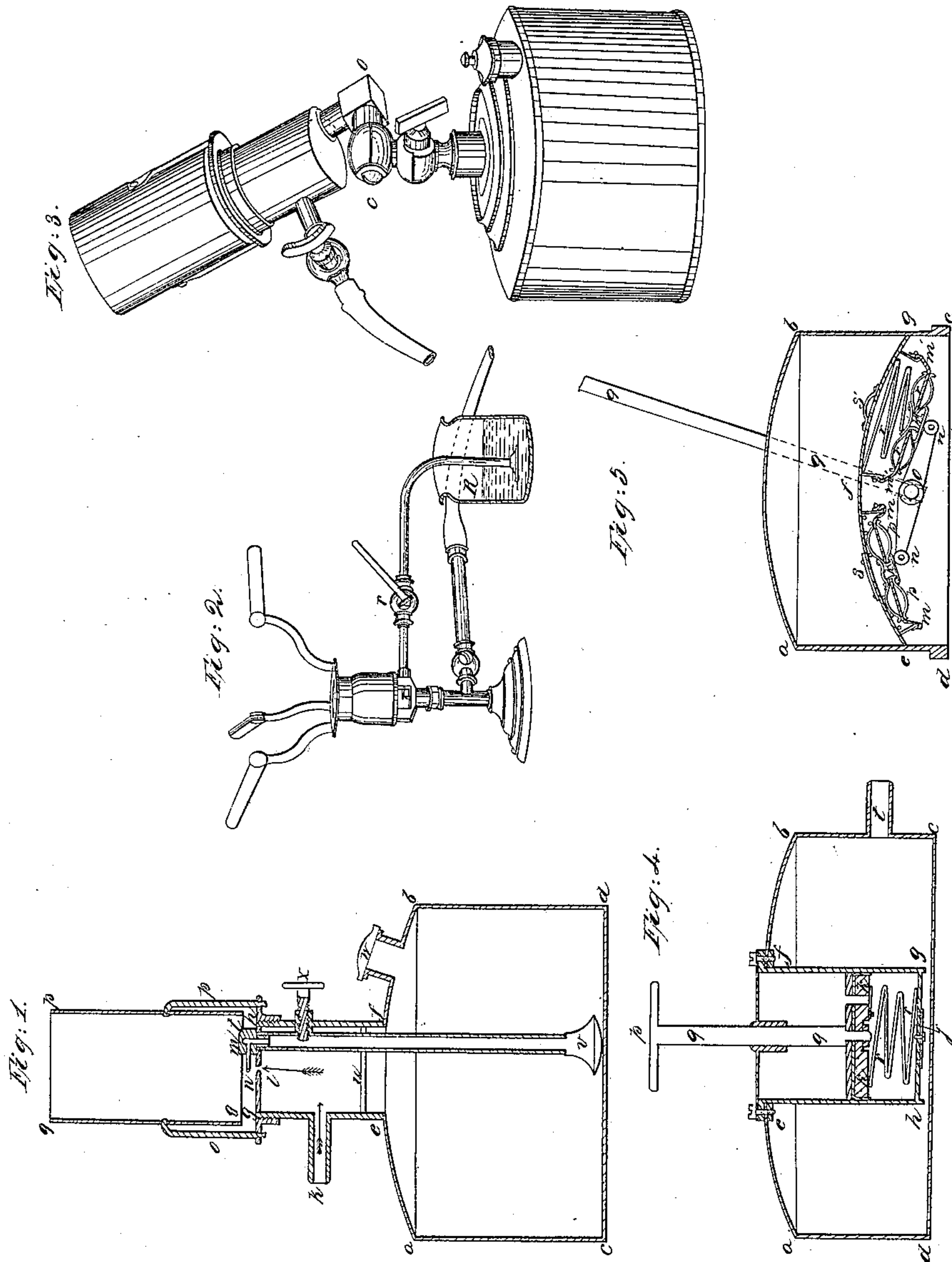


# Schnakofsky & Stange, Burning Hydrocarbon.

N<sup>o</sup> 53,763.

Patented Apr. 3, 1866.



Witnesses:  
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# UNITED STATES PATENT OFFICE.

ALEXANDRE SCHPAKOFSKY AND NICOLAS STANGE, OF ST. PETERSBURG, RUSSIA.

## IMPROVED APPARATUS FOR BURNING LIQUID HYDROCARBONS.

Specification forming part of Letters Patent No. 53,763, dated April 3, 1866.

*To all whom it may concern:*

Be it known that we, ALEXANDRE SCHPAKOFSKY and NICOLAS STANGE, of St. Petersburg, Russia, have invented certain new and useful Improvements in Methods of and Apparatus for Burning Liquid Hydrocarbons and the employment thereof for heating purposes; and we hereby declare the following to be a full, clear, and exact description of the same.

We have invented an apparatus which we term a "volcano," and which is based on a new method of burning liquid carburets of hydrogen, such as the essence of turpentine, petroleum-oil, spirits of wine, &c. We employ the liquid reduced to spray by a blast of air in apparatus such as represented in the accompanying drawings in illustration of our invention.

1. *Volcano apparatus.*—This is shown in Figures 1, 2, and 3. On the upper part of the reservoir *a b c d*, into which the liquid is poured, is fixed a cylindrical chamber, *e f g h*. This chamber is put in communication with a blowing apparatus by means of a side branch, *k*, and of a rubber tube. The compressed air issues in a vertical blast through the opening *l*, above which is the outer extremity of a horizontal pipe, *n m*, which communicates with the reservoir by the pipe *m v*. The passage of this last pipe *m v* may be narrowed when desired by the screw *X*. To the ring *g h* is attached, by the uprights *o* and *p*, the chamber *q r s t*, in which the combustion is effected. Between the lower edge, *s t*, of this chamber and the part *g h* a space is left to allow the air to circulate freely. A stopper, *W*, closes the aperture through which the liquid is supplied to the vessel. At the bottom of the pipe *m v* is netting or wire-work *v* to, prevent impurities entering and obstructing this tube.

*Working of the apparatus.*—The vertical blast of air *l*, traversed by the extremity of the horizontal tube *n m*, produces rarefaction in the latter in such manner that the atmospheric pressure causes the liquid to rise from the reservoir *a b c d* into the chamber *q r s t*, in which the liquid is diffused by the same blast of air in the form of spray. The burner, having been once lighted, continues to burn as long as the blowing apparatus is in action, and the spray mixed with air enters the chambers. By alter-

ing the flow of the liquid, by means of the screw *X*, we can produce an oxidizing or de-oxidizing flame. The elasticity of the air introduced should exceed by at least one-eighth the atmospheric pressure. In the system represented in Fig. 2 the reservoir *R*, for containing the liquid, is separated from the apparatus, and we place a trivet above the combustion-chamber to support the objects which are to be submitted to the action of the flame. The cock *r* is for regulating the flow of the liquid. The only difference between the system represented in Fig. 3 and the two preceding is that the combustion-chamber is free to turn on a horizontal axis, *o c*, to give the flame an inclined direction.

2. *Blowing apparatus.*—These apparatus are of two kinds: First, single-acting apparatus, Fig. 4. This apparatus is composed of the following parts: *a b c d*, regulating-reservoir; *e f g h*, body of the blower; *j*, induction-valve; *k*, piston; *i*, valve of aspiration; *r r*, spring for raising the piston; *p*, pedal for moving the piston with the foot; *t*, pipe to which an india-rubber tube is fitted, putting the blowing apparatus in communication with the volcano. Second, double-acting apparatus, Fig. 5. At the lower part of the box *a b c d* is a partition, *e f g*, separating the upper part, *a b g f e*, and intended for regulating the air. Below the partition are two rings, to which are fastened, by iron wire, the edges of leather washers *m m'*, lined with caoutchouc. The piston *p p* is formed of two bent metal washers, holding the leather by their edges. The center of the piston is furnished with a sucking or aspiring valve, *k*, formed with a caoutchouc disk. Opposite the center of the piston the partition *e f g* is furnished with valves *s* and *s'*, which allow the air to enter the chamber. The play of the pistons *p p* and *r r* is produced on one side to force the air into the chamber by mechanism consisting of a lever, *n o n'*, turning on a horizontal axis, *o*, and on the other side to absorb the air by conical springs *v*. Pulleys *n n'* are fitted at the ends of the lever to diminish the friction. The blowing apparatus is worked by hand, while the foot is kept pressed upon the cover *a b* to hold the apparatus.

The volcano may be employed, first, in technical manipulations to melt and solder metals,

glass, enamels, &c.; second, in chemical and metallurgical operations; third, to quickly heat water and as a portable cooking apparatus; fourth, for cooking food and for other domestic purposes; fifth, for the superficial calorization of wood; sixth, to generate steam.

The size of the flame produced by the apparatus depends upon its dimensions. The greatest consumption of liquid by one burner is two quarts per hour. If it be required to consume more liquid—that is to say, to have a larger flame—we increase the number of burners and arrange them in a single fire-chamber in a circular or rectilinear series.

Having thus described our invention and the manner in which the same is or may be performed, we desire to have it understood that

we do not limit ourselves to the precise construction, arrangement, and combination of details, as these may be varied without departure from our invention; but

What we do claim is—

The method of and apparatus for burning the vapors of hydrocarbon fluids, substantially as herein shown and described.

In testimony whereof we have signed our names to this specification before two subscribing witnesses.

A. SCHPAKOFSKY.  
N. STANGE.

Witnesses:

E. WILCKE,  
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