing chamber to mix with fuel therein, and a venturi tube mounted in the ignition tube between the mixing chamber and combustion chamber and rotatable about the axis of the ignition tube, and having a bore therein alined axially with the jet and with the axis of the ignition tube for conducting fuel mixture from the mixing chamber to the combustion chamber, the venturi tube having a flange thereon provided with peripheral screw-threads which cooperate with the interior screw-threads in the perforated wall of the mixing chamber and communicating at its opposite sides with the mixing chamber and combustion chamber respectively, the venturi tube being adjustable, by rotation thereof, axially of the ignition tube to vary the ratio of the number of perforations uncovered at opposite sides of said flange and thereby vary the ratio of air admitted to the mixing chamber and combustion chamber respectively.

References Cited in the file of this patent

UNITED STATES PATENTS

1,411,063	Needham	Mar. 28, 1922
1,546,286	Koch	July 14, 1925

FOREIGN PATENTS

26,834	Great Britain	of 1897
179,637	Germany	Dec. 18, 1906
494,360	France	May 28, 1919
274,033	Italy	May 9, 1930
770,478	France	July 2, 1934
883,702	France	Mar. 29, 1943
122,708	Australia	Nov. 5, 1946