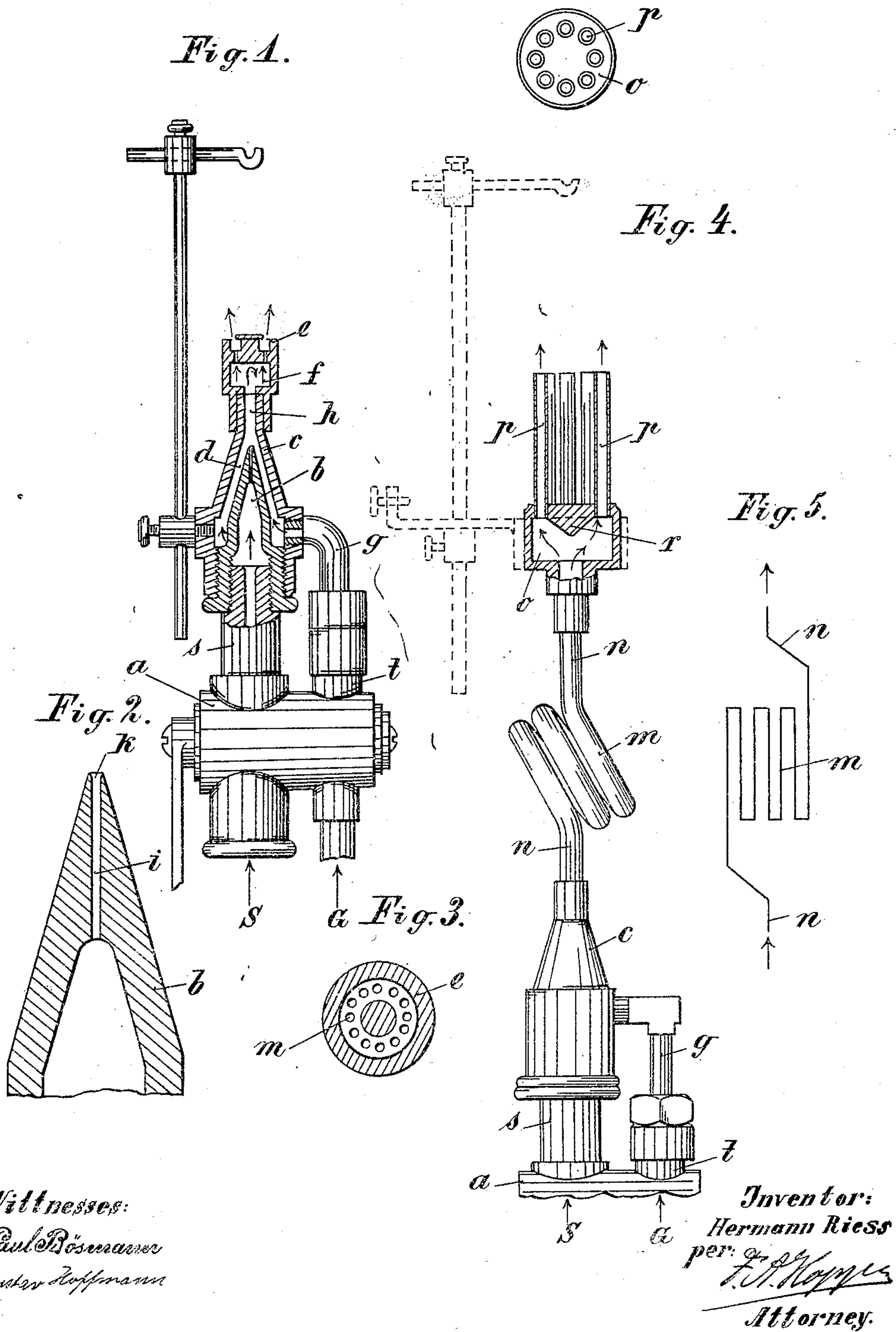


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GAS AND OXYGEN BURNER.
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918,089.

Patented Apr. 13, 1909.



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UNITED STATES PATENT OFFICE.

HERMANN RIESS, OF REINICKENDORF-WEST, NEAR BERLIN, GERMANY.

GAS AND OXYGEN BURNER.

No. 918,089.

Specification of Letters Patent.

Patented April 13, 1909.

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To all whom it may concern:

Be it known that I, HERMANN RIESS, engineer, a subject of the King of Prussia and German Emperor, and residing at No. 45 Schillingstrasse, Reinickendorf - West, near Berlin, Germany, have invented new and useful Improvements in Gas and Oxygen Burners, of which the following is a specification.

10 The present invention relates to gas and oxygen burners in which the oxygen supplied at high pressure sucks the gas from an upwardly tapering annular chamber adapted to the shape of the oxygen nozzle and conveys it into the mixing channel.

15 In accordance with the invention on the one hand the outlet channel of the oxygen nozzle is enlarged at its mouth, so that the stream of oxygen is spread out and mixes intimately within the mixing channel with the gas which has been sucked in; on the other hand the two gases are intimately mixed in addition by their either hitting against the cover of an enlarged burner-head, the orifices for the mixture being arranged
25 near the outside edge of the burner-head, or a suitable number of coils are arranged in the mixing channel, which may also form turns or the like running in an opposite direction, and a known conical face is arranged at the cover of the head of the burner; this face conducts the gases to the openings of the burner-head, in which openings tubes of a material which conducts heat as badly as possible, or which is insulating and fire-proof, may be preferably attached, in order to produce an insulating layer of air between the upper mouth of the tubes, which now forms the burning surface, and the lower parts of the burner or burner-head and mixing channel. This layer of air is continuously renewed, flows round the tubes and thereby cools them, and tends upward to the flame with considerable energy.

45 In order that the invention may be clearly understood reference is made to the accompanying drawing in which embodiments are represented by way of example, and in which:—

50 Figure 1 is a vertical longitudinal section through one form of burner, and Figs. 2 and 3 show details of the same, Fig. 3 being a vertical section through the upper part of the burner-head, Fig. 4 is an elevation partly in section of a modified form of burner, whereas
55 Fig. 5 is a diagram showing that the windings

of the mixing channel can also be replaced by another form, for example by a plurality of turns or the like running in opposite directions.

60 Referring to the drawing, the burner carried by the sockets *s, t* of a double stop-cock or the like consists of a case *c* (Fig. 1), the inner wall of which corresponds in the usual manner with the oxygen nozzle *b* running to a point, so that an annular chamber *d* (Fig. 1) is formed tapering upward and inclosing the nozzle, which chamber opens into a narrow mixing channel *h* of suitable length. The mixing channel *h* opens into a burner-head *e* having an enlarged mixing chamber *f* (Fig. 1), from which the mixture of gases flows through orifices *m* in the cover of the burner-head *e* (Fig. 3). Gas is conducted into the chamber *d* surrounding the nozzle by means of a pipe *g* (Fig. 1). The pointed oxygen nozzle *b* in the case *c* has been provided with a long and narrow outlet channel *i* (Fig. 2) which is enlarged at *k* at its end.

Oxygen flows through the opening *i* of nozzle *b* into the tapering chamber *d*, and sucks gas from this chamber into the mixing channel *h*, and since the nozzle-channel *i* is enlarged at *k* at its upper end, the stream of oxygen can spread out immediately at the outside edge of its orifice and penetrate into the other stream of gas surrounding it, on which it exercises a suction effect in the manner of a jet-blast. Both gases which mix to some extent in the channel *h* enter into the enlarged chamber *f*, (Fig. 1) rebound on the roof or cover of the head *e*, and whirl around, whereby the mixing of the same is perfected. The gases then pass out through many orifices at the outside edge of the top or cover of the burner-head. By this arrangement it is possible to intimately mix the two gases within the burner without having to fear an explosion, and, with regard to the shape of flame and its heating power, a favorable result is obtained with a small consumption of oxygen.

The other form of burner represented by way of example in Fig. 4 is the same, as regards its arrangement, up to the mixing channel *h* (Fig. 1) of the casing *c* which is not represented. The head of the burner, here denominated *o*, has been constructed in another manner however, and between it and the previously mentioned mixing channel *h* of the casing *c* which is not shown there is inserted or arranged a fairly long extension

n, m, n of the mixing channel which has at m a plurality of coils, or instead of the same a number of turns or the like running in contrary directions (Fig. 5). The cover of the burner-head o is conical in the center of the orifices at its edges, whereby the gases are conducted to the orifices as indicated by the arrows. In these orifices there are attached tubes p of suitable length which preferably consist of an insulating fireproof material or one which conducts heat badly. In this form of construction (Fig. 4) the gases are mixed still more intimately in the long extension n, m, n of the mixing channel, and the burning surface or the place where the very hot flame is formed has been removed by means of the tubes p as far as possible away from the roof or cover of the burner-head, whereby not only is less heat conducted backward, but also, on account of the air which is carried along by the flames and which enters between the tubes, flows round the latter and cools them, a new insulating layer of air is produced which is uninterruptedly renewed and which energetically ascends toward the flame, and this layer of air keeps off the heat of the flames radiated from the burner. But also a considerable quantity of fresh air is supplied in addition to the flames themselves which not only flows around the tubes p , but also the individual flames flowing around the lower portion of the latter until they unite into one single flame. Lastly however, the case c is kept almost perfectly cool on account of a fairly long extension n, m, n of the mixing channel being inserted, because the heat conducted backward has traversed up to that point a fairly long path cooled by air, whereby the otherwise injurious effects are prevented.

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

1. In a burner of the type described, the combination, with a stop-cock having two sockets, of a conical nozzle having an orifice enlarged at its point connected with one socket, a case on said nozzle connected with the other socket inclosing an annular conical chamber around said nozzle and providing a mixing channel connected with said chamber, and a hollow enlarged burner-head hav-

ing orifices arranged near its periphery on said case, as set forth.

2. In a burner of the type described, the combination, with a stop-cock having two sockets, of a conical nozzle having an orifice enlarged at its point connected with one socket, a case on said nozzle connected with the other socket inclosing an annular conical chamber around said nozzle and providing a mixing channel connected with said chamber, a hollow enlarged burner-head having orifices arranged near its periphery, and a pipe bent in part so as to form coils or turns connecting said burner-head with said case, as set forth.

3. In a burner of the type described, the combination with a stop-cock having two sockets, of a conical nozzle having an orifice enlarged at its point connected with one socket, a case on said nozzle connected with the other socket inclosing an annular conical chamber around said nozzle and providing a mixing channel connected with said chamber, a hollow enlarged burner-head having orifices arranged near its periphery on said case, and a plurality of tubes forming the mouth of the burner in said orifices in said burner-head, the latter orifices being arranged at such a distance from one another that an insulating layer of air can cool the tubes, as set forth.

4. In a burner of the type described, the combination, with a stop-cock having two sockets, of a conical nozzle having an orifice enlarged at its point connected with one socket, a case on said nozzle connected with the other socket inclosing an annular conical chamber around said nozzle and providing a mixing channel connected with said chamber, a hollow burner-head having an internal conical roof and having orifices arranged near its periphery on said case, and a plurality of fireproof heat-insulating tubes forming the mouth of the burner in said orifices in said burner-head, as set forth.

In witness whereof I have hereunto set my hand in presence of two witnesses.

HERMANN RIESS.

Witnesses.

WOLDEMAR HAUPT,
HENRY HASPER.