

Nov. 4, 1952

J. DELATTRE-SEGUY

2,616,277

PYROPHORIC LIGHTER

Filed Feb. 24, 1950

2 SHEETS—SHEET 1

*Fig. 1.*

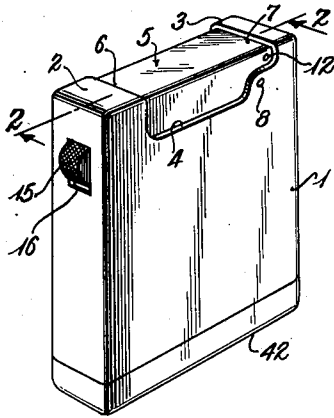


*Fig. 2.*

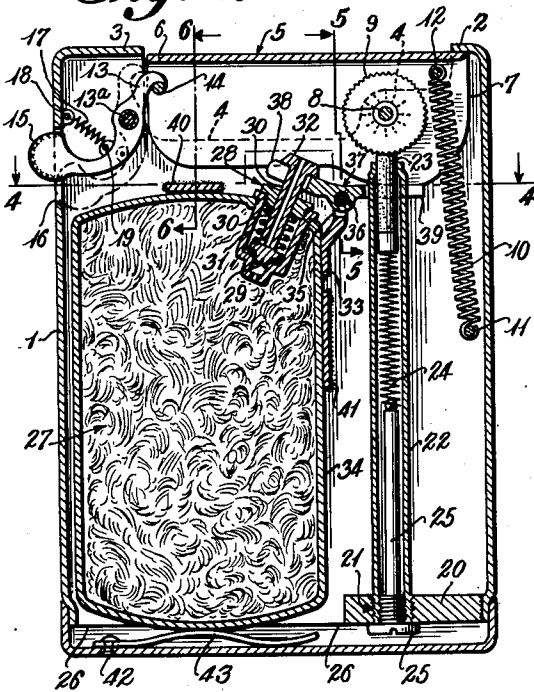


*Fig. 4.*

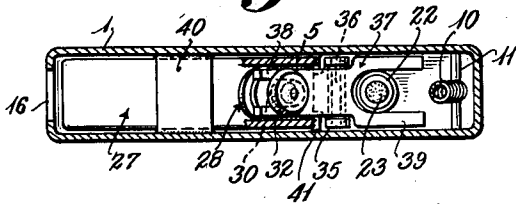


*Fig. 3.*

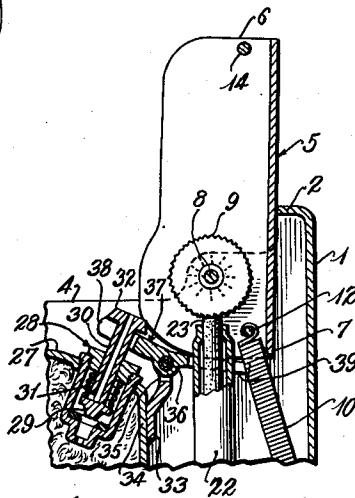


*Fig. 5.*

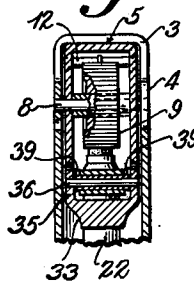


*Fig. 6.*

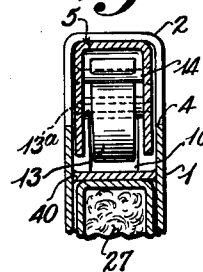
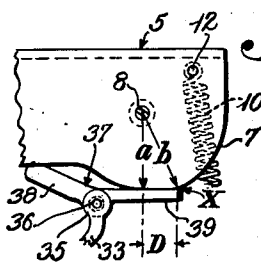


*Fig. 7.*



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2 SHEETS—SHEET 2

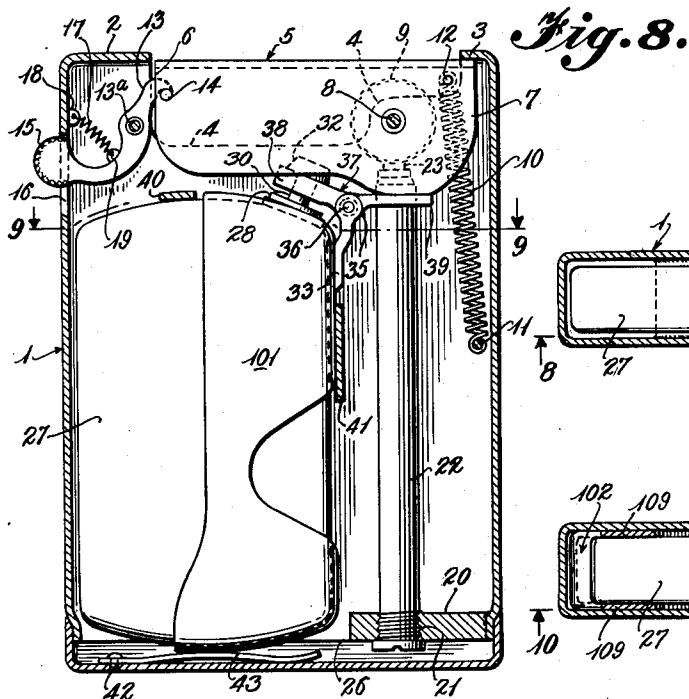


*Fig. 9.*

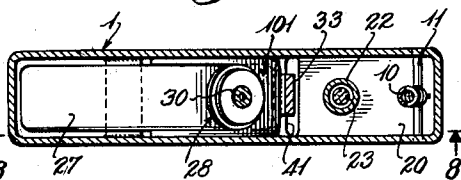


*Fig. 11.*

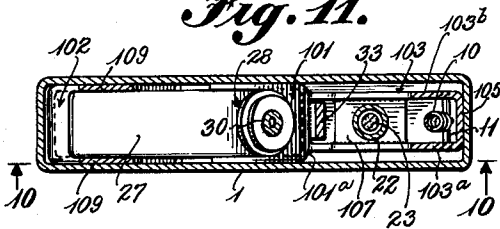


*Fig. 10.*

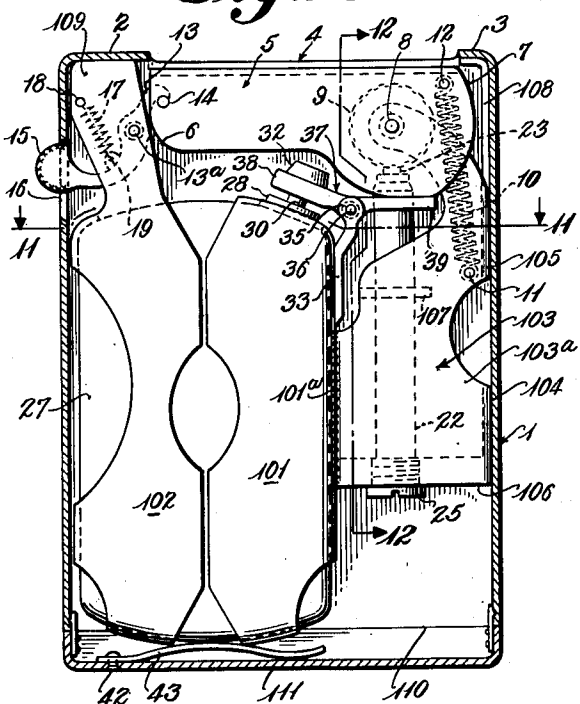
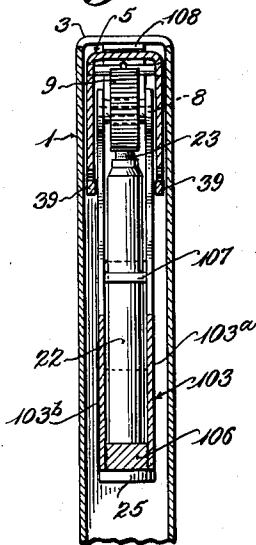


*Fig. 12.*



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## UNITED STATES PATENT OFFICE

2,616,277

## PYROPHORIC LIGHTER

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Application February 24, 1950, Serial No. 145,947

7 Claims. (Cl. 67-7.1)

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This invention relates to improvements in pyrophoric lighters, and more particularly to the operation and construction of smokers' lighters using for fuel a liquified gas.

In lighters using a liquified gas, generally under pressure, as fuel, the ignition of the fuel entails two operations, the opening of the gas release valve and the production of a spark to ignite the escaping gas. In addition, the valve must remain opened as long as the user wishes to keep the flame burning. In the only liquified gas lighters so far known and successfully used, the gas release valve and the spark producing system are manually operated independently of each other and by different fingers of the user's hand; these known devices present, therefore, at least two disadvantages: misses occur, unless the action of the fingers used is perfectly correlated, and the flame lasts only as long as the pressure of one of the user's fingers presses on the valve-opening mechanism; all of which renders the manipulation of these devices awkward.

This invention overcomes the foregoing defects. As one of its features, it provides for a construction of liquified gas lighters in which a momentary action of a single finger of the user causes the opening of the gas release valve and the ignition of the escaping gas, and maintains the gas lighted or ignited for any desired length of time.

As another feature of this invention, it provides for a construction of a liquified gas lighter in which a single manipulation by the user causes an automatic and controlled cooperation between the gas release and the gas ignition.

As a further feature of this invention, it provides for a construction of liquified gas lighters in which a single momentary manipulation by the user causes the release of a locking device to release the gas and, substantially simultaneously, to ignite the latter by production of a spark, and in which the gas burns as long as the locking device remains in its position of release.

It will be understood that, in the lighters herein referred to, the fuel is an inflammable gas, such as butane or other suitable gas, maintained in a valve-controlled container under sufficient pressure to keep the gas in the container in liquid form at the ambient temperatures of use.

The foregoing and other features of this invention, as defined in the appended claims, will appear from the following description and from the attached drawing, which are given by way of illustration and not of limitation.

In the drawing:

Fig. 1 is a perspective view of an assembled lighter, in closed position;

Fig. 2 is a cross-sectional elevation along median plane 2-2 of Fig. 1;

Fig. 3 is a partial cross-section along plane

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2-2 of Fig. 1, showing the lighter in opened position;

Fig. 4 is a cross-section along plane 4-4 of Fig. 2;

Fig. 5 is a partial cross-section along plane 5-5 of Fig. 2, toward the ignition device; Fig. 6 is a partial cross-section along plane 6-6 of Fig. 2, toward the lighter's release mechanism;

Fig. 7 is a detailed view of the valve operating mechanism;

Fig. 8 illustrates another embodiment of the invention, taken along plane 8-8 of Fig. 9;

Fig. 9 is a cross-section along line 9-9 of Fig. 8;

Fig. 10 illustrates a further embodiment of the invention and is taken along plane 10-10 of Fig. 11;

Fig. 11 is a cross-section along line 11-11 of Fig. 10;

Fig. 12 is a partial cross-section taken along line 12-12 of Fig. 10, toward the ignition device.

In the drawing, corresponding parts in the various figures are given the same reference number.

In the embodiment shown in Figs. 1 to 7, the lighter object of this invention comprises: an outer case 1, the top lid of which consists of two end shoulders 2 and 3, separated by an elongated opening defined at 4 by the upper edge of the case 1 along said opening. A movable cover 5, shaped as an inverted saddle or inverted U, fits within said opening, and the length and height of the side walls of said cover 5 are preferably greater than the depth and length of said opening, as appears from Fig. 2, so that in its closed position, the bottom edge of the side walls of cover 5 is below the edge of opening 4.

Cover 5 is pivotally mounted near one of its ends on an axis 8, in the manner and for the purpose hereafter described. The end 7 so mounted will be referred to hereafter as the pivoting end, while the opposite end 6 of the cover will be identified as the opening end.

The opening end 6 of cover 5 terminates slightly short of shoulder 2, so that the latter does not interfere with the pivoting motion of cover 5 around axis 8. The cover's pivoting end 7 is encased over a short distance within shoulder 3.

Axis 8 is suitably mounted in the two opposite faces of case 1; for instance, it may be held in place in two sockets provided in said faces, somewhat below edge 4 of the opening provided in said case as aforesaid.

A striking or ignition wheel 9 is so mounted on axis 8 that it pivots simultaneously and concurrently with the cover 5, as described hereafter. The pivoting motion of cover 5 and of wheel 9 on or around axis 8 is obtained by means of the

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action of spring 10 attached fixedly at one of its ends to case 1, directly or by means of stationary shaft 11, at a point of said case substantially below axis 8, and, in the particular showing of Fig. 2, to the right of said axis. At the other of its ends, spring 10 is attached to the pivoting end 7 of cover 5, directly or by means of a stationary shaft 12, near the top lid of the cover. Spring 10 and its points of attachment are such that the spring always tends to pull cover 5 downwards towards shaft 11, thereby causing cover 5 to rotate with wheel 9 around axis 8 in the opening direction of the cover (clockwise in the representation of Fig. 2). However, the pivoting motion of cover 5 and wheel 9 is limited to an angle of about 90° as a result of several cooperating actions:

(a) at its "closed" position (Figs. 2 and 6), cover 5 is held substantially parallel to the top of case 1 against the tension of spring 10 by means of a locking device, which comprises a lock 13 similar to a gun trigger and susceptible of pivoting around a shaft 13a supported by the sides of case 1 towards shoulder 2; this lock, at one end, engages cover 5 near its opening end 6 by any suitable means, such as shaft 14 attached to the sides of the cover, and, at its opposite end terminates as a push button 15 normally projecting outside case 1 through an opening 16 therein. A spring 17 is attached at one end 18 to the case 1 in any suitable way and at its opposite end to lock 13 at point 19 between shaft 13a and button 15, thus tending continuously to lift point 19. Therefore, cover 5 is held at its closed position by the locking grip of trigger 13 on shaft 14 against the tension of spring 10. But, when a slight pressure on button 15 releases the opening end 6 of cover 5 to the action of spring 10, the latter causes said cover 5 to pivot, clockwise in the drawing, with, or around, axis 8 to bring said cover to the open position, shown in Fig. 3.

(b) upon said release of cover 5 from its closed position, as just described, this cover and wheel 9 pivot simultaneously with or about axis 8, clockwise in the drawing, over an angle of aperture of about 90°. The aperture of this angle is the result of the suitable arrangement of the points of attachment of spring 10, namely at shafts 11 and 12, in the casing and the cover, and of the tension of said spring 10, together with the fact that shoulder 3 of case 1 is, as illustrated in Fig. 3, of such length that it serves as an abutment for cover 5 when the latter has pivoted around shaft 8 over the aforesaid angle.

Thus, in its closed position, cover 5 is generally parallel to the top of case 1, as represented by shoulders 2 and 3, while in its open position it is substantially at right angle thereto.

The angle of aperture, given above at 90°, can vary somewhat from said value. But from a structural as well as from an operational point of view, the variation cannot be great, and the value heretofore given seems preferable.

The bottom of case 1 consists of a flanged portion 20, which serves, by means of suitable filleted parts such as 21, as support for a flint-holding tube 22, containing flint 23, which is maintained in striking contact with wheel 9 by means of suitable springs 24 and plug 25, or otherwise.

The opening pivoting motion of cover 5, as heretofore described, and the concurrent pivoting of wheel 9 cause the latter to produce, in cooperation with flint 23, sparks which will ignite the fuel then being released from its container as hereafter described. As a feature of this inven-

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tion, sparks are produced as long as wheel 9 and cover 5 pivot with or about axis 8 over the aforesaid angle of aperture.

The remaining part of the bottom of case 1 is open, as shown at 26, and this opening serves to introduce into, or remove from, case 1 a fuel tank 27 containing inflammable, liquified gas, such as butane, under suitable pressure, and, if desired, a mass of absorbent material, such as cotton. The roof of tank 27 supports towards one of its ends an assembly 28 of a gas release and expansion valve 29 and burner 30, the axis of said assembly being so arranged as to bring the tip of the burner 30 and the point of contact of wheel 9 with flint 23 within a distance which will allow the spark produced by pivoting of wheel 9 over flint 23 to light the gas issuing from the burner tip, upon opening of valve 29. Burner 30 is slidably mounted within assembly 28; its lower end forms a valve plug so arranged that when the burner moves slightly outwardly from assembly 28, gas is released from tank 27 through valve 29 and burner 30. A spring 31, mounted within assembly 28 maintains the burner and its plug at the closed position, preventing escape of gas from tank 27 as long as the lighter is not in use. The tip of burner 30 may be shaped as, or be provided with, a flanged collar 32. Since the fuel in tank 27 is under pressure, a small motion of burner 30 is sufficient to let out the fuel required for the production of a flame of useful length, or conversely, to interrupt the gas flow and extinguish the flame.

According to this invention, the displacement of burner 30 with its valve plug outward of assembly 28, and therefore the escape of gas from tank 27, are obtained automatically, and concurrently with the production of sparks as a result of the action of wheel 9 against flint 23, as a result of a single manipulation of the user, namely his action on button 15, which, as heretofore described, causes release and pivoting of the cover 5 with or around axis 8, with simultaneous pivoting of striking wheel 9. This result is obtained by means of the following features, which are among the principal ones of this invention:

A bracket 33 is attached to tank 27, towards the upper end of side 34 nearest assembly 28; the actual point and method of attachment of this bracket to the tank may vary from those shown in the drawing; as illustrated, the upper end of bracket 33 terminates in the shape of a fork 35 located between flint holder 22 and the flanged tip 32 of burner 30, fork 35 serving as support for a shaft 36 pivotally mounted therein and located parallel to and slightly below the lower plane of flanged collar 32. Shaft 36 serves as pivot for a double-forked lever 37. One fork 38 of lever 37 engages under collar 32 in a plane generally parallel to the plane of the under-flange of said collar; the second fork 39 of lever 37 extends from shaft 36 on the side thereof opposite burner 30, around flint-holder 22, in a plane preferably, but not necessarily, perpendicular to the plane containing axis 8 and the axis of holder 22. This arrangement is such that, when fork 39 pivots downwards towards the bottom of tank 27, fork 38 will correspondingly pivot upwards, lifting collar 32 and burner 30, thereby allowing gas to escape from tank 27.

In this embodiment of the invention, as illustrated in Figs. 2 and 4, the outer width of fork 38 should be approximately equal to the maximum diameter of collar 32 and should, in any case, be somewhat smaller than the distance between the inner faces of the sides of case 1, for the purpose

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hereafter set forth. On the other hand, the outer width of fork 39 should be equal to the distance between the outer faces of the sides of cover 5, in order that the lower edges of said sides may act upon said fork 39 to cause the latter to pivot around axis 36 according to the following:

The slight pivoting of fork 39 and the corresponding pivoting of fork 38 around axis 36, by means of which the gas release and the burner are actuated, either for opening or closing, results from said contact of the lower edges of the sides of the cover 5, at its pivoting end, with fork 39, and from the profile of said edges on the pivoting end 7 of cover 5.

Said profile will be illustrated by taking as datum plane the plane containing the axis of flint-holder 22 and axis 8 (Figs. 2, 3 and 7). It will be assumed that, when cover 5, burner 30 and valve 29 are at the closed position, fork 39 is in a plane, perpendicular to the datum plane, and the distance of which to the axis 8 of rotation of wheel 9 and cover 5 is  $a$ ; and that the pivoting motion of the plane of fork 39 required to move fork 38 and collar 32 to the open and gas releasing position of burner 30 and valve 29 is measured by the difference between said distance  $a$  and a distance  $b$  measured between the axis 8 and the plane of fork 39 when the latter is at the gas-release position, distances  $a$  and  $b$  being both measured in the datum plane, and distance  $b$  being but slightly greater than distance  $a$ . On these premises, cover 5 being closed and the escape of fuel prevented, the distance in the datum plane between axis 8 and the lower edge of the sides of cover 5 at its pivoting end 7 is equal to  $a$ ; said lower edge then extends from the datum plane away from the burner (to the right in the drawing) parallel to the upper face of the tines of fork 39 up to a point X at which the distance between axis 8 and said lower edge is equal to  $b$ ; from point X on (to the right in the drawing), said edge is shaped as an arc of circle having for center axis 8 and for radius a dimension  $b$ , said arc being at least equal to the angle of aperture of cover 5, after which said edge's profile follows any suitable curve until it merges with the roof of cover 5. The foregoing is shown in detail in Fig. 7.

On the other side of the datum plane, toward the burner or the opening end 6 of cover 5, the profile of the lower edge of the sides of cover 5 is more or less arbitrary, beginning in the datum plane with a distance  $a$  between the axis 8 and the said edge; but, as stated before, it is desirable that on that side, the profile of the said lower edge be such that the sides of the cover fit within and below the upper edges 4 of the opening in case 1.

In the construction of portable lighters, the pivoting motion of forks 38 and 39 required to move the burner and its associated valve seat from closed to opened positions and vice versa is small, of the order of a few millimeters measured on the datum plane, and therefore the distance between the datum plane and point X is small.

From the foregoing it will be understood that, when pressure on button 15 releases cover 5 and allows it to open by pivoting around axis 8 by the action of spring 10, the lower edge of the sides of the pivoting end 7 of cover 5 bears on fork 39 from the start of said pivoting motion, lowers said fork very rapidly, over a small angle defined by the distance  $D$  between the datum plane and point X, thereby bringing dependent

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fork 38 to bear on collar 32 of burner 30 and its associated valve plug, moving the latter from the closed to the opened position, thereby releasing gas from tank 27; and, further, that, as a result of the profile of the lower edge of the sides of cover 5, as heretofore described, the gas will continue to flow out from tank 27 as long as cover 5 shall remain open, since the burner and its associated valve seat are at the open position during that time (see Fig. 3).

Thus, upon opening of cover 5 by mere pressure on button 15, the flow of fuel begins and reaches full intensity long before the cover's rotation has been completed. Simultaneously, starting with the beginning of the cover's rotation and continuing during its duration, sparks are produced as a result of the action of wheel 9, rotating with cover 5, on flint 23, thereby insuring ample time to ignite the released gas; the flow of fuel continues as long as the cover is open. Closing of the cover 5, alone, permits shutting-off the flow of gas from tank 27, such closing bringing forks 38 and 39 back to the position corresponding to the closing of the burner 30 and its associated valve plug, as a result of the caminated shape of the lower edge of the sides of cover 5 as heretofore described.

When fuel tank 27 is empty, it can easily be replaced by a full tank by pressing on button 15, which opens the cover 5, and pushing the empty tank out of case 1 through bottom opening 26; assembly 28, double fork 37, 38 and 39 come out together with the tank. Similarly, the full tank, carrying an assembly 28, bracket 33 and double fork 37, 38 and 39 is easily inserted inside case 1.

If a tank must be removed from case 1 before it is completely emptied of fuel, the loss of the latter is negligible, since the caminated edge of cover 5 ceases to act upon the valve and burner as soon as fork 37 has moved with tank 27 a short distance.

Tank 27 should be maintained firmly in position inside cover 1, by means of brackets or ribs dependent from the case and shown diagrammatically at 40 and 41 respectively limiting the motion of tank 27 upwards and sideways. The size of lateral brackets or ribs 41 is such as to allow passage of the tank with assembly 28, bracket 33 and fork 37, 38 and 39 when these parts are removed from or inserted in case 1.

The bottom of case 1 is provided with cover 42 which may also serve to hold tank 27 motionless, for instance by means of spring 43, or otherwise.

The shape, the method and points of attachment of springs 10 and 17 may be varied from the foregoing description, as long as the modifications preserve the function of these springs. Moreover, in order to avoid tear and wear of case 1 and to permit an improvement in the external appearance of said case, the pivoting parts may be mounted on collars revolving around fixed axis or shafts instead of depending directly from rotating shafts or axis. In this way, the case 1 supports the fixed shaft or axis, the ends of which may be hidden in the thickness of the walls of the case, instead of supporting pivoting parts. This may be used in the case of trigger 13, cover 5 and wheel 9.

An improved embodiment of this invention is illustrated in Figs. 8 and 9 and will be now described.

In the embodiments of this invention so far described by reference to Figs. 2 to 6, the support 33 for the double fork 37, 38 and 39 is attached to fuel tank 27. Therefore, when it is necessary

to change fuel tank, said support and fork come out of case 1 as one piece, and the new tank must carry, before its insertion in case 1, a support 33 and a double fork 37, 38 and 39. Any disadvantages which may result therefrom may be obviated, as shown in Figs. 8 and 9 by mounting bracket 33 and the double fork 37, 38 and 39 detachably on tank 27, so that, after tank 27 with assembly 28, bracket 33 and the double fork 37, 38 and 39 has been removed from case 1, the bracket and the double fork which it supports may be separated from tank 27 and assembly 28. In this manner, the new or replacement tank need only have attached to it the assembly 28, while the same bracket 33 and double fork 37, 38 and 39 can be used over again.

In the improved embodiment here described, by reference to Figs. 8 and 9 a thin movable sheath 101 fits closely around the vertical portions of tank 27 which is on the side thereof on which assembly 28 is mounted; bracket 33 is not mounted on the tank 27, as was the case in the embodiment illustrated by Figs. 2 to 6, but is now mounted on sheath 101. Thus, upon removal of a tank 27 from case 1, the tank, its assembly 28, sheath 101 with its attached bracket 33 supporting forks 37, 38 and 39 come out together, but this whole can be separated into two parts, one consisting of tank 27 and assembly 28, and the other consisting of sheath 101 with bracket 33 and the double fork. Conversely, if a new tank 27 with its assembly 28 must be inserted inside case 1, a sheath 101 with its connected bracket 33 and double fork 37, 38 and 39 is fitted beforehand around tank 27, in such a way that fork 38 slides under the under-flange of collar 32 of the burner, and the whole is then inserted in case 1.

In this embodiment the upper roof of sheath 101 is shaped as a two-prong fork fitting around such parts of assembly 28 that protrude out of tank 27.

Sheath 101 may, by friction, reduce or eliminate movement of tank 27 inside case 1, and may therefore permit the elimination of brackets or ribs 40 and 41, shown in Figs. 2 and 8.

The walls of sheath 101 may be so shaped as to lighten it and make its separation from tank 27 easier.

The method for operating, lighting the flame and shutting it off, according to this improved embodiment, as well as the construction of the remaining parts of the device remain substantially as described in connection with Figs. 1 to 7, with the same results.

Another improved embodiment of this invention is illustrated in Figs. 10 to 12 and described hereafter, which presents advantages as compared with the embodiments so far described and illustrated in Figs. 2 to 9. In this other improved embodiment, all the axis or shafts of the device are independent from the outer case 1, so that the latter serves merely to hold the inner assembly in place and for decorative purposes. In this modification, the operating mechanism of the lighter depends from a sheath 101, similar to that shown in Figs. 8 and 9 and heretofore described, and from a second sheath 102 and from suitable extensions of these sheathes, sheath 102 surrounding at least partially tank 27 on the side thereof towards trigger 13 and being independent from sheath 101.

In this other improved embodiment, bracket 33 and the double fork 37, 38 and 39 which it supports depend from sheath 101, substantially

as described in connection with Figs. 8 and 9. But, here, sheath 101 is provided with an extension bracket 103 having parallel walls 103a and 103b and fixedly attached at 101a to sheath 101 on the side towards flint holder 22. The shape of said extension bracket 103 is such that: 1) when tank 27 is in place inside case 1, at least part of the outer edges of said extension bracket 103 fits against the inner side of case 1 as shown at 104 and 105 in Figs. 10 and 11; and 2) the upper end of said bracket 103 supports shaft 8, with its dependent wheel 9 and cover 5, and serves as attachment point for end 11 of spring 10.

The outer distance between outer faces 103a and 103b of extension bracket 103 is preferably shorter than the distance between the inner faces of the sides of cover 5, so that the sides of said extension bracket 103 fit inside the cover 5.

Flint holder 22 is screwed or otherwise attached to a flange 106 forming the bottom of extension bracket 103. The height of joint 101a between the bracket 103 and the sheath 101 may be varied, and the length of flint holder 22 may be correspondingly varied. The rigidity of flint holder 22, in this embodiment as well as in the others, may be increased by providing for a collar-bracket 107 attached to the sides of the extension bracket 103, or of case 1. Extension-bracket 103 may be provided, as an upper extension of the edges 104 and 105, with a tongue 108 which fits within shoulder 3 of case 1 and serves, in cooperation with other parts of the structure, to hold tank 27 and its appended parts in place inside case 1. In this embodiment, the profile of the edge of the sides of cover 5, its operative relation with fork 39 remain as described previously, with the same overall results in the operation of the lighter.

The upper part of sheath 102 presents two parallel extensions 109, fitting snugly within shoulder 2 of case 1, thereby contributing to maintain tank 27 and its associated parts motionless within case 1. Shaft 13a and spring attachment 18 are supported by extensions 109. Otherwise, the release and closure means for cover 5, and their operation, are substantially as described in connection with Figs. 1 to 7.

In the improved embodiment last mentioned, bottom 110 of case 1 is open over its entire cross-section, so that tank 27, with sheathes 101 and 102 and their dependent parts may be removed from or inserted into case 1 as a unit. When the whole inner assembly is out of case 1, tank 27 and assembly 28 can easily be separated from the remaining parts by slipping off sheath 101 and its dependent parts, and sheath 102 and extension bracket 103 with their dependent parts.

It is seen that pushing button 15 inside of case 1 allows said removal or insertion of the inner mechanism.

Bottom 110 of case 1, which is open on its entire cross-section, is closed by means of suitable cover 111 which may also contribute to maintain the inner assembly in place inside case 1.

In all embodiments of this invention, it is desirable to mount wheel 9 and cover 5 with respect of each other around their axis of rotation 8 in such a manner that wheel 9 will only rotate with cover 5 during the opening of the latter, remaining motionless while cover 5 is closed. Methods and means to accomplish this result are well known, and have therefore been neither described nor shown. This result may be achieved, for instance, by mounting cover 5 and wheel 9 on two independent collars pivoting around axis 8

and by providing one side face of wheel 9 with radial ratchets so disposed that a spring attached to the adjacent inner face of a side of cover 5 engages one of the ratchets when the cover opens, thereby rotating the wheel 9 with the cover, but slides over said ratchets without motion of the wheel when the cover 5 is being closed. When the closed cover is again opened, it is again ready to move wheel 9 by engagement of the spring with another ratchet of the wheel.

In all embodiments of this invention, the dimensions of the case 1 can be varied within limits in relation to those of fuel tank 27, by changing the dimension of distances *a* and *b* and the radius of wheel 9, and by adjusting the distance between the axis of flint holder 22 and tank 27. The smaller the dimensions *a* and *b* and the radius of wheel 9, and the distance between the axis of flint holder 22 and tank 27, the smaller the height and width of case 1.

I claim as my invention:

1. A lighter, comprising in combination, an outer casing having an open top portion and opposite side walls; a cover member located in said open top portion of said casing and extending between said side walls, said cover member being mounted, at an end portion thereof located adjacent one of said side walls, for pivotal movement, about an axis extending transversely through said end portion of said cover member, between one position where said cover member substantially closes said open top portion of said casing and another position where said cover member uncovers said open top portion of said casing; spring means located only between said axis and said one side wall of said casing and being operatively connected to said cover member for urging the same toward said other position thereof; releasable latch means located adjacent said open top portion and the other of said opposite side walls of said casing and being operatively connected to said cover member for releasably holding the same in said one position thereof against the action of said spring means; a friction wheel operatively connected to said cover member for turning movement therewith from said one to said other position and about said axis; flint means engaging said friction wheel; combustible-fluid container means located in said casing beneath said cover member and spaced from said one side wall of said casing; valve means mounted on said container means and being located on the opposite side of said axis from said spring means; and lever means interconnecting said valve means with said end portion of said cover member for opening said valve means upon movement of said cover member to said other position thereof, whereby, when said releasable latch means is actuated to release said cover member, said spring means moves the latter to said other position thereof to simultaneously rotate said friction wheel and open said valve means.

2. A lighter, comprising in combination, an outer casing having an open top portion and opposite side walls; a channel-shaped cover member having an open bottom, being located in said open top portion of said casing and extending between said side walls, said cover member being mounted, at an end portion thereof located adjacent one of said side walls, for pivotal movement, about an axis extending transversely through said end portion of said cover member, between one position where said cover member substantially closes said open top portion of

said casing and another position where said cover member uncovers said open top portion of said casing; spring means located only between said axis and said one side wall of said casing and being operatively connected to said cover member for urging the same toward said other position thereof; releasable latch means located adjacent said open top portion and the other of said opposite side walls of said casing and being operatively connected to said cover member for releasably holding the same in said one position thereof against the action of said spring means; a friction wheel located within said channel-shaped cover member and being operatively connected to said cover member for turning movement therewith from said one to said other position and about said axis; flint means engaging said friction wheel; combustible-fluid container means located in said casing beneath said cover member and spaced from said one side wall of said casing; valve means mounted on said container means and being located on the opposite side of said axis from said spring means; and lever means interconnecting said valve means with said end portion of said cover member for opening said valve means upon movement of said cover member to said other position thereof, whereby, when said releasable latch means is actuated to release said cover member, said spring means moves the latter to said other position thereof to simultaneously rotate said friction wheel and open said valve means.

3. A lighter, comprising in combination, an outer casing having an open top portion and opposite side walls; a channel-shaped cover member having an open bottom, being located in said open top portion of said casing and extending between said side walls, said cover member being mounted, at one end portion thereof located adjacent one of said side walls, for pivotal movement, about an axis extending transversely through said end portion of said cover member, between one position where said cover member substantially closes said open top portion of said casing and another position where said cover member uncovers said open top portion of said casing; said end portion of said cover member having at least one bottom cam-shaped side edge; spring means located only between said axis and said one side wall of said casing and being operatively connected to said cover member for urging the same toward said other position thereof; releasable latch means located adjacent said open top portion and the other of said opposite side walls of said casing and being operatively connected to said cover member for releasably holding the same in said one position thereof against the action of said spring means; a friction wheel located within said channel-shaped cover member and being operatively connected to said cover member for turning movement therewith from said one to said other position and about said axis; flint means engaging said friction wheel; combustible fluid container means located in said casing beneath said cover member and spaced from said one side wall of said casing; valve means mounted on said container means and being located on the opposite side of said axis from said spring means; and pivotally mounted lever means connected to said valve means and abutting against said cam-shaped bottom side edge of said end portion of said cover member for opening said valve means upon movement of said cover member to said other position thereof,

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whereby, when said releasable latch means is actuated to release said cover member, said spring means moves the latter to said other position thereof to simultaneously rotate said friction wheel and open said valve means.

4. A lighter, comprising in combination, an outer casing having an open top portion and opposite side walls; a channel-shaped cover member having an open bottom, being located in said open top portion of said casing and extending between said side walls, said cover member being mounted, at one end portion thereof located adjacent one of said side walls, for pivotal movement, about an axis extending transversely through said end portion of said cover member, between one position where said cover member substantially closes said open top portion of said casing and another position where said cover member uncovers said open top portion of said casing, said end portion of said cover member having bottom cam-shaped side edges; spring means located only between said axis and said one side wall of said casing and being operatively connected to said cover member for urging the same toward said other position thereof; releasable latch means located adjacent said open top portion and the other of said opposite side walls of said casing and being operatively connected to said cover member for releasably holding the same in said one position thereof against the action of said spring means; a friction wheel located within said channel-shaped cover member and being operatively connected to said cover member for turning movement therewith from said one to said other position and about said axis; elongated flint means engaging said friction wheel; combustible-fluid container means located in said casing beneath said cover member and spaced from said one side wall of said casing; valve means mounted on said container means and being located on the opposite side of said axis from said spring means; and pivotally mounted lever means connected to said valve means, having a bifurcated end located about said flint means and abutting against said cam-shaped bottom side edges of said end portion of said cover member for opening said valve means upon movement of said cover member to said other position thereof, whereby, when said releasable latch means is actuated to release said cover member, said spring means moves the latter to said other position thereof to simultaneously rotate said friction wheel and open said valve means.

5. A lighter, comprising in combination, an outer casing having an open top portion and opposite side walls one of which is formed with an opening extending therethrough; a channel-shaped cover member having an open bottom, being located in said open top portion of said casing and extending between said side walls, said cover member being mounted, at an end portion thereof located adjacent to the other of said side walls, for pivotal movement, about a first axis extending transversely through said end portion of said cover member, between one position where said cover member substantially closes said open top portion of said casing and another position where said cover member uncovers said open top portion of said casing, said end portion of said cover member having bottom cam-shaped side edges; spring means located only between said first axis and said other side wall of said casing and being operatively connected to said cover member for urging the same toward said

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other position thereof; releasable latch means mounted for pivotal movement about a second axis parallel to said first axis, being located adjacent said open top portion and said one side wall of said casing, and being operatively connected to said cover member for releasably holding the same in said one position thereof against the action of said spring means, said latch means having an end portion extending through said opening in said one side wall so that said latch means may be actuated from the outside of said casing; a friction wheel located within said channel-shaped cover member and being operatively connected to said cover member for turning movement therewith from said one to said other position and about said first axis; elongated flint means engaging said friction wheel; combustible-fluid container means located in said casing beneath said cover member and spaced from said other side wall of said casing; valve means mounted on said container means and being located on the opposite side of said first axis from said spring means; and pivotally mounted lever means connected to said valve means and having a bifurcated end located about said flint means and abutting against said cam-shaped bottom said edges of said cover member for opening said valve means upon movement of said cover member from said one to said other position thereof, whereby, when said end portion of said latch means is actuated to release said cover member, said spring means moves the latter to said other position thereof to simultaneously rotate said friction wheel and open said valve means.

6. A lighter, comprising in combination, an outer casing having an open top portion and opposite side walls one of which is formed with an opening thereon; a combustible-fluid container removably located in said casing adjacent said one side wall thereof and spaced from the other of said opposite side walls thereof; valve means mounted on said container; a first sheath member removably mounted on said container and located adjacent to said other side wall, said first sheath member having a first extension extending therefrom to said other side wall and said open top portion of said casing; a bracket mounted on said first sheath member adjacent said valve means; elongated flint means removably mounted on said first extension and being located adjacent to said bracket; a lever member pivotally mounted on said bracket, having one end engaging said valve means for operating the same and having an opposite bifurcated end located about said flint means; a channel-shaped cover member having an open bottom, being located in said open top portion of said casing and extending between said side walls thereof, said cover member having an end portion pivotally mounted on said first extension over said flint means for movement about a first axis between one position where said cover member substantially closes said open top portion of said casing and another position where said cover member uncovers said top portion of said casing, said end portion of said cover member having bottom cam-shaped side edges abutting against said bifurcated end of said lever; spring means located only between said first axis and said other side wall of said casing and being connected at one end thereof to said cover member and at the other end thereof to said first extension for urging said cover member toward said other position thereof; a friction wheel mounted within said channel-shaped cover member and being con-

nected thereto for pivotal movement therewith about said first axis from said one position to said other position thereof, said friction wheel engaging said flint means; a second sheath member removably mounted on said container adjacent said one side wall of said casing and having a second extension located adjacent said one side wall and said open top portion of said casing; releasable latch means pivotally mounted on said second extension, for turning movement about a second axis parallel to said first axis, and having an end portion extending through said opening in said one side wall of said casing so that said releasable latch means may be actuated from the outside of said casing, said releasable latch means being operatively connected to said cover member for holding the same in said one position thereof against the action of said spring means, whereby, when said end portion of said releasable latch means is actuated to release said cover member, said spring means moves said cover member to said other position thereof so that said valve means is moved into its open position and said friction wheel is turned against said flint means, said first and second sheath members permitting said casing to be entirely separated from the other parts of the lighter.

7. A lighter, comprising, in combination, a lighter body having opposite sides extending downwardly from an upper part of said body; a lever located on said upper part of said body and having opposite end portions respectively located adjacent said sides, said lever being mounted, adjacent one end portion thereof, for pivotal movement, about an axis extending transversely through said lever, between an inoperative position where said lever is located adjacent said body and an operative position where said lever extends upwardly from said body; spring means operatively connected to said one end portion of said lever, between said axis and the extremity of said one end portion of said lever, for urging

said lever toward said operative position thereof; releasable latch means on said lighter body located adjacent said upper part thereof and the one of said sides thereof distant from said axis and being operatively connected to said lever for releasably holding the same in said inoperative position thereof against the action of said spring means; a friction wheel operatively connected to said lever for turning movement thereof with about said axis; flint means mounted on said body and engaging said friction wheel; combustible-fluid container means located on said body beneath said lever and adjacent said one side of said body; valve means mounted on said container means and being located on the opposite side of said axis from said spring means, said valve means being movable between open and closed positions for respectively opening and closing said container means; and means associated with said valve means and lever for synchronizing the operation of said valve means and lever so that said valve means is open when said lever means is in said operative position thereof and so that said valve means is closed when said lever means is in said inoperative position thereof.

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