R. FIEDLER.

METHOD OF PRODUCING FLAME ON THE SURFACE OF WATER.

APPLICATION FILED AUG. 17, 1911.

1,087,112.

Patented Feb. 17, 1914.

2 SHEETS—SHEET 1.

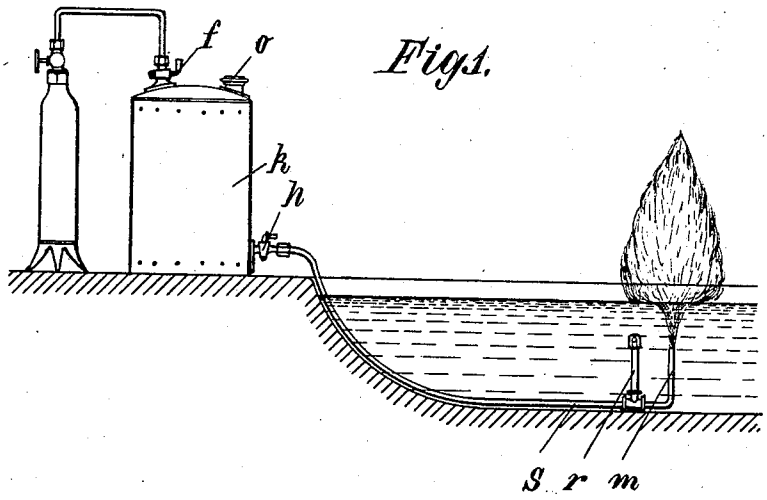


Fig. 1.

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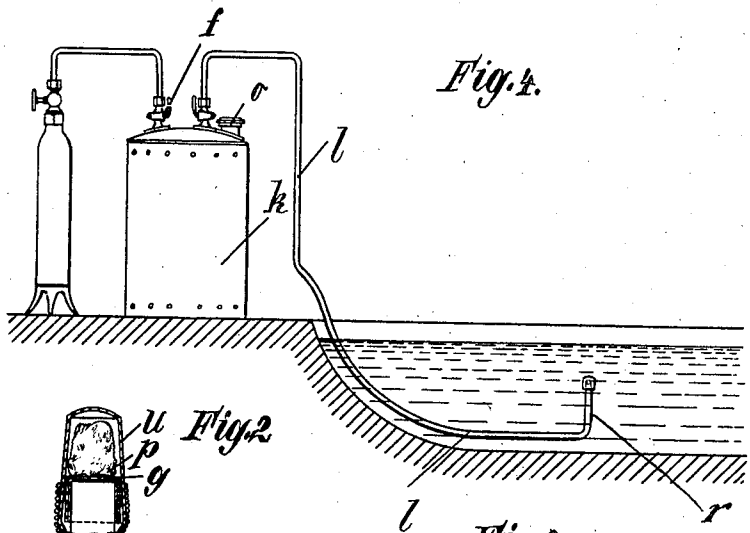


Fig. 4.

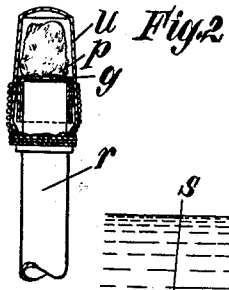


Fig. 2

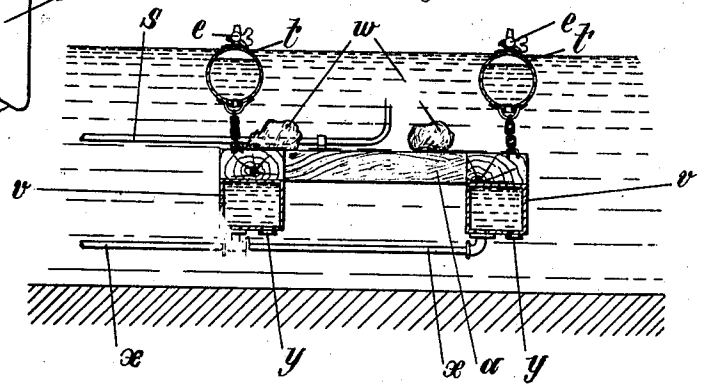


Fig. 3.

Witnesses:

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UNITED STATES PATENT OFFICE.

RICHARD FIEDLER, OF BERLIN, GERMANY.

METHOD OF PRODUCING FLAME ON THE SURFACE OF WATER.

1,087,112. Specification of Letters Patent. Patented Feb. 17, 1914.

Original application filed December 14, 1908, Serial No. 467,509. Divided and this application filed August 17, 1911. Serial No. 644,705.

To all whom it may concern:

Be it known that I, RICHARD FIEDLER, a subject of the German Emperor, residing at Berlin, S. W., 61, in Germany, have invented a certain new and useful Improvement in Methods of Producing Flame on the Surface of Water, of which the following is a specification.

This application is a division of applicant's copending application Serial No. 467,509, filed December 14, 1908.

This invention relates to a method of generating a large body of flame on the surface of water, suitable for warlike and other purposes. The flames are generated by igniting combustible fuel, specifically lighter than water and not miscible therewith which is caused to issue under pressure from an orifice under water and is ignited when it has ascended to the surface of the water.

Apparatus suitable for carrying the invention into effect is illustrated in the annexed drawing, in which,

Figure 1 is an elevation partly in section illustrating one form of the apparatus. Fig. 2 is a section on a larger scale of the igniter. Fig. 3 is a side elevation partly in section of a modification of part of the apparatus. Fig. 4 illustrates in elevation another modification of the apparatus.

Referring to Fig. 1, the drum *k* has a closable orifice *o* through which liquid fuel can be introduced into the drum. A cock *f* mounted on the upper cover of the drum controls the supply of a liquid or gas under pressure, which can be admitted to the drum to expel the combustible liquid. Carbon dioxid used for this purpose has the advantage that it does not generate explosive gases. Near the bottom of the drum there is a cock *h* joined to a flexible pipe or hose *s* with a nozzle *m*. The fuel traverses a layer of water before being ignited. Liquid hydro-carbons are preferably used as fuel, since they do not mix with water and are specifically lighter than water. The pressure applied to the fuel, and the lightness of the latter, cause it to ascend to the surface of the water and form thereon a combustible layer. This layer of fuel can be ignited for illuminating or signaling purposes, or for the purpose of military or other operations.

In the construction shown in Fig. 1 the pipe *s* leading from the drum *k* is laid under water and terminates below that portion of the water surface on which the flame is to be produced. When pressure is applied to the liquid fuel in the drum *k*, and the cock *h* is opened, fuel issues from the nozzle *m* and ascends to the surface of the water, on which it forms a continuous combustible layer. This layer of fuel is preferably ignited by utilizing the well known property of potassium, sodium or calcium phosphid of decomposing water and igniting the hydrogen or phosphoreted hydrogen produced by the decomposition. This may be effected by means of the device shown in Fig. 2, which comprises a tube *r* with a weak diaphragm *g* of india-rubber closing its upper orifice. On this diaphragm is placed a lump of potassium, sodium or calcium phosphid *p*, and an india-rubber cap *u* is placed over the said lump and fastened tightly to the end of the tube *r* so that neither air nor water can have access to the metal or phosphid. The tube *r* is either joined to the pipe *s*, as shown in Fig. 1, or is connected by a pipe *l* to the drum *k*, as indicated in Fig. 4. The admission of fluid under pressure to the pipe *s* or *l* causes the diaphragm *g* and cap *u* to burst, so that the lump *p* can rise to the surface of the water and produce ignition in the known manner. The layer of liquid fuel on the water is by this means ignited, and combustion can be supported for an indefinite period by supplying fresh fuel from the drum *k*, only a single ignition being required. The igniting device described is very safe and reliable, since the metal or phosphid is kept quite separate from the fuel until ignition is to take place; there is no risk of accidental ignition.

In order to keep the nozzle at the desired distance below the surface of the water the pipe *s* may be fastened to a float *a*, as shown, for example, in Fig. 3. The float may consist of a wooden or iron frame-work. If a wooden frame-work is used, weights *w* may be placed thereon to keep it under the surface of the water.

To the corners or other convenient parts of the frame-work buoys *t* are connected by means of chains. The buoys are preferably hollow and provided with air-cocks *e*. By regulating these cocks the buoys can easily be so regulated that only very small portions thereof protrude from the water.

To enable the frame-work *a* to be raised

to the surface, for the purpose of effecting repairs or the like, boxes v with orifices y are fixed to the frame-work and connected by a pipe x to the drum k or to the compressor or the like. To raise the frame-work a, carbon dioxid under pressure is admitted to the pipe x and boxes v, so that the water is expelled from the latter through the orifices y, whereupon the frame-work ascends to the surface. When the frame-work is to be lowered again the carbon dioxid is allowed to escape from the pipe x, whereupon water reënters the boxes v through the orifices y.

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

1. The method of generating a large mass of flame on the surface of water, which consists in forcibly ejecting a jet of fuel specifically lighter than water and not miscible with water in an upward direction from an orifice under water, and igniting said fuel when it has ascended to the surface of the water.

2. The method of generating a large mass of flame on the surface of water, which consists in forcibly ejecting a jet of fuel specifically lighter than water and not miscible with water in an upward direction from an orifice under water, and simultaneously projecting, from a container under the water, a chemical igniter which generates heat by reaction with the water, whereby said fuel is ignited at the surface of the water.

3. The method of generating a large mass of flame on the surface of water, which consists in forcibly ejecting a jet of fuel in an upward direction from a floating nozzle under water, igniting said fuel when it has ascended to the surface of the water, and regulating the depth at which the nozzle floats by means of fluid-controlled buoys.

In witness whereof I have signed this specification in the presence of two witnesses.

RICHARD FIEDLER.

Witnesses:

WOLDEMAR HAUPT,

HENRY HASPER.