July 18, 1939. W. VOSS 2,166,881

IGNITER WITH LIQUID FUEL

Filed Nov. 1, 1935

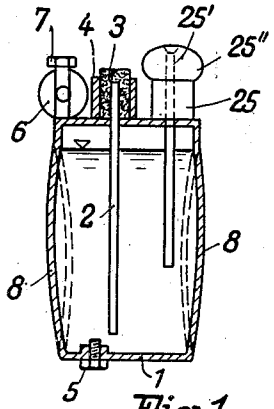


Fig.1

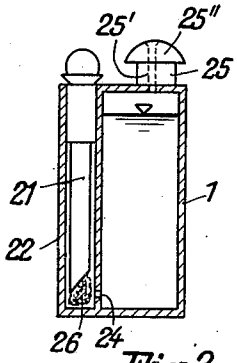


Fig.2

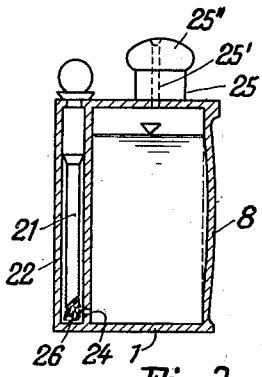


Fig.3

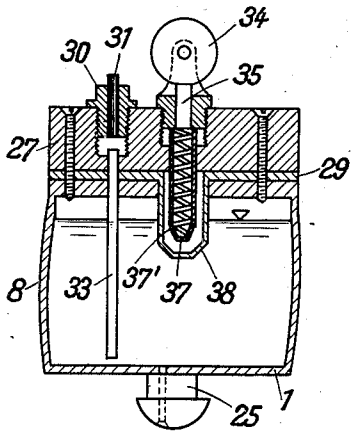


Fig.4

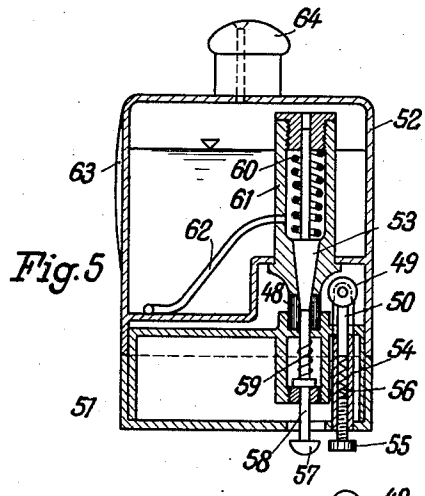


Fig.5

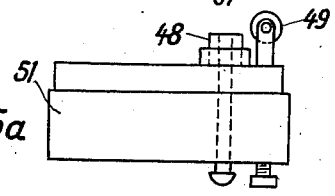


Fig.5a

Inventor:
Walter Voss,
By Sommers & Young
Attys.

Patented July 18, 1939 2,166,881

UNITED STATES PATENT OFFICE

2,166,881

IGNITER WITH LIQUID FUEL

Walter Voss, The Hague, Netherlands

Application November 1, 1935, Serial No. 47,901
In Germany November 16, 1934

7 Claims. (Cl. 67—7.1)

This invention relates to improvements in igniters using liquid fuel. It is already known to provide a pyrophoric igniter with a receptacle containing liquid fuel and with a wick-torch which is situated when not in use in a separate chamber not communicating with the liquid receptacle and which is moistened before use with liquid fuel from the receptacle, and to combine an igniter of this kind with a drop delivery stopper or sprinkler permitting the delivery of the contents of the receptacle by drops not only for moistening the torch but also for other purposes, for instance, for cleaning cloth garments or, when using a scented spirit as the liquid fuel, for refreshing the owner of the lighter. The handling of such a lighter is not sufficiently simple as the moistening of the torch requires an ejection of liquid fuel from the receptacle which causes in most cases also a waste of fuel. Therefore, this known type of pyrophoric lighter does not realise, in a practically satisfying manner, the idea of using the liquid content as a fuel for igniting purposes as well as for perfuming, refreshing and cleaning.

This problem is solved according to the invention by forming the igniter so that the usual absorbent wick as well as a drop delivery or dispensing device or sprinkler is in communication with the receptacle containing the liquid fuel, which receptacle is provided with an elastic wall utilisable for pumping liquid fuel. The elastic wall may be used for forcing liquid to the wick or it may serve either for driving liquid to the drop delivery device or sprinkler, or it may be employed for forcing liquid to the wick as well as to the drop delivery device. Also this drop delivery or sprinkler device can be used for forcing liquid to the wick and, to this end, it must be arranged on the receptacle in such a relation to the wick communicating also with the interior of the receptacle that it allows, when opened, not only the drop delivery of dissipating of liquid but also the forcing of liquid to the wick by means of the action of the atmospheric pressure.

By using the elastic receptacle wall for pumping liquid fuel, it is possible to produce a delivery of liquid to the wick so as to moisten the same by means of a simple action of the thumb upon the receptacle, and, in the case where the igniter is provided with a wick-torch situated, when not used, in a chamber lying outside of the liquid receptacle, there is no necessity of drawing this torch out of its chamber for moistening it. When using the elastic receptacle for forcing liquid to the drop delivery stopper, the shaking of the receptacle otherwise required for operating the drop delivery stopper, as was required with previously known devices, is avoided. In the case where the drop delivery or sprinkling device is employed for delivery of liquid to the wick, only an opening of the stopper is necessary for causing the atmospheric pressure to act upon the liquid level in the receptacle so as to drive liquid to the wick. Furthermore, the construction of the whole igniter is simple because special pump pistons which have been already proposed for the liquid delivery in pyrophoric igniters are avoided and are replaced by parts already existing in the igniter and its receptacle. Another advantage of the igniter constructed according to the invention consists in that the liquid delivery, particularly the liquid supply to the wick is very economical, uniform and regular.

The drawing shows by way of example several embodiments of an igniter according to the invention. Figure 1 is a vertical longitudinal section of a pyrophoric igniter provided with a friction wheel. Figure 2 is a vertical longitudinal section of a pyrophoric igniter provided with a wick-torch. Figure 3 shows a modified embodiment of the igniter of Figure 2 also in a vertical longitudinal section. Figures 4 and 5 are vertical sectional views of two further embodiments of igniters constructed according to the invention and provided with friction wheels. Figure 5a is a side view of a part of the igniter of Figure 5.

According to the Figure 1, the tube 2 extends into the receptacle 1 and ends at its lower extremity in the vicinity of the bottom of the receptacle 1 whilst its upper extremity extends through and somewhat beyond the cover of the receptacle 1 with which it is tightly connected. The extremity of the tube 2 projecting upwards from the receptacle cover is surrounded by a wick mass, for instance, a wick yarn lying in the tube 4 fixed to the receptacle cover. Beside the tube 4 there is arranged on the receptacle cover the friction wheel 6 acting upon the stone 7 composed of suitable spark producing material, for instance, cerium. The receptacle 1 contains a liquid fuel utilisable also for perfuming purposes, for instance, cologne, toilet water, or perfume, which contains a high percentage of alcohol and also some water, and non-inflammable perfume oil. The filling aperture is closed by means of the screw plug 5. The receptacle cover carries, beside the tube 4, a drop delivery stopper or sprinkler 25 which is of usual construction and is in communication with the interior of the receptacle 1 by means of a channel 25' which is opened or

closed respectively by turning the cover 25'' in the one or the other direction whereby an aperture provided in the cover 25'' is brought into and out of register respectively with the channel 25'.

The lateral walls 8 of the receptacle are formed as resilient arched diaphragms so that they can be brought from the position indicated in full lines into the position indicated in dotted lines by the fingers of a hand exerting a pressure upon them and will then automatically return into the original position when released by the fingers. When the resilient walls are brought into the position indicated in dotted lines whereby the interior space of the receptacle 1 is reduced, the liquid fuel contained in the receptacle is put under a pressure which forces a little quantity of liquid fuel through the tube 2 to the wick 3 which is moistened in this way with liquid fuel. By forcing the sides inwards one or more times the delivery of liquid can be repeated as often as desired whereby the flame ignited by means of the friction wheel 6 can be maintained with economical consumption of fuel during a longer period, for instance, for igniting a tobacco-pipe. On the other hand, when the drop delivery or sprinkling device 25 is opened, the liquid can be forced out through the channel 25' for refreshing or perfuming purposes by means of a pressure exerted upon the resilient walls 8 by the fingers. The tube 2 communicating with the wick 3 may be provided at its upper end with one or more holes allowing the return into the receptacle of liquid forced into the tube by pressure generated in the receptacles by expansion of the fluid by the heating of the receptacle, for instance, during the burning of the wick flame. In this case the receptacle 1 must be inverted when a liquid delivery is to be effected towards the wick 3 by actuation of the resilient walls 8.

Figure 2 shows the employment of a drop delivery stopper for effecting the liquid supply in a pyrophoric igniter provided with a wick-torch and the receptacle of which does not possess a resilient elastic wall. According to Figure 2, beside the receptacle 1 containing the liquid fuel and carrying the drop delivery or sprinkling device 25 and a plate of suitable spark-producing material not shown in the drawing, there is provided a chamber 22 into which the wick-torch 21 is introduced when not in use and which communicates at its lower end through a small hole 24 with the interior of the receptacle 1 and contains an absorbent mass 26 serving for moistening the wick-torch. When the air pressure existing in the receptacle space above the liquid level is reduced by the consumption of liquid fuel to a value too small for forcing fuel through the hole 24 towards the absorbent mass 26 and the wick-torch 21, one need only open the drop delivery stopper 25 by turning the cover 25'' and, then, the exterior atmospheric pressure, becoming operative through the stopper channel 25' in the receptacle 1, immediately causes the passage of liquid from the interior of the receptacle 1 towards the absorbent mass 26 through the hole 24.

As shown in Figure 3, the pyrophoric igniter of Figure 2 can be provided with a resilient lateral wall 8 so that the liquid supply to the absorbent mass 26 can be effected not only by opening the drop delivery stopper 25 but also by exerting a pressure upon the resilient wall 8. The construction of the igniter shown in Figure 3 is the same in other respects as in Figure 2. When using the liquid content of the igniter of the Figure 3, for instance cologne for perfuming or refreshing purposes, the cover 25'' of the drop delivery stopper 25 is turned into the open position and then the liquid is ejected through the stopper channel 25' which may be effected without the aid of the resilient wall 8. The igniter of Figure 2 is handled in the same way for perfuming or refreshing purposes.

Figure 4 shows that the drop delivery stopper or sprinkler 25, if it is not used for pumping liquid, may be provided also on the bottom of the receptacle 1 containing the liquid fuel. According to Figure 4, the top wall of the receptacle 1 carries a block 27 made from heat insulating material fixed to the receptacle 1 by means of screws with interposition of a plate 29 of asbestos. The tube 30 surrounding the wick 31 and the tube 37' carrying the friction wheel 34 and containing the cerium stone 35 and its spring 37 are screwed into the block 27 which prevents an excessive heat conduction from the burning wick 31 to the receptacle 1 and to the hand acting upon the elastic walls 8 of the receptacle even in the case of an extended period of use of the igniter. The tube 33 communicating with the wick tube 30 and the cap 38 enclosing the tube 37' may also be made of heat insulating material, for instance, from vulcanised india-rubber. The wick 31 can be protected, when not in use, by means of a cap (not shown) screwed on to the tube 30 in a well known manner.

In order to avoid an undesired moistening of the wick with liquid fuel when the igniter is used only for perfuming or refreshing purposes, an interruption of the communication between liquid receptacle and wick may be established during the non-use of the lighter for igniting. This can be effected, as shown in Figure 5, by arranging the wick 48 alone or together with the friction wheel 49 and the spark-producing stone 50 on a separate carrier 51 capable of being detached from the receptacle 52 containing the liquid fuel and by providing the receptacle 52 with an opening serving for the outlet of liquid fuel and which, when the wick carrier 51 and the receptacle 52 are united together, lies adjacent the wick 48, the opening being normally closed by means of a valve 53 which may be opened from the outside of the receptacle 52. The wick carrier 51 is formed as a hollow body of sheet metal and capable of being introduced into a socket in the lower end of the receptacle 52 formed by extensions of the side walls of the receptacle. The interior of this body 51 contains a spring 56 acting upon the spark-producing stone 50 the spring and stone being guided in the tube 54, and which can be adjusted by means of a screw 55 from the outside of the wick carrier 51. Furthermore there is guided in the wick carrier 51 a rod 58 which can be displaced along the wick axis by means of a knob 57. When the rod 58 is moved inwards against the action of the spring 59, it acts upon the conical valve 53 so as to open this valve against the action of the spring 60 tending to maintain the valve closed. The spring 60 and the valve 53 are guided in a tube 61 which communicates through the tube 62 with the deepest level of the hollow space of the receptacle 52. The top wall of the receptacle 52 carries a drop delivery device 64.

When the valve 53 is opened by pressing upon the knob 57 and when, at the same time, a pressure is exerted by hand upon the resilient receptacle wall 63, liquid fuel is forced through the tube 62 and tube 61 to the wick 48 communicat-

ing directly with the mouth of the valve 53. When the knob 57 is again released, the rod 58 is moved outwardly by the action of the spring 59 whereby the valve 53 is allowed to be reclosed by the spring 60. In order to ignite the wick 48, the wick carrier 51 is removed from the lower extremity of the receptacle 52, as shown in Fig. 5a, whereupon the wick can be ignited by turning the friction wheel 49. In this way, the ignited wick can be used independently of the receptacle 52, whereby also an unfavourable heat transmission from the wick flame to the liquid receptacle is rendered impossible. After the use of the wick flame, the wick carrier 51 is reintroduced into the lower extremity of the receptacle 52 whereby the flame is automatically extinguished if it has not been extinguished previously by the owner of the igniter. The wick and spark-producing means are located on the wick carrier adjacent each other in such relative position that when the spark-producing means is operated, the sparks will be directed against the wick and ignite the fuel thereon, but the wick and spark producer are spaced apart from each other sufficiently to allow liquid fuel to be applied to the wick without the spark-producing means being wet thereby. It is particularly important in lighters which employ fuel containing water and non-inflammable perfume oil that the fuel shall not repeatedly wet the spark-producing means, as the steel of the spark producer would soon become so rusty and coated with gum-like deposit that it would not operate properly, if at all. Since spiritous fuel containing water is not so inflammable as some other fuels, for instance gasoline, it is desirable that a strong spark be provided for lighters using such fuel.

The igniter shown in Figure 5 may be modified in such a way that the igniting of the wick, moistened with liquid fuel, is effected automatically when the wick carrier is drawn out from the receptacle. To this end, for instance, an auxiliary wheel is provided carried by the same support as the friction wheel and engaging with the latter and which rolls along a roughened path provided at the lower extremity of the receptacle so that when the wick carrier is drawn out from the receptacle a rotating movement is imparted also to the friction wheel driven by the auxiliary wheel. Furthermore the opening of the valve closing the liquid receptacle can be effected also by means of the resilient receptacle wall which, in this case, is connected with the valve by means of a lever system or another suitable power transmission means so that it opens the valve when it is displaced inwardly. Instead of pyrophoric igniting means, also an electric ignition may be employed and, to this end, for instance, the wick carrier may contain a dry cell supplying current to an igniting wire arranged in the immediate neighbourhood of the wick. An electric or other non-pyrophoric ignition may be provided if desired also in the case of the igniters shown in the Figures 1 to 4 in place of the friction wheel and the spark-producing body. When a pyrophoric ignition is provided, the relative movement between friction body and spark-producing stone which produces the igniting spark may be obtained by means of a mechanical driving device acting upon these two parts or upon one of them.

Also many other modifications may be made without departing from the spirit of the invention.

What I claim is:

1. An igniter comprising in combination a receptacle for free liquid fuel, including free spiritous liquid fuel, also containing non-inflammable liquid such as water or non-inflammable perfume oil, for instance cologne, perfume or the like, a drop delivery device arranged on the receptacle and communicating with the receptacle cavity, a wick, means for producing sparks for igniting the wick, a carrier for the wick and the spark-producing means detachably connected with the receptacle, and means for putting the wick into and out of communication with the receptacle cavity, the receptacle having a resilient wall for actuation to reduce the volume of the receptacle cavity for forcing free liquid fuel to the wick and drop delivery device.

2. An igniter comprising in combination a receptacle for free liquid fuel, including free spiritous liquid fuel, also containing non-inflammable liquid such as water or non-inflammable perfume oil, for instance cologne, perfume or the like, a drop delivery device arranged on the receptacle and communicating with its interior, a valve for opening and closing the receptacle cavity, a wick, means for producing sparks for igniting the wick, means for opening the valve to put the wick in communication with free liquid fuel in the receptacle, and a common carrier for the wick, the spark-producing means and the valve-opening means, said carrier being detachably connected with the receptacle.

3. An igniter comprising in combination a receptacle for free liquid fuel, including free spiritous liquid fuel, also containing non-inflammable liquid such as water or non-inflammable perfume oil, for instance cologne, perfume or the like, a drop delivery device arranged on the receptacle and communicating with its cavity and having a movable valve cap, another valve for opening and closing the receptacle cavity, a spring tending to maintain the other valve closed, means for forcing free liquid fuel to said other valve, a movable rod for opening said other valve by hand, a wick to receive the free liquid fuel through said other valve when open, means for producing sparks for igniting the wick, and a common carrier for the wick, the movable rod and the spark-producing means, said carrier being detachably connected with the receptacle.

4. An igniter comprising in combination a receptacle for liquid fuel, including free spiritous liquid fuel, also containing non-inflammable liquid such as water or non-inflammable perfume oil, for instance cologne, perfume or the like, a drop delivery device arranged on the receptacle and communicating with its cavity, a valve for closing the receptacle cavity, a spring tending to maintain the valve closed, a tube situated in the receptacle and containing the valve and its spring, a further tube connecting the first-named tube with the deepest level of the receptacle cavity, the receptacle having a resilient wall to be actuated for forcing liquid fuel to the valve through the second-named tube, a movable rod for opening the valve by hand, a spring tending to prevent said rod from opening the valve, a wick, means for producing sparks for igniting the wick, and a common carrier for the wick, the spark-producing means, the rod and its spring, said carrier being detachably connected with the receptacle.

5. An igniter comprising in combination a receptacle for liquid fuel, including free spiritous liquid fuel, also containing non-inflammable liquid such as water or non-inflammable perfume oil,

for instance cologne, perfume or the like, a drop delivery device arranged on the receptacle and communicating with its cavity, a wick, means for producing sparks for igniting the wick, and a carrier for the wick and spark-producing means detachably held on the receptacle, the wick and spark-producing means being mounted on said carrier sufficiently close for sparks to reach the wick and ignite the fuel thereon when the spark producer is operated, but being spaced sufficiently far apart to allow fuel to be applied to the wick without wetting the spark-producing means, the receptacle having a resilient wall to be actuated for forcing free liquid fuel to the drop delivery device and wick, and said drop delivery device having a shut-off valve.

6. An igniter comprising in combination walls forming a closed receptacle for free liquid fuel, including free spiritous liquid fuel, also containing non-combustible liquid such as water or non-inflammable perfume oil, for instance cologne, perfume or the like; some of said walls extending outwardly beyond another of said walls so as to form a socket; a carrier body having a wick and igniting spark-producing means mounted thereon with a portion of the wick exposed, the wick and spark-producing means being located adjacent each other so that the sparks are directed against the wick when the spark-producing means is operated but spaced apart sufficiently to permit fuel to be applied to the wick without wetting the spark-producing means; the wick carrier body fitting snugly within the socket with the wick and spark-producing means inside said socket so as to be shielded when not in use by the portions of the receptacle walls forming the socket, and removable from said socket for use; one wall of the receptacle having an opening for direct delivery of drops of free liquid fuel to the exposed portion of the wick for burning; a valve for controlling said opening; and said receptacle having a resiliently deformable wall for forcing the liquid fuel through the drop delivery opening upon being pressed inwardly when the valve is open.

7. An igniter comprising in combination walls forming a closed receptacle for free liquid fuel, including free spiritous liquid fuel, also containing non-combustible liquid such as water or non-inflammable perfume oil, for instance cologne, perfume or the like; some of said walls extending outwardly beyond another of said walls so as to form a socket; a carrier body having a wick and igniting spark-producing means mounted thereon with a portion of the wick exposed, the wick and spark-producing means being located adjacent each other so that the sparks are directed against the wick when the spark-producing means is operated but spaced apart sufficiently to permit fuel to be applied to the wick without wetting the spark-producing means; the wick carrier body fitting snugly within the socket with the wick and spark-producing means inside said socket so as to be shielded when not in use by the portions of the receptacle walls forming the socket, and removable from said socket for use; one wall of the receptacle having an opening for direct delivery of drops of free liquid fuel to the exposed portion of the wick for burning; and a valve for controlling said opening.

WALTER VOSS.