April 5, 1932. H. TÖPPER 1,852,946

BURNER FOR AUTOGENOUS FUSING AND WELDING UNDER WATER

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Fig. 1

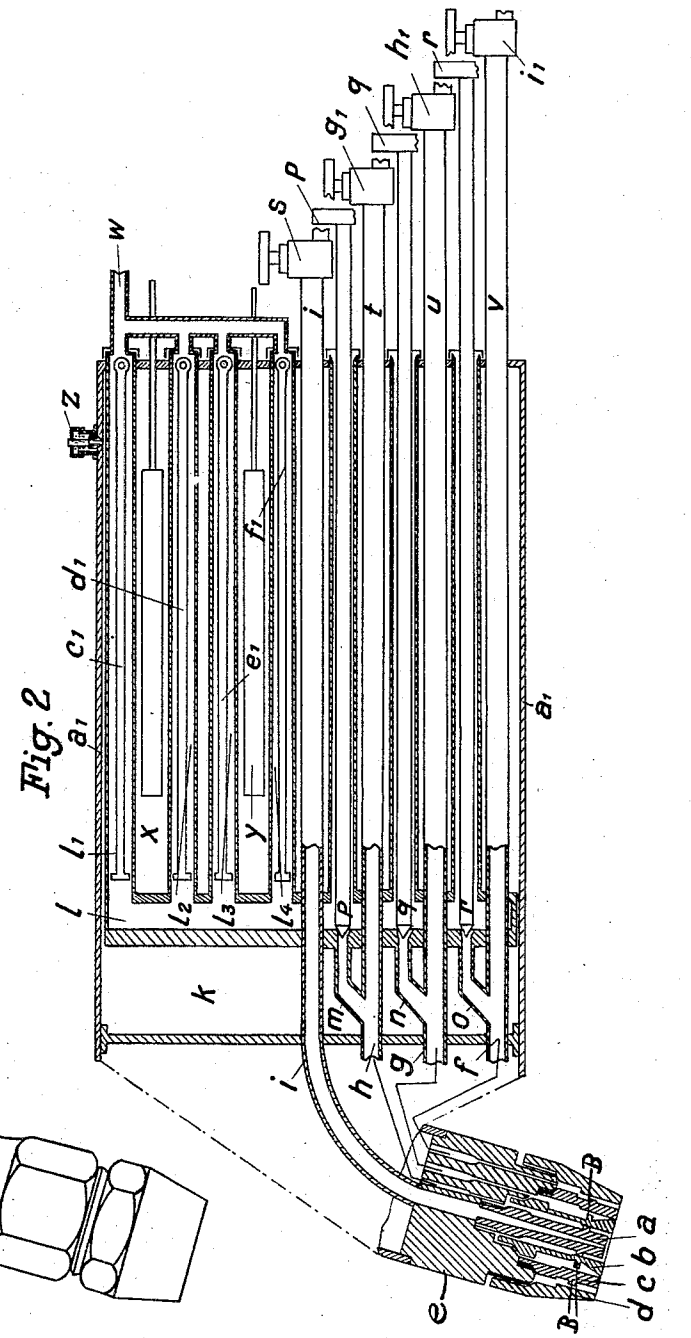

Fig. 2

Inventor:
H. Töpper

By: Marks & Clerk
Attys.

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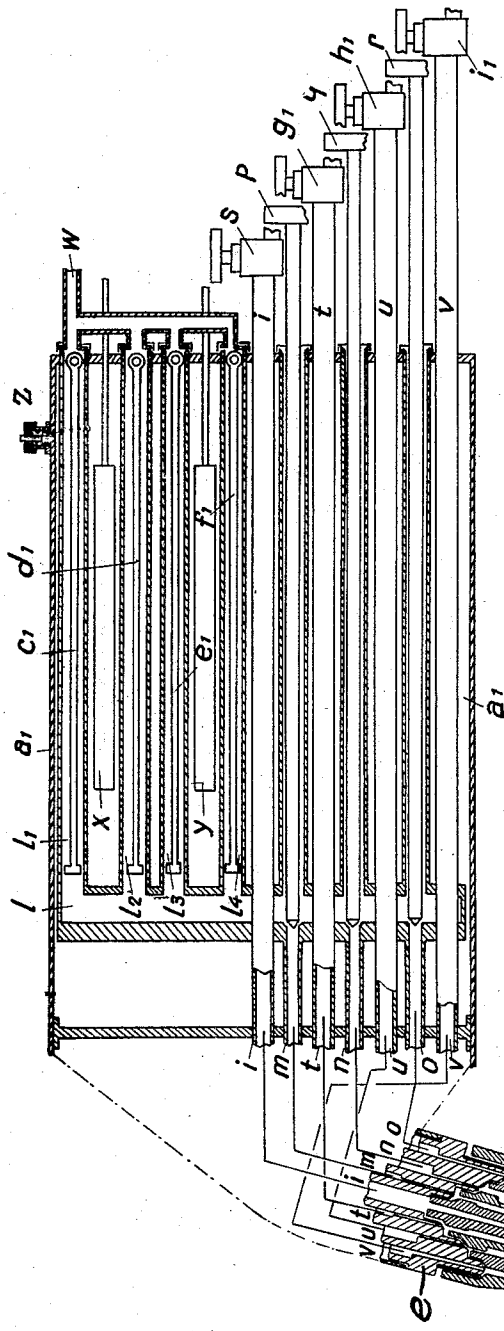
Fig. 3



Inventor:
H. Töpper
By: Marks & Clerk
Attys.

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UNITED STATES PATENT OFFICE

HARRY TÖPPER, OF BERLIN, GERMANY

BURNER FOR AUTOGENOUS FUSING AND WELDING UNDER WATER

Application filed July 21, 1930, Serial No. 469,594, and in Germany July 30, 1929.

In fusing autogenously under water by means of the known subaqueous fusing-burners, hydrogen or acetylene and oxygen are combined in a mixing-chamber of the burner into a mixture which develops a certain heat (about 2500° C. measured with hydrogen in the air) at the nozzle-end of the burner-head.

This heat is very considerably reduced through using cold fusing-oxygen and unrigid protectives of cold oxygen or compressed air and through the water which cools the free supply-pipes, so that, in consequence of the small amount of heat then still remaining, strong material, or material riveted together cannot be warmed through sufficiently.

Besides, in the known subaqueous fusing-burners with only one heating-nozzle, the warming surface at the fusing-place is limited by the protectives around the heating-flame, thereby causing the material which is to be fused, to be warmed through only according to the size of the warming-surface at the fusing-place.

When increasing the pressure of the heating-gases, there is no greater heating-surface produced, as the gases mixed in the mixing-chamber ready for burning have got to be consumed as such.

In using acetylene instead of hydrogen, an increase of pressure of the mixture is not possible at all as this becomes very easily explosive.

Because of the danger of heating hydrogen or acetylene, burning-gases have been cooled till now through conduits lying possibly free and cooled with water or by envelopment with cold oxygen or compressed air, whereby the efficiency of the subaqueous fusing-burners is considerably reduced.

The object of the present invention is to avoid all these drawbacks, by gasification of liquid fuel within a plurality of gasifying-chambers by means of electric heating appliances and by conducting these gases out of the gasifying chambers into an accumulating chamber which is connected with a number of new oxygen supply-pipes corresponding with the number of heating-nozzles. The fusing-oxygen is conducted, as usual, to a central nozzle.

In consequence of the arrangement of three heating nozzles, the diver can, in cases of ordinary work at weak materials, arrange a heating-nozzle for heating the fusing-place and a second heating-nozzle for evaporation of the water.

In cases of stronger materials, the diver, while fusing, can also put on the third heating-nozzle, which then acts to evaporate the water. Through the other two heating-nozzles he can then put on a greater heating-flame according to the material to be fused.

In the known subaqueous burners of the present kind, a ready gas-mixture, composed of the gasified fuel and oxygen, enters the burner mouth-piece. In this the flame is often interrupted. In order to prevent this, oxygen out of a special conduit is added in the known arrangement closely behind the burner-mouth.

According to the present invention the addition of oxygen to the ready gas-mixture is to be rendered unnecessary by arranging the single parts of the burner mouth-piece in such a way as to form ring-channels amongst each other in which a heatable and ignitible gas-mixture is produced which, without fear of interrupting the flame of the burner mouth-piece, can emanate from the latter with any increase of pressure.

The accompanying drawings represent two forms of carrying out the object of the present invention, viz:

Fig. 1 is a side-view of the first form of constructing the burner.

Fig. 2 is a longitudinal section of a development of the burner.

Fig. 3 shows the second form in which the burner-handle is represented in development, while the burner mouth-piece consisting of several parts is shown in section.

According to the form of Figs. 1 and 2 the liquid fuel is led into a pipe where it distributes itself on four gas-developers 1^1, 1^2, 1^3, 1^4 in which it is gasified, the gas streaming into the gas accumulator 1.

In the gas-developers 1^1, 1^2, 1^3, 1^4 exchangeable cores c^1, d^1, e^1, f^1 are inserted provided

with a cover of asbestos for the reception of residues resulting from the development of gas.

By the opening of valves r, q, p, burning-gas streams from the gas-accumulator 1 through pipes m, n, o and further through pipes f, g, h into the heating-nozzles b, c, d.

By the opening of valves g^1, h^1, i^1 the oxygen streams through pipes t, u, v and further through pipes f, g, h into the heating-nozzles b, c, d.

The fusing-oxygen, after opening valve s, streams through a pipe i into the fusing-nozzle a.

Through electric radiators x, y the heat in the heating-chamber k which is enveloped by a mantle a^1, is developed for gasifying the liquid fuel. The heating can be regulated.

A safety-valve z opens and closes automatically when overpressure is caused through evaporization in the heating-chamber k.

The oxygen-pipes s, g^1, h^1, i^1 are supplied out of branch-pipes from an oxygen supply-conduit not shown in drawings, in which a relief-valve is arranged. Into the conduit for supplying liquid fuel to pipe w a relief-valve is also provided.

In the form carried out as per Fig. 3 the burner-head is provided with bores separate from each other and widened at their upper end for reception of the oxygen-supply pipes i, t, u, v and the fuel supply pipes m, n, o.

The single parts a, b, c, d of the complex burner mouth-piece are screwed on to the actual burner-head e, so as to form ring-channels in which the oxygen and the gases, so far conducted entirely separate from each other, can mix. On the inside, the single parts of the burner mouth-piece are provided with trusses B against which the gases and the oxygen beat, thereby causing a whirl and a good mixture. For controlling the heating-value of the gas-mixture, the supply currents can be regulated.

1^1, 1^2, 1^3, 1^4 are the gas-developers from which the gases stream into the accumulator 1. c^1, d^1, e^1, f^1 are exchangeable insertion-cores provided with asbestos insulation for reception of residues from the development of gas. x, y are electric heat-radiators.

Through opening valves r, q, p the burning-gas streams out of the accumulator 1 through pipes m, n, o, immediately into the burner-head. Through opening valves g^1, h^1, i^1 the welding-oxygen streams through pipes t, u, v separate from pipes m, n, o into the burner-head.

Through opening valve s, the fusing-oxygen streams through a pipe i into the fusing-nozzle a.

For clearness sake, all pipes m, n, o, t, u, v and i are shown broken off when leaving the burner-handle a^1. Their connection with the burner-head is indicated by strokes.

A safety-valve z opens and closes automatically when overpressure occurs through evaporization in the heating-chamber k.

What I claim as my invention, and desire to secure by Letters Patent, is:

1. A burner for the autogenous cutting and welding under water, comprising a plurality of gasifying chambers, electrical heating devices mounted in said chambers, an accumulating chamber into which the gasifying chambers empty, pipes connecting the accumulating chamber with the burner, and oxygen supplying pipes passing through the accumulating chamber and connected with the burner.

2. A burner for the autogenous cutting and welding under water comprising a plurality of electrically heated gasifying chambers, an accumulating chamber into which the gasifying chambers discharge, a heating nozzle formed with a plurality of annular channels, pipes connecting the accumulating chamber and channels, and oxygen supplying pipes passing through the accumulating chamber and communicating with the channels of the nozzle.

3. A device as claimed in claim 2, wherein trusses are mounted in the annular channels of the heating nozzle near their outlets to limit the flareback of flame.

4. A burner for the autogenous fusing and welding under water, a plurality of gasifying chambers, electrical heating means in the chambers for gasifying liquid fuel therein, an accumulating chamber, a plurality of heating nozzles, pipes connecting said chamber and heating nozzles, and oxygen conducting pipes connected with said pipes for supplying oxygen thereto.

In testimony whereof I have signed my name to this specification.

HARRY TÖPPER.