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(Under International Convention.)

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being date of first Foreign Application (in } 6th May, 1904
Switzerland),

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Under Section 1 (2) of the Patents Act, 1901, this Specification became open to public inspection at the expiration of twelve months from the date of the application in Switzerland

Accepted, 21st Apr., 1906

COMPLETE SPECIFICATION.

“Improvements in Bunsen Burners for Liquid Hydrocarbons.”

We, PHILIPPE ULMANN and HENRY SELIGMANN trading as Ulmann & Co., of Dübendorf, near Zurich, in the Republic of Switzerland, Manufacturers, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement: --

In Bunsen burners for liquid hydrocarbons, more particularly heavy hydrocarbons, the fuel is converted into a vaporous condition, as is well-known, by being heated and then mixed with fresh air. This mixing is effected by vapour being driven through a nozzle which connects with the open air, in order to enable it to draw in fresh air.

Now it has been found in practice, that good results cannot be obtained with such constructions, as in spite of the heating tube for the vapour being prolonged and placed within reach of the burner flame, condensation of the vapour takes place, which acts unfavourably on the nozzle, the flame and the incandescent mantle. Condensate is deposited in the nozzle, and vapour containing some molecules of liquid reaches the flame.

As experiments have shown, these drawbacks are to be ascribed to heat being constantly withdrawn by the nozzle from the vapour flowing through it owing to said nozzle being in contact with the open air and being always surrounded by free air, so that condensation must take place unless, as in the present invention, care be taken that the nozzle be constantly heated.

In order to overcome these drawbacks, it has already been proposed to arrange the nozzle in proximity to the flame in order that it may be thus heated, and condensation avoided. In these attempts however the correct solution of the problem and the correct arrangements for the nozzle have not been discovered. The nozzle was either arranged higher than the zone of greatest heat which as is wellknown is directly above the burner head and in the lower part of the flame so that the nozzle did not receive sufficient heat to be able to avoid the deposition of condensate in it; or again nozzles have been arranged lower than the burner head when they cannot receive any heat at all from the burner. In some cases although the nozzle has been arranged in proximity to the burner

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head and slightly above the same, the air inlet and mixing chamber have been in the zone of greatest heat and stress has been laid upon the necessity of heating this mixing chamber. The result is that the nozzle is above this zone and cool air is drawn down past the nozzle and abstracts a portion of the heat from the incandescent mantle which would otherwise pass direct to the nozzle so that sufficient heat to prevent condensation is not communicated thereto. Also when the nozzle has been placed in proximity to the burner head it has been covered by metal parts, for instance, pipes so that it could receive no heat direct but only a portion of that emitted, that is to say too little to prevent condensation. 5

These drawbacks are removed by the present invention by arranging the mixing nozzle on a level or above and in close proximity to the burner so that it is in the zone of greatest heat of, and receives heat direct from the incandescent mantle connected to the burner, whereby the nozzle, because it is hotter than the vapour flowing through it, robs the latter of no heat, so that no condensation takes place therein, and when the vapour already in the heating tube tends to be condensed, it is again converted into vapour free from liquid by the heat of the nozzle. 10 15

The invention is shown as an example in the accompanying drawings:—

Figure 1 being a front view; and

Figure 2 a side view and partial section of a Bunsen burner, according to the present invention. 20

The Bunsen burner shown has two vertical tubes *a*, *b*, of unequal length running parallel to one another, the upper ends of which connect with a hollow head *c*. Near these tubes there is a burner head *d* over which a mantle *e* is arranged in the ordinary way, the tubes *a* and *b* standing within reach of the flame of this mantle. At the level of the mantle or the burner head and close thereto the shorter tube *b* connects below with a downwardly directed discharge nozzle *f* which thus also stands within reach of the flame, and which stands directly opposite the mouth of a mixing tube *g*, the other mouth of which is connected with the burner head *d*. This mixing tube is provided with an arm *h*, by means of which it is adjustably mounted on the tube *a*, so that the mouth of the mixing tube facing the nozzle may be approached to the nozzle and removed therefrom. 25 30

The working of the Bunsen burner hereinbefore described is as follows:—

The fuel passes through the pipe *a* into the Bunsen burner and rises in this tube up to the level of the incandescent mantle, where, in consequence of the heating of this tube through the radiating warmth of the mantle, the fuel is vaporised. The vapour produced in the pipe *a*, rises into the head *c* and passes over from this into the pipe *b*, in which, in consequence of the heating of the latter, it is superheated by the radiating warmth of the mantle. In this condition the vapour flows, through an outlet nozzle formed at the lower end of the pipe *b*, into the mixing pipe carrying air with it, with which it is then mixed, in order to flow out of the burner head in a mixed condition and thus burn as blue or non-luminous flame. The vapour outlet nozzle lies so close to the flame and is thereby so heated that any formation of condensate tending to stop up the nozzle, is entirely impossible. 35 40 45

Having now particularly described and ascertained the nature of our said invention, and in what manner the same is to be performed, we declare that we are aware of the Specification of William Thomas Wood's Patent No. 3780/04, and we make no claim to what is set forth in said patent, but what we do claim is:— 50

The improvement in Bunsen burners for liquid hydro-carbons which have an upwardly rising vaporising tube (*a*) and a downwardly directed superheating tube (*b*) which merges into a downwardly directed discharge nozzle (*f*) discharging into a mixing tube (*g*) in such a way that the vaporised fuel escaping 55

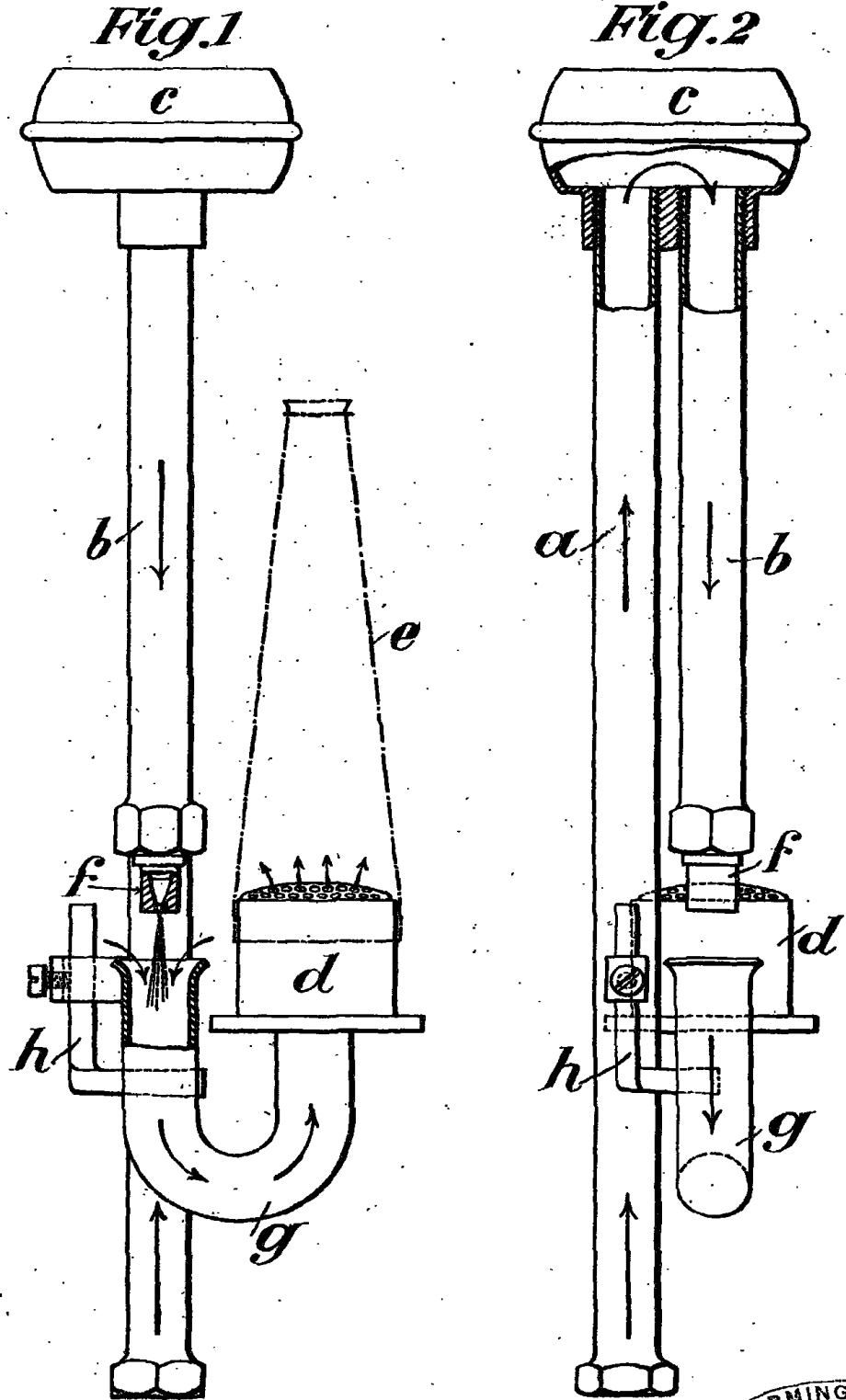
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5 from the nozzle (*f*) may draw combustion air into the tube (*g*), which improvement consists in the arrangement of the nozzle (*f*) from the superheating tube (*b*) on a level or just above and in close proximity to the burner head (*d*) so that the nozzle is in the zone of greatest heat and receives heat direct from the incandescent mantle connected to the burner head.

Dated this 20th day of April 1905:

W. P. THOMPSON & Co.,
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Agents for the Applicants.

[This Drawing is a reproduction of the Original on a reduced scale.]



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