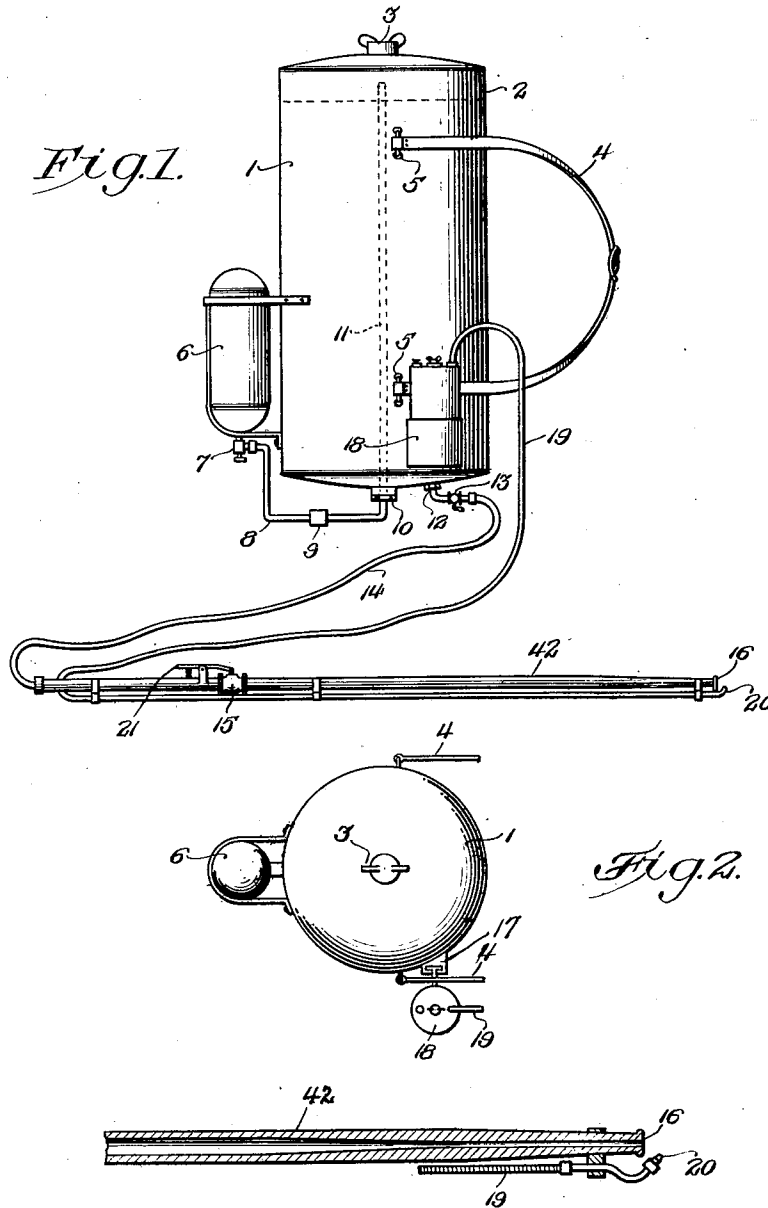


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 APPLICATION FILED DEC. 29, 1916.

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 2 SHEETS—SHEET 1.



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Inventor.
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 by
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Fig. 4.

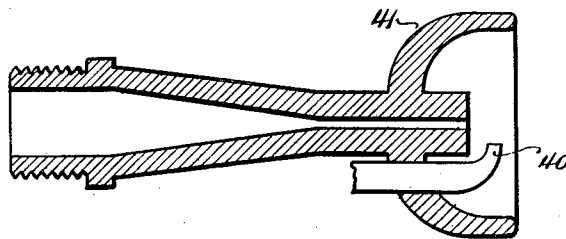
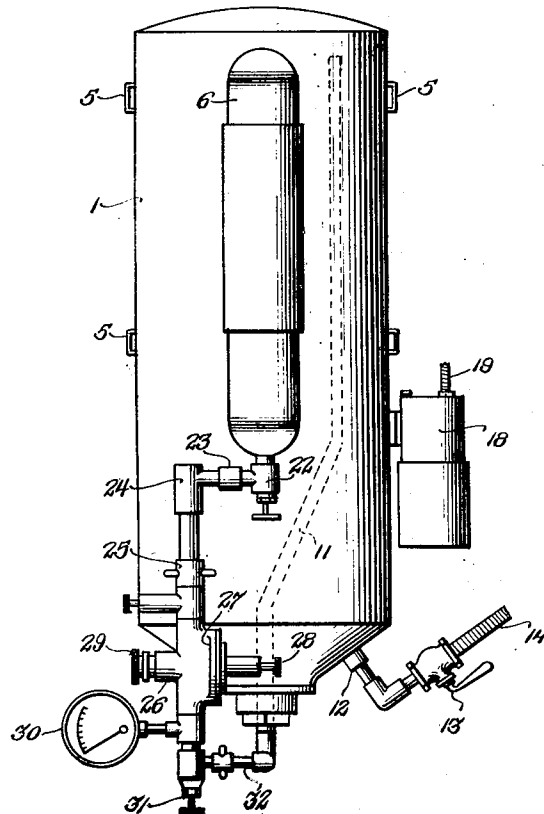


Fig. 5

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UNITED STATES PATENT OFFICE.

WILLIAM A. HALL, OF NEW YORK, N. Y.

DEVICE FOR PROJECTING BURNING LIQUIDS.

1,220,103.

Specification of Letters Patent.

Patented Mar. 20, 1917.

Application filed December 29, 1916. Serial No. 139,683.

To all whom it may concern:

Be it known that I, WILLIAM A. HALL, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Devices for Projecting Burning Liquids, of which the following is a specification.

The present invention relates to the projecting of burning liquids, and has for its object to provide a relatively simple and highly efficient device for this purpose.

The invention comprises, in a general way, the provision of a tank to contain inflammable liquid, which may be a mixture of equal parts of ordinary gasoline and the petroleum fraction boiling between 140° C. and 220° C., known commercially as turpentine substitute. Also other inflammable liquids, such as mixtures of gasoline and kerosene, or turpentine substitute and kerosene can be employed. It is of course well understood that in cold climates it is necessary to employ a liquid which is more volatile or which contains fractions more volatile, than would be necessary in a warm climate. This liquid is more inflammable than ordinary gasoline, and is found to ignite with extreme ease, and to carry the flame, irrespective of weather conditions. Attached to this tank of liquid is provided a cylinder containing gas under pressure, for forcing the said liquid through the burner. Also attached to the tank of liquid is a small generator for producing a spontaneously inflammable gas, a mixture of acetylene and phosphorated hydrogen being suitable for the purpose.

In the accompanying drawings I have shown an apparatus embraced within my invention for the purpose described. In said drawings Figure 1 shows an elevation of one form of the entire device, Fig. 2 shows a plan view of the containing tank, gas cylinder and gas generator and Fig. 3 shows a suitable form of burner for projecting a flame for a long distance. Fig. 4 shows a modified form of the tank, gas cylinder and gas generator and connections therefor, and Fig. 5 shows a modified form of burner nozzle.

Referring to said drawings, 1 represents a tank for holding the inflammable liquid above referred to, 2 representing the approximate liquid level therein when filled. This tank may be provided with a cap 3

for charging the same, or if desired the tank can be charged at the bottom. 4 shows a strap attached to suitable lugs 5 for carrying the device on a man's back. 6 shows a gas cylinder which may contain any desired kind of gas under high pressure, this being employed as a source of pressure to drive the liquid from tank 1 through the pipes and nozzle or burner. The cylinder 6 will be provided with a needle valve 7, attached to tubing 8 containing a pressure reducing valve 9, to connection 10, and is extended within the tank 1 as pipe 11 to a point near the top. The pressure from the receptacle 6 will cause the liquid to be ejected from the tank 1 through connection 12, past valve 13 through pipe 14, through the control valve 15 which may be the well known "Flex and Bowden lever control valve" or other suitable control valve to the nozzle 16.

Attached to the tank 1, by means of a suitable bracket 17 is a gas generator 18, which is employed for producing a spontaneously inflammable gas. This generator is preferably charged with a mixture of two parts of calcium phosphid to one part of calcium carbid. These materials are preferably both crushed to about the size of peas, and then thoroughly mixed before being put into the generator. The gas from generator 18 passes through pipe 19 to the pilot burner 20, situated just in front of the nozzle 16.

By pressing the lever 21 and thereby opening the valve 15, either a steady flame may be produced from the nozzle 16, or if so desired small jets of the burning liquid may be thrown. In using a small apparatus weighing about 20 pounds empty and 45 pounds fully charged, I have been able to easily project the flaming liquid for a distance of 75 to 80 feet.

Referring to Fig. 4, I have here shown a more complicated apparatus for admitting the gas under pressure from the cylinder 6 to the tank 1. In said modified form of construction the pressure cylinder 6 is provided with a needle valve 22, connected through the pipe 23, elbow 24 and union 25 to a pressure regulating device 26. This device 26 comprises a diaphragm 27 and a thumb screw 28 coöperating therewith. At the opposite side of the regulator is a screw 29 with a hole in its center, which controls a hidden spring. When this screw is undone, it will be found that the gas can escape when the gage registers a certain pressure

determined by the relative position of the screw 28 and diaphragm 27. This accordingly constitutes a safety valve with the outlet through the screw 29, and it is advisable to set the screws 28 and 29 so as to allow release of pressure through the safety valve when the pressure below the regulating device (as indicated by the pressure gage 30) reaches 100 pounds. At 31 is shown a valve directly connecting the bottom of the pressure regulator device with the piping 32 leading into the pipe 11 in the tank 1.

It is preferable to fill the pressure cylinder 1 with gas under very high pressure, for example 1,000 pounds per square inch more or less. The gas may conveniently consist of highly compressed illuminating gas, or other combustible gases may be employed if desired. The projector shown in Fig. 3 may consist of a straight pipe with tapering bore, terminating at 16, and in proximity thereto is located the pilot flame of the spontaneously inflammable gases above referred to. It is desirable in many cases to allow gas to pass through the pipe 19 and issue at 20 only just at the time when it is desired to employ the flame projector. A suitable valve or gas cock will accordingly be provided in the pipe 19.

In Fig. 5 I have shown a modified form of nozzle, likewise provided with a pilot burner 40, this being surrounded by a hood 41 as illustrated, to prevent rain, wind and the like from interfering with the pilot flame.

The particular shape of the bore of the nozzle will have considerable effect upon the character of the flame produced by using the device.

In some instances it is advisable to open the valve 21, and hold the same open for a considerable length of time, to produce a long steady flame, while in other cases it is advisable to open and close the same immediately, thereby projecting only a small amount of fuel, which will assume a more or

less globular shape, and will travel in a burning condition for a considerable distance. The entire burner 42 may be three to five feet long more or less, and can readily be pointed at the object upon which it is desired to have the burning fluid land.

The pipe connections between the cylinder 6 and the tank 1 may be made of flexible tubing or piping if so desired, but the pipes 14 and 19 should in all cases be made of flexible material, for readily pointing the burner 42 at the object which it is desired to strike.

What I claim is:

1. A flame projecting device, comprising a tank for containing an inflammable liquid, means for attaching the same to the body of a person, a gas pressure cylinder carried by said tank, a connection between said cylinder and said tank, a pressure regulator in said connection, a gas generator removably carried by said tank, a main burner, a liquid connection from said tank to said burner, a spring pressed normally closed valve in said burner, a pilot burner arranged in front of said main burner, and a connection from said generator to said pilot burner.

2. In a device for projecting burning liquid, a receptacle for containing a combustible liquid, a gas pressure receptacle attached thereto, means for allowing and regulating a flow of gas from said second mentioned receptacle to said first mentioned receptacle, a generator for readily inflammable gas, a long rigid tube for squirting the combustible liquid at an object, a valve therein, a nozzle on the end thereof, a pilot burner adjacent said nozzle, a flexible connection between the outlet of said receptacle for combustible liquid and said rigid tube, and a pipe connection, at least a portion of which is flexible leading from the said gas generator to said pilot burner.

In testimony whereof I affix my signature.

WILLIAM AUGUSTUS HALL.