

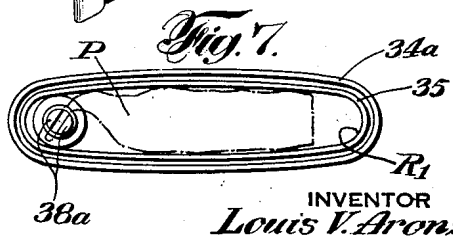
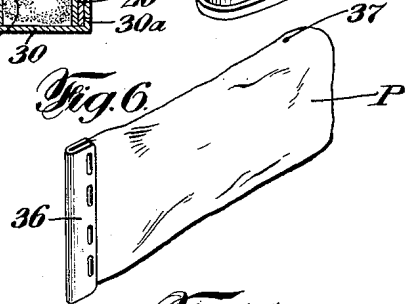
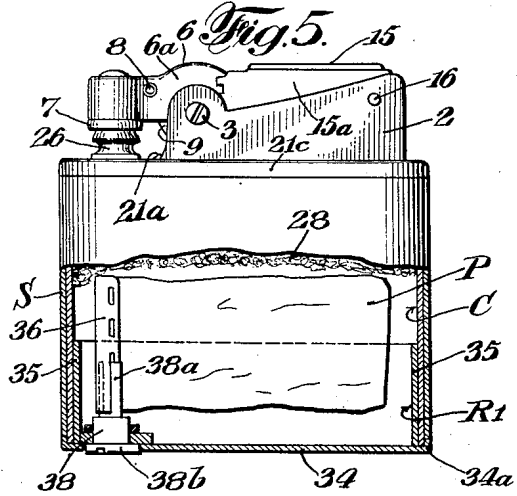
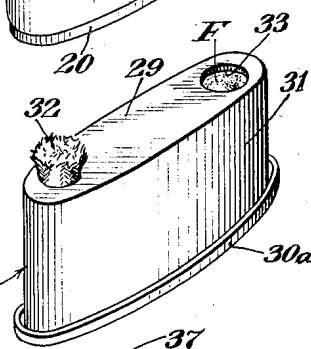
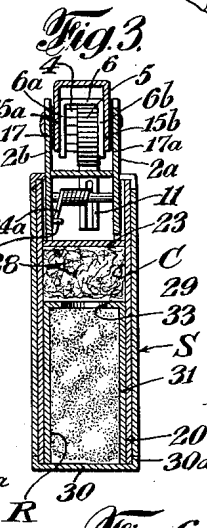
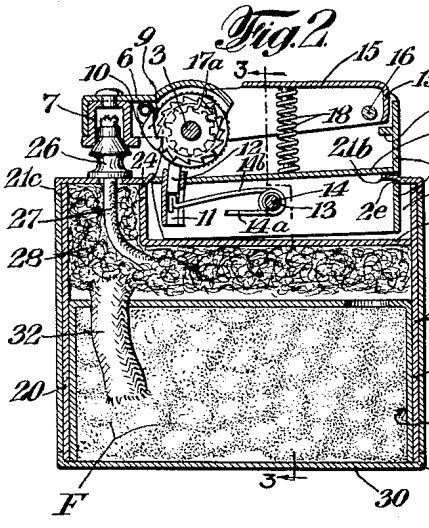
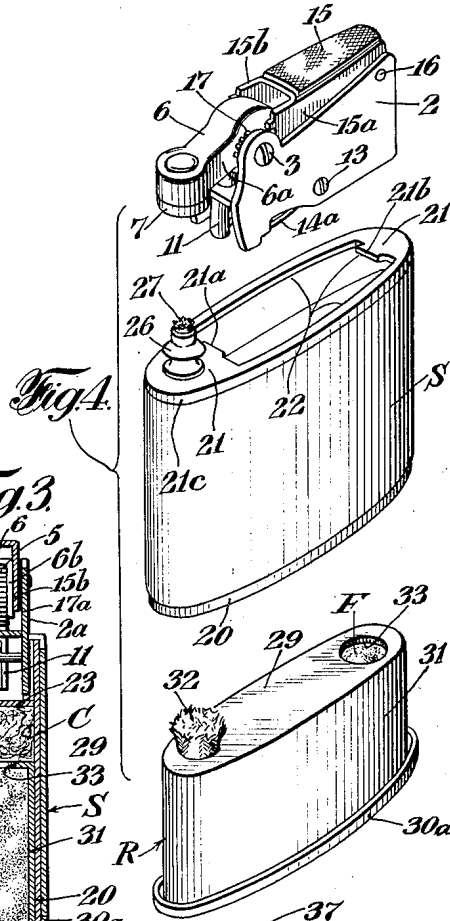
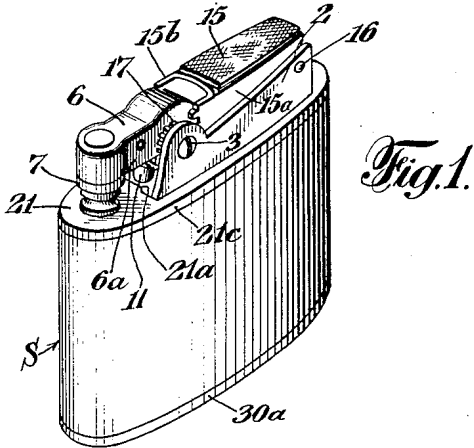
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1,941,873

PYROPHORIC LIGHTER ARRANGEMENT

Filed March 31, 1930



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PYROPHORIC LIGHTER ARRANGEMENT

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Application March 31, 1930. Serial No. 440,215

8 Claims. (Cl. 67-7.1)

My invention relates to pyrophoric lighting mechanism and to novel arrangements for supplying fuel to the wick of such mechanism.

My invention relates to novel fuel containers, novel fuel-supplying or -feeding arrangements, and to lighter mechanism, particularly adapted for the purposes of my invention.

Various other features, characteristics and advantages of my invention will become apparent from the following detailed description taken in connection with the accompanying drawing.

My invention resides in the pyrophoric lighting mechanism, fuel-supplying arrangements, combination of parts, and features of construction of the character hereinafter described and claimed.

For an understanding of my invention and for an illustration of some of the many forms thereof, reference is to be had to the accompanying drawing, in which:

Figure 1 is a perspective view of a pyrophoric lighting device as constructed in accordance with my invention;

Fig. 2 is a vertical sectional view, partly in elevation, of the device shown in Fig. 1;

Fig. 3 is a transverse vertical sectional view, partly in elevation, and is taken on the line 3-3 of Fig. 2;

Fig. 4 is a perspective view of the device shown in Figs. 1, 2 and 3 but illustrating parts thereof in disassembled relation;

Fig. 5 is an elevational view, partly in vertical section, showing a modified arrangement for supplying fuel to pyrophoric lighting mechanism;

Fig. 6 is a perspective view showing the fuel-containing casing of Fig. 5; and

Fig. 7 is a plan view of the receptacle utilized with the fuel-containing casing of Fig. 5.

Referring to Figs. 1-6 inclusive, 1 illustrates a plate or member having spaced, chamber-forming walls 2, 2a upstanding therefrom and depending therebelow, Fig. 3, adjacent ends of said walls preferably being connected by a transverse wall 2b, Fig. 2. The aforesaid walls 2, 2a may extend throughout the length of the plate 1 and are unconnected at their ends removed from the transverse wall 2b.

Extending through the walls 2, 2a, immediately adjacent their unconnected ends, is a pin or member 3 carrying, in side-by-side relation, a ratchet wheel 4 and a peripherally-roughened wheel 5, the wheels 4 and 5 being suitably secured together for free rotative movement as a unit on the member 3.

Freely oscillatory on the member 3 is an arm

or member 6 having depending side walls 6a and 6b between which the aforesaid wheels 4 and 5 are snugly received and which, adjacent one end thereof, have the aforesaid pin or member 3 extending therethrough. At its end removed from said member 3, the member 6 carries a snuffer cap 7 which is secured thereto in any suitable manner. A pin 8 extending through the aforesaid walls 6a and 6b has a pawl 9 freely pivoted thereon, the notched end of said pawl being suitably biased toward and into engagement with the ratchet wheel 4, as by a spring 10.

Extending through the plate 1 is a tube 11 from the upper end of which a pyrophoric element 12 partly projects, Fig. 2. The upper end of the pyrophoric element 12, Fig. 2, is adapted to engage the periphery of the wheel 5 with considerable pressure and, to this end, any suitable arrangement may be utilized such, for example, as herein illustrated wherein a rod 13 extends laterally between and is carried by those sections of the walls 2, 2a depending below the plate 1. Coiled around the rod 13 is a spring 14, one end 14a of which is suitably held in fixed position, as by a lug 2c projecting laterally from the aforesaid plate 2, Fig. 3. The other end 14b of spring 14 extends through a slot formed longitudinally in the tube 11 and engages the lower end of the pyrophoric element 12, said spring end 14b, when positioned as shown in Fig. 2, tending to swing in a clockwise direction, due to the unwinding tendency of the spring 14 whereby the pyrophoric element 12, with considerable pressure, is held in engagement with the periphery of wheel 5.

Any suitable arrangement may be utilized for actuating the wheel 5 to cause it, by coaction with the pyrophoric element 12, to produce sparks for fuel-ignition or flame-producing purposes. As herein illustrated, there is thus utilized a manually operable member 15 having depending, spaced side walls 15a, 15b partly disposed interiorly of those sections of the walls 2 and 2a which upstand from the plate 1; preferably, adjacent ends of the walls 15a, 15b are connected by a transverse wall 15c, Fig. 2. A pin or member 16 extends transversely through the aforesaid upstanding sections of walls 2, 2a closely adjacent said transverse wall 2b, the depending walls 15a and 15b of member 15 being pivoted on said pin 16, and the transverse wall 15c being disposed between the pin 16 and the transverse wall 2b, Fig. 2.

As shown on the drawing, said depending walls 15a and 15b of actuating member 15 extend toward the member 3 and each is formed with rack

teeth, the sets of rack teeth meshing, respectively, with pinions 17, 17a secured to the respective exterior surfaces of the walls 6a, 6b of member 6, whereby said member 6 together
5 with the pinions 17, 17a are freely oscillatory as a unit about and with respect to the member 3. The actuating member 15 may be suitably biased in a clockwise direction, Fig. 2, as by a helical spring 18 disposed between the plate 1 and the
10 horizontal section of actuating member 15, said spring 18 being suitably anchored, as by centering lugs, if desired.

Preferably, in accordance with my invention, a suitable arrangement is provided for limiting
15 clockwise movement, Fig. 4, of the actuating member 15 under the influence of spring 18. To this end, there may be utilized a lug 2d which projects laterally from the interior surface of the transverse wall 2b and is interposed in the
20 path of the transverse wall 15c of actuating member 15.

The plate 1 constitutes a supporting member for the parts hereinbefore described which, as shown at the top of Fig. 4, form a unitary device
25 utilizable for spark-producing purposes. As thus illustrated in Fig. 4, the plate 1 may be held in one hand and the actuating member 15 depressed in opposition to the expansive tendency of spring 18. The hereinbefore described sets of rack
30 teeth meshing, respectively, with the pinions 17 and 17a cause the member 6 to swing clockwise, Fig. 4, the pawl 9 coacting with the ratchet wheel 4 to impart a step of movement to the latter and to the serrated wheel 5. Accordingly,
35 the latter coacts with the pyrophoric element 12 to produce a shower of sparks which are directed beneath the snuffer cap 7.

Upon release of pressure on the actuating member 15, the latter moves clockwise, Fig. 4,
40 under the influence of spring 18 until wall 15c comes into engagement with lug 2d to thereby discontinue such movement of the actuating member 15, the last described movement of the latter causing the member 6 to swing counter-
45 clockwise, Fig. 2. However, during such movement of the member 6, the pawl 9 idles with respect to the ratchet wheel 4 and consequently the wheel 5 remains stationary.

In accordance with my invention, the aforesaid plate 1, together with the thereby-carried
50 mechanism, is adapted for ready detachable association with a main casing C which per se may comprise side wall structure 20 of oval, square, rectangular or other suitable configura-
55 tion, said side wall structure 20 being circumferentially complete and normally open at the bottom, such open bottom being adapted for closure by a suitable fuel-supplying device as herein-
60 after described. The casing C per se may also comprise a top wall 21 cut-away or apertured as shown at 22, Fig. 4, and further may comprise an intermediate wall 23 connected to said top
65 wall 21 by a vertical wall 24. The walls 23 and 24 conform with interior, adjacent surfaces of the side wall structure 20 to which said walls 23 and 24 are soldered, or otherwise suitably secured, whereby the casing C comprises an upper chamber 25 open at its top and sealed from the fuel chamber proper.

The aforesaid plate 1, with the various parts
70 of the spark-producing mechanism assembled thereon, is adapted to be detachably secured to the casing C and more particularly to the top wall 21 so that said plate 1 closes or substantially closes the aforesaid aperture 22 with the parts
75 therebelow housed in the chamber 25. This de-

tachable relation may be obtained in any suitable manner such, for example, as herein illustrated wherein the top plate 21, at opposite ends of the aperture 22, is shown as comprising sections 21a and 21b extending toward each other, the former adapted for coaction with that end of
80 the plate 1 below the wheels 4 and 5, and the latter adapted to be received by a slot 2e formed in the transverse wall 2b immediately below said plate 1, all as more particularly hereinafter de-
85 scribed.

Upstanding from that part of the casing top wall 21 comprising the aforesaid section 21a is a wick tube 26 having a surface adapted for
90 coaction with the aforesaid snuffer cap 7. A wick 27 projects slightly above the wick tube 26, extends downwardly therethrough and terminates interiorly of the casing fuel-containing chamber, i. e., that casing chamber which is
95 sealed from the aforesaid chamber 25. If desired and preferably, a mass 28 of suitable absorbent material, as cotton, may be disposed around the wick 27 and largely or entirely within the upper part of said fuel-containing chamber,
100 Fig. 2.

In accordance with my invention, fuel is supplied to the interior of the casing C, and more particularly to the section of wick 27 disposed therein, in a novel manner. In a broad sense
105 and in accordance with my present invention, fuel of any suitable type may be supplied to the interior of said casing C. However, in accordance with the disclosure of this application and preferably but not necessarily, semi-solid or jelly-like fuel is supplied to the interior of casing
110 C, the fuel last stated being such as is described, for example, in the copending Nathan Proper application Serial No. 342,306, filed February 23, 1929.

Accordingly, in accordance with my invention,
115 there may be associated with the casing C a supplementary casing or receptacle R which, as shown, has a top wall 29 and a bottom wall 30, said top and bottom walls being joined by side wall structure 31. Ordinarily, the aforesaid
120 walls of the receptacle R are formed from suitable sheet metal and, in accordance with that phase of my invention wherein said receptacle R is to be held interiorly of the casing C solely by a frictional effect, the receptacle side wall structure 31 should conform with and be only slightly
125 smaller in horizontal cross-sectional configuration than that of the casing C; when the aforesaid frictional effect is desired, the distance between adjacent front and rear surfaces of said
130 side wall structure 31 should be slightly greater than the distance between front and rear surfaces of the casing side wall structure 20.

With the casing C and receptacle R in dis-
135 associated relation and with said receptacle R containing a suitable quantity of fuel, such as the aforesaid semi-solid or jelly-like fuel F, said receptacle R may be introduced into the lower end of the casing C and moved thereto until
140 coming into the position shown in Figs. 2 and 3, the receptacle base 30 comprising a peripheral flanged section 30a adapted to assume the relation shown in Figs. 2 and 3 with respect to the casing side wall structure 20 for limiting further
145 inward movement of said receptacle R with respect to the casing C.

As shown in Fig. 2, the receptacle R should contain a wick 32 (preferably but not necessarily greater in diameter than that of the aforesaid
wick 27, this being desirable when the fuel is

of semi-solid character), said wick 32 being lodged, in more or less intimate contact with the body of fuel F and extending through the receptacle top wall 29 and into the space there-

above, i. e., that fuel-containing chamber of the casing C in which the wick 27 is disposed. Accordingly, by the wick 32, or equivalent, fuel is transferred more or less directly to the wick 27 and comes to the upper exposed end of the latter.

To assemble the plate 1, together with all parts carried thereby in operative relation on and with respect to the casing C, said plate 1 is suitably manipulated to cause the slot 2e of transverse wall 2b to pass from left to right, Fig. 2, so that the section 21b of wall 21 enters said slot 2e which comes into about the position shown. Then, by pressure downwardly applied, the plate 1 is moved into the position shown in Fig. 2 wherein the snuffer cap 7 is seated on the wick tube 26. Just before reaching such position, the end of plate 1 to the left, Fig. 2, passes beneath the resilient sections 21a of said plate 21.

By virtue of this construction, the plate 1 and the thereby-carried operating parts are firmly secured in ready detachable relation on the casing C. The casing wall 23 and the ends of the walls 2a and 2b to the left, Fig. 2, engage to prevent further downward movement of plate 1, Fig. 2; the wall sections 21a and 21b prevent casual unintended upward movement of said plate 1, while the latter, in the region thereof toward the left, Fig. 2, snugly fits the surfaces defining the aperture 22 and prevents any substantial sideways, the latter being resisted, of course, by the other engaging parts.

When the plate 1 is to be detached from the casing C, it is moved upwardly with the required force until the end thereof to the left, Fig. 2, clears the resilient wall section 21a, whereupon the transverse wall 2b may readily be disengaged from the wall section 21b.

The above described detachable relation of the plate 1 is provided so that access may be had to the tube 11 when it becomes necessary to adjust the pryphoric element 12a to renew the same. Obviously, as regards some phases of my invention, any other suitable arrangement may be utilized for this purpose.

With all of the parts hereinbefore described related as shown in Fig. 2, depression of the manually actuatable member 15 causes the production of sparks as described above, the sparks producing flame at said upper end of wick 27, the latter being exposed when the snuffer cap 7 is elevated. Upon release of pressure upon the manually actuatable member 15, the parts return to the position shown in Fig. 2, the snuffer cap 7 returning to engagement with the wick tube 26 to extinguish the flame and to close the fuel passage from the interior of the casing C.

As will be noted from Fig. 2, the wick tube 26 coacts with the snuffer cap 7 to discontinue clockwise movement, Fig. 2, of the actuating member 15 before the transverse wall 15c thereof comes into engagement with the lug 2d. Accordingly, the spring 18, acting through the train of mechanism, functions to hold the snuffer cap 7 against its seating surface of the wick tube 26. The lug 2d is provided to prevent undue movement of the actuating member 15 and member 6 during any time wherein the plate 1 is removed from the casing C since, at that time, the snuffer cap 7 and wick tube 26 are disassociated. Accordingly, were the lug 2d, or equivalent, not provided, the spring 18 probably would swing the actuating

member 15 to such an extent in a clockwise direction, Fig. 4, that the sets of rack teeth at the ends of members 15a and 15b would become disengaged, respectively, from the pinions 17 and 17a.

The receptacle R may be provided with a suitable filling opening 33 which, if desired, may be in the top wall 29 thereof to one side of the wick 32. With an arrangement of this character, it is necessary to remove the receptacle R from the casing C when it becomes necessary to supply additional fuel thereto. It shall be understood, however, that the filling opening 33 may be positioned otherwise than as herein shown. If desired, such filling opening may be in the bottom wall 30 of receptacle R so that it is unnecessary to remove said receptacle from the casing C in order to replenish the fuel supply.

Although the herein described receptacle R has been described as detachably related to the casing C, it shall be understood that my invention is not to be limited to this arrangement. Thus, for example, a receptacle R, or equivalent, may be more or less permanently secured interiorly of the casing C, suitable fuel being passed thereinto through an opening provided, for example, in the bottom receptacle wall 30.

Referring to Figs. 5, 6 and 7, there is illustrated a modified form of my invention as regards the fuel-supplying phase thereof. As shown, there is thus utilized a receptacle or support R1 having a bottom wall 34 from which upstands wall structure 35, the latter being adapted to be frictionally or otherwise detachably secured in suitable manner interiorly of the casing C.

Disposed partly or entirely within the receptacle R1, or supported thereby, is a supplementary casing or cartridge P or other suitable casing adapted preferably, but not necessarily, to receive a supply of the aforesaid semi-solid or jelly-like fuel.

Preferably and as herein illustrated, the cartridge P is formed from readily deformable sheet metal such as is well known in the collapsible tube art, said cartridge P, before filling, being entirely closed except for the opening through which the fuel is passed and the filling opening being subsequently closed, as well understood in said tube art, by a U-shaped clamping member 36, Figs. 5 and 6. Before disposition of the cartridge P interiorly of the casing C, it may be provided with a small opening 37, Fig. 6, in that section thereof which is to face the top of said casing.

With the cartridge P in operative position interiorly of the casing C as shown in Fig. 5, any suitable arrangement may be utilized for expelling the fuel therefrom so that it eventually passes to the ignition region. As herein shown, there is thus utilized a member 38 rotatably mounted in the receptacle wall 34 and having a fork section or shank 38a in which a part of the aforesaid clamping member 36 is more or less loosely received; for operating or rotating the member 38, the latter may comprise a disk face 38b accessible from the exterior of the casing C and slotted for the reception of a coin or screw driver.

With the various parts positioned as shown in Fig. 5, the member 38 may be rotated to a desired extent when it becomes necessary to replenish the available supply of fuel interiorly of the upper part of the casing C. When the member 38 is thus rotated, the cartridge P is spirally wound about the forked shank 38a, such winding

action, as will be obvious, causing fuel to be expelled through the opening 37 and lodged within and in contact with the absorbent material 28, when the latter is utilized; if not utilized, the fuel comes into the fuel-containing compartment of the casing C in more or less adjacent relation with respect to the wick 27.

It is intended that cartridges P, or equivalent, shall be sold on the market, and that the user of the lighting mechanism, when the fuel is exhausted from that cartridge then within his mechanism, shall manually detach the receptacle R1 from the casing C, remove the therein-contained empty cartridge, discard the same, and substitute therefor a duplicate cartridge filled with fuel. After the new cartridge is thus associated with the receptacle R1, the latter may be again inserted interiorly of the casing C so that the lighting mechanism is again restocked with an available supply of fuel.

Although I have illustrated and described one particular form of cartridge and one particular form of operating mechanism therefor, it shall be understood that various other types of cartridges and various equivalent forms of operating mechanism are within the scope and purview of my invention.

Further, it shall be understood that my invention is not to be limited to the utilization of a receptacle R, or equivalent, as shown in Figs. 5 and 7. As well, however, a cartridge P, or equivalent, may be inserted interiorly of the casing C, supporting therein in operative fuel-transferring relation, and removed therefrom without invoking the use of a supplementary receptacle R1. It shall be distinctly understood, therefore, that my invention is not to be limited to the utilization of such a receptacle.

The operating arts of the lighting mechanism per se are herein shown and described merely for the purpose of disclosing one of the many forms of such mechanism with which my invention is utilizable. It shall be understood, therefore, that my invention is not to be limited to lighter mechanism, lighter operating mechanism, pyrophoric element controlling mechanism, etc. of any particular type, whether disclosed herein or not.

Although the use of the disclosed construction involving the detachable plate 1 is desirable because, as stated, the tube 11 is thereby exposed so that a new pyrophoric element may be substituted for an old or worn one, it shall be understood that my invention is not to be limited to the utilization of the disclosed detachable plate 1 since many other arrangements are suitable for the desired purpose.

As herein illustrated, the bottom plates of the respective receptacles R and R1 may be provided with peripheral flanges 30a and 34a against which a sleeve S is adapted to abut, said sleeve S encircling and closely engaging the casing side wall structure 20 in the manner described in my copending application, Serial No. 440,213, filed March 31, 1930, said sleeve S, at its end opposite the receptacle flange, being disposed in abutting relation with respect to a flange 21c of the aforesaid top casing wall 21. As will be obvious, the sleeve S, with the arrangement herein shown, may be slidably disposed on the casing side wall structure 20 only at those times when the receptacle R or R1, as the case may be, is removed from said side wall structure 20. While the use of a sleeve S is desirable with some casing constructions, it shall be understood that my inven-

tion is not to be limited thereto and that the use thereof is entirely optional.

While the invention has been described with respect to certain particular preferred examples which give satisfactory results, it will be understood by those skilled in the art after understanding the invention, that various changes and modifications may be made without departing from the spirit and scope of the invention and it is intended, therefore, in the appended claims to cover all such changes and modifications.

What is claimed as new and desired to be secured by Letters Patent, is:

1. In a pyrophoric lighter, a main casing, pyrophoric lighting mechanism carried by said main casing, a support in said main casing and detachable therefrom through an opening in the bottom thereof, a supplementary fuel-containing casing carried by said support, and means for forcing fuel into said main casing from said fuel-containing casing.

2. In a pyrophoric lighter, a main casing, pyrophoric lighting mechanism carried by said main casing, a supplementary fuel-containing casing in said main casing, the wall structure of said supplementary fuel-containing casing being formed from deformable sheet material, and means for restricting the volume of said supplementary fuel-containing casing to force fuel into said main casing.

3. In a pyrophoric lighter, a main casing, pyrophoric lighting mechanism carried by said main casing, a supplementary fuel-containing casing in said main casing, the wall structure of said supplementary fuel-containing casing being formed from deformable sheet material, and a fork-like member operable from the exterior of said main casing for winding said supplementary fuel-containing casing spirally therearound whereby fuel is forced into said main casing.

4. In a pyrophoric lighter, a main casing having compartments sealed from each other, pyrophoric flame-producing mechanism carried by said casing, said mechanism comprising a pyrophoric element and a biasing spring therefor disposed in one of said compartments, a supplementary fuel-containing casing in another of said compartments, fuel passing from said supplementary casing into said last named compartment, and a mass of absorbent material in that part of said last named compartment which is not occupied by said supplementary casing.

5. In a pyrophoric lighter, a main casing having compartments sealed from each other, pyrophoric flame-producing mechanism carried by said casing, said mechanism comprising a pyrophoric element and a biasing spring therefor disposed in one of said compartments, a supplementary fuel-containing casing in another of said compartments, fuel passing from said supplementary casing into said last named compartment, said supplementary casing being spaced from said one of said compartments, and a mass of absorbent material in the space between said supplementary casing and said one of said compartments.

6. In a pyrophoric lighter, a main casing having compartments sealed from each other, one of said compartments being a fuel chamber and another of said compartments being reentrant in said main casing and having an opening at the top thereof, a cover for said opening, flame-producing mechanism carried by said cover, said mechanism comprising a pyrophoric element and a biasing spring therefor disposed in said re-

trant compartment, and a supplementary fuel-containing casing in another of said compartments, fuel passing from said supplementary casing into said last named compartment.

between said supplementary casing and said reentrant chamber.

5 7. In a pyrophoric lighter, a main casing having compartments sealed for each other, one of said compartments being a fuel chamber and another of said compartments being reentrant in said main casing and having an opening at the top thereof, a cover for said opening, flame-producing mechanism carried by said cover, said mechanism comprising a pyrophoric element and a biasing spring therefor disposed in said reentrant compartment, a supplementary fuel-containing casing in another of said compartments and spaced from said reentrant compartment, and a mass of absorbent material in the space

8. In a pyrophoric lighter, a main casing having compartments sealed from each other, one of said compartments being a fuel chamber and another of said compartments having an opening at the top thereof, pyrophoric flame-producing mechanism detachably carried by said casing, said mechanism comprising a pyrophoric element and a biasing spring therefor disposed in said other compartment, said pyrophoric element and said biasing spring moving through said opening when said mechanism is detached from said casing, and readily detachable means for securing said mechanism to said casing.

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