Sept. 29, 1936. L. V. ARONSON 2,055,993

PYROPHORIC SPARK PRODUCING MECHANISM

Filed May 23, 1934 2 Sheets-Sheet 1

Fig. 1.

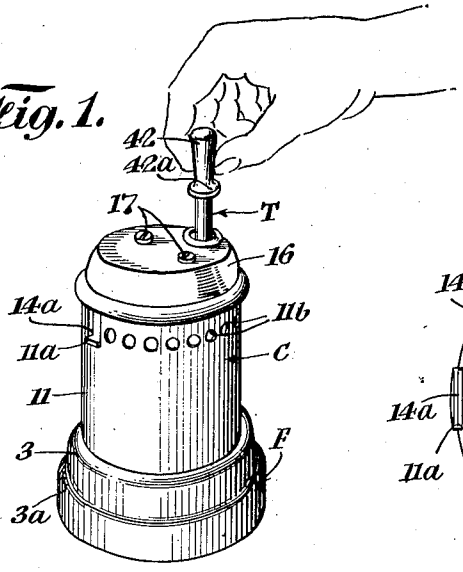


Fig. 3.

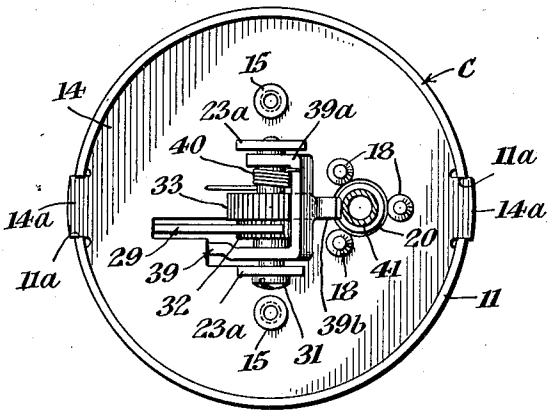


Fig. 2.

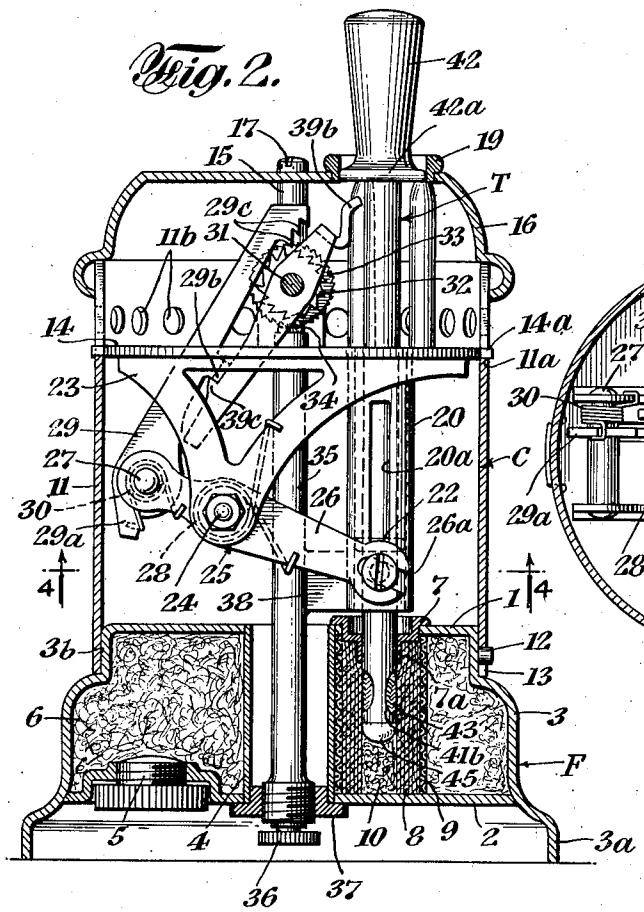
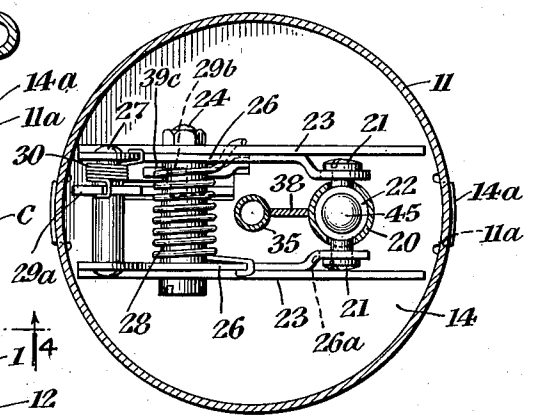


Fig. 4.



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PYROPHORIC SPARK PRODUCING MECHANISM

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Fig. 5.

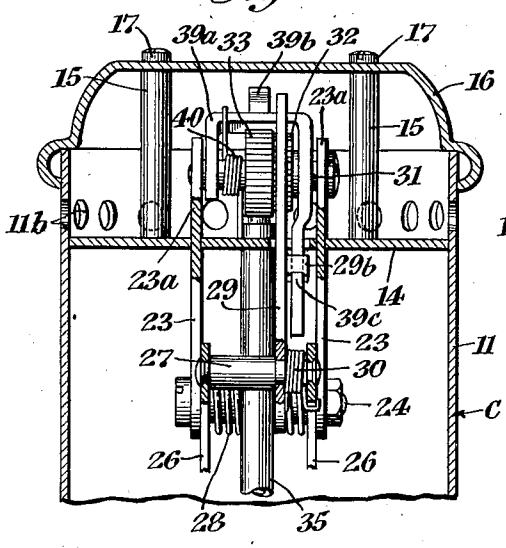


Fig. 6.

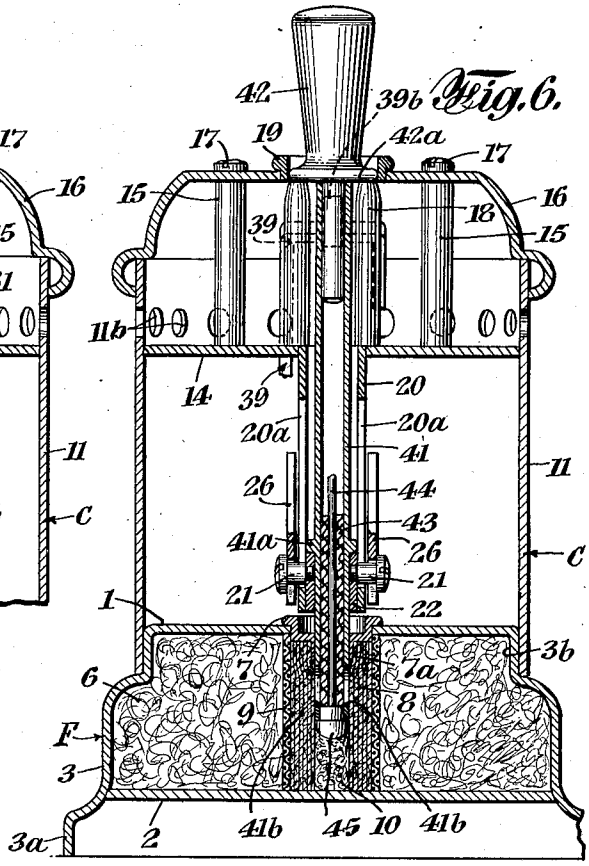
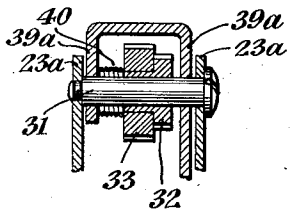


Fig. 7.



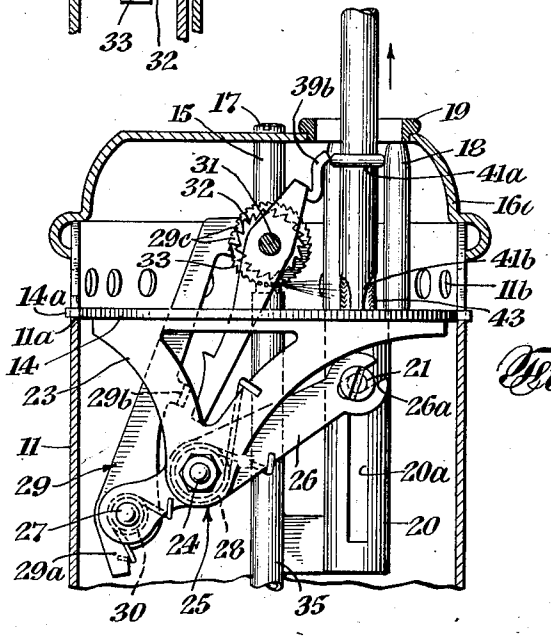
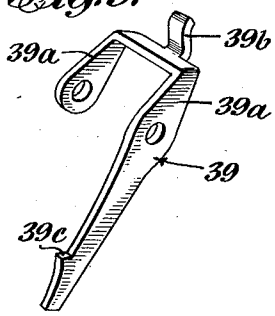


Fig. 8.

Fig. 9.



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Patented Sept. 29, 1936 2,055,993

UNITED STATES PATENT OFFICE

2,055,993

PYROPHORIC SPARK PRODUCING MECHANISM

Louis V. Aronson, Newark, N. J.

Application May 23, 1934, Serial No. 727,061

8 Claims. (Cl. 67—4.1)

My invention relates to pyrophoric spark-producing mechanism of the type embodying a torch-forming member which may be moved in a predetermined manner to automatically actuate said mechanism.

My invention has particular reference to a spark-producing mechanism which may be automatically actuated by the act of withdrawing the torch-forming member from the casing for said mechanism.

Various other advantages, characteristics and features of my invention will become apparent from the following detailed description.

My invention resides in the spark-producing mechanism, arrangements and features of the character hereinafter described and claimed.

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

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

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

Fig. 3 is a plan view, partly in section, of the mechanism shown in Figs. 1 and 2 with the casing cover removed;

Fig. 4 is a horizontal sectional view taken substantially on the line 4—4 of Fig. 2 looking in the direction of the arrows;

Fig. 5 is a fragmentary, transverse, vertical sectional view, partly in elevation, of the mechanism shown in Figs. 1–4 inclusive;

Fig. 6 is a transverse, vertical sectional view, partly in elevation, of the mechanism shown in Figs. 1–4 inclusive;

Fig. 7 is a fragmentary, vertical sectional view, partly in elevation, showing parts of the spark-producing mechanism;

Fig. 8 is a fragmentary, vertical sectional view, partly in elevation, of the novel mechanism of my invention; and

Fig. 9 is a perspective view of a part of the actuating mechanism.

Referring to the drawings, the mechanism of my invention, in general, is shown as comprising a fuel casing F and a main casing C. A torch-forming member T is adapted to be moved in one direction so as to enter the fuel casing F and, when removed therefrom, is adapted to actuate the spark-producing mechanism for the purpose of igniting a charge of fuel carried by said member T.

The fuel casing F may be of any suitable character and, as herein shown, it may be of generally circular configuration such, for example, as comprises a top wall 1 connected to a bottom wall 2 by a generally circular side wall structure 3, the latter comprising a depending wall surface 3*a* adapted to rest upon any suitable support. As shown, a vertical passage may extend through the fuel casing F, this passage being defined by a cylindrical member 4 suitably connected at its upper end to the top casing wall 1 and at its lower end to the bottom casing wall 2. The provision of this member 4 is optional although the presence thereof is desirable. When provided, it serves in the manner hereinafter described as a passage for the reception of a part of the spark-producing mechanism.

To the end that fuel of suitable character may be introduced into the fuel casing F, there may be provided a plug 5 which is threaded, in readily detachable manner, into the bottom wall 2 of said casing F. The latter, preferably, contains a mass of suitable material 6, such as cotton, whereby the fuel introduced into said casing F is readily absorbed.

The top wall 1 of the fuel casing F, at one side of the aforesaid cylindrical member 4, is provided with an opening which receives a cap 7 shaped to form a central, vertically disposed sleeve section 7*a* adapted to be introduced interiorly of the upper end of a vertical passage defined by a structure 8 formed from a strip of suitably laminated material, such as felt, which is spirally wound as more particularly described in my pending application Serial No. 719,640, filed April 9, 1934 and retained in such configuration by adhesive secured to the adjacent surfaces of the felt strip. Preferably, a member 9 of open mesh material, such as may be fabricated from copper wire, is disposed around the structure 8 to more firmly retain it in the configuration indicated. Furthermore, as shown in Figs. 2 and 6, the lower end of the passage defined by said structure 8 may be closed by a wad 10 of suitable absorbent material.

The side wall of the fuel casing F defines a circular, vertical exterior surface 3*b* adapted to detachably or otherwise receive the circular wall structure 11 of the main casing C. Preferably, the wall structure 11 is detachably related to the fuel casing F and, if so, there may be utilized a pin 12 adapted to be received in a slot 13 of said wall structure 11 whereby the latter may be located in predetermined position on the fuel casing F.

In the form of the invention herein shown, the

aforesaid wall structure 11 is provided at the top thereof with a pair of diametrically alined passages 11a, Fig. 3, adapted to receive the respective projecting sections 14a of a plate 14 which, in normal position, is disposed interiorly of the wall structure 11 and forms a support for various parts of the hereinafter described operating mechanism. As shown, the wall structure 11 may be provided with a plurality of perforations 11b which afford ready entrance of air above the plate 14 so as to support the flame which is produced by pyrophoric action.

A plurality of spaced standards 15 are soldered or otherwise suitably fixed to the plate 14 and these standards extend vertically so as to support a cover member 16 for the top of the casing C. As shown, screws 17 extend through the cover member 16 and are threaded to the respective standards 15 whereby said cover member is detachably retained to the wall structure 11 in the position shown on the drawings.

A plurality of standards 18, spaced apart in generally triangular relation as shown in Fig. 3, are soldered or otherwise suitably fixed to the plate 14, these standards 18 extending in generally a vertical direction and being utilizable as hereinafter described. The cover member 16 is formed with an upper opening concentrically arranged with respect to the vertical passage defined by the standards 18, said upper opening of the cover member 16 preferably carrying a bushing 19 which is suitably secured to said cover member.

As clearly shown in Fig. 6, a tubular member 20 depends from the plate 14 and is soldered or otherwise suitably secured thereto, the passage defined by said member 20 being vertically alined with respect to the passage defined by the aforesaid sleeve section 7a of the fuel casing cap 7, said passage of the member 20 also being vertically alined with respect to the vertical passage defined by the standards 18 and the bushing 19. The member 20 is provided with vertically extending slots 20a which are diametrically alined for the reception of bolts 21, respectively, which are threaded into opposite sides of a short tubular member 22 freely slidable interiorly of the tubular member 20.

Fixed to and depending from the aforesaid plate 14 are a pair of spaced bracket members 23 having a bolt 24 or other suitable member horizontally disposed in the lower sections thereof. Freely pivoted on the member 24 is a lever arrangement 25 which comprises a pair of members 26 pivoted to said member 24 and disposed closely adjacent the respective brackets 23. Adjacent ends of these members 26 are connected together by a transverse member 27, and the other adjacent ends of said members 26 are slotted as indicated at 26a, these slots receiving and being slidably related with respect to the respective bolts 21. A spring 28 is coiled around the aforesaid member 24, or a sleeve carried thereby, and one end of said spring is connected to one of the members 26, the other end of said spring 28 being connected to one of the brackets 23. In this manner, the lever arrangement 25 is biased in a counter-clockwise direction, Fig. 2.

The aforesaid member 27 which connects the members 26 together has pivoted thereto an upwardly extending lever 29 which is suitably biased in a clockwise direction, Fig. 2, by a spring 30 which is coiled around the member 27 and has one end thereof secured to the adjacent member 26 and the other end thereof secured to a section 29a of said lever 29. The lever 29 comprises a latch section 29b and, adjacent its upper end, said lever 29 is provided with a plurality of ratchet teeth 29c.

The aforesaid brackets 23 comprise the respective sections 23a which extend above the plate 14 and horizontally support a fixed bolt 31, or other similar member. Freely rotatable on the member 31 is a ratchet wheel 32 which comprises a projecting sleeve carrying a serrated wheel 33, the wheels 32 and 33 being secured together for rotatable movement as a unit. Coactable with the serrated wheel 33 is a pyrophoric element 34 which projects from a tube 35 extending downwardly through the aforesaid casing C and the cylindrical member 4. The tube 35 contains the usual coil spring, not shown, the lower end of which seats against a cap 36 threaded into the lower end of said tube 35, the upper end of said coil spring engaging and biasing the pyrophoric element 34 into engagement with the serrated wheel 33. As shown, the lower end of the tube 35 may be threaded for the reception of a nut 37 which is received by the lower end of the cylindrical member 4. Furthermore, the tube 35 may be further anchored in a position by a plate 38 which connects said tube 35 to the aforesaid tubular member 20.

As shown in Fig. 7, the member 31 carries, in free pivoted relation, the spaced arms 39a of a latching lever 39 such as shown in Fig. 9, for example. The latching lever 39 comprises a transverse section from which projects a lug 39b adapted to be positioned in the space defined by the aforesaid standards 18. At its lower end, the latching lever 39 is provided with a notched section 39c adapted to coact with the aforesaid latch section 29b of the lever 29. As shown in Figs. 5 and 7, a spring 40 is coiled around the member 31, one end of this spring engaging the aforesaid transverse section of the lever 39 and the other end of said spring resting upon the plate 14. The spring 40 serves to bias the lever 39 in a clockwise direction, Fig. 2.

The torch-forming member T may be and preferably is of the character disclosed in my aforesaid pending application Serial No. 719,640. Thus, as shown in Fig. 6, the member T comprises a tubular member 41 terminating in an upper handle section 42 said handle section having a lower flanged surface 42a. Suitably spaced from the lower end thereof, the member 41 comprises a laterally extending section 41a adapted to coact with the aforesaid tubular member 22.

The tubular member 41 further comprises one or more lower apertures 41b which expose sections of a suitable wick 43 disposed within said member 41 and supported by a rod 44 carried by a head 45 frictionally secured to said member 41.

With the parts of the hereinbefore described mechanism positioned as illustrated in Figs. 2 and 6, it will be observed that the torch-forming member T is disposed within the vertical passage defined by the member 19, the standards 18, the tubular member 20, the sleeve section 7a of the cap 7 and the passage defined by the structure 8. It results, therefore, that the opening into the fuel casing F is sealed by the lower end of the torch-forming member T and, at the same time, fuel is absorbed from said fuel casing by the wick 43, such fuel passing to the wick by way of the apertures 41b of the tubular member 41. When the torch-forming member T is positioned as

last described, the flanged surface 42a rests upon the standards 18 and the lateral section 41a rests upon the tubular member 22.

With the parts positioned in the manner described above, the lever arrangement 25 is in its most advanced clockwise direction and the spring 28 is wound or energized. The lever 29 is in its upper position and the spring 30 holds the ratchet teeth 29c of said lever 29 in engagement with the ratchet wheel 32. Further as shown, the notched section 39c of the latching lever 39 is in engagement with the latch section 29b of the lever 29 and it is by reason of such engagement that the parts are retained in the position shown in Figs. 2 and 6.

When the lighting mechanism is to be actuated, the handle section 42 of the torch-forming member T is manually grasped and moved upwardly. During such upward movement, the parts remain positioned as shown in Figs. 2 and 6 until the lateral section 41a of the member 40 engages the lug section 39b of the lever 39. Thereupon, during slight continued upward movement of the torch-forming member T, the lever 39 is rocked in a counter-clockwise direction, Figs. 2 and 6, to thereby disengage the notched section 39c thereof from the latch section 29b of the lever 29. When disengagement is thus effected, the spring 28 becomes effective to swing the lever arrangement 25 in a counter-clockwise direction, Figs. 2 and 6, with a snapping action, the lever 29 moving downwardly under the control of the lever arrangement 25 and the ratchet teeth 29c of said lever 29 clutching the teeth of the ratchet wheel 32. As a result, a step of rotative movement is imparted to the wheels 32 and 33, the latter coacting with the pyrophoric element 34 to produce a shower of sparks which pass along a path extending toward and into the space defined by the standards 18. The timing is such that the sparks pass along the path last noted just as the exposed wick sections at the apertures 41b pass therethrough and, as a result, the charge of fuel at the lower end of the torch-forming member T is ignited to produce a flame which may be utilized for any desired purpose, as for the ignition of cigars, cigarettes, candles, pipes or the like and, in so doing, the torch-forming member may be passed from hand to hand as desired.

When the torch-forming member T has served its intended purpose, the flame at the lower end thereof may be extinguished, if desired, whereupon said torch-forming member T may be returned to the position shown in Figs. 2 and 6. In so doing, the lateral section 41a of the member 41 engages the tubular member 22 which at this time is in its uppermost position as indicated in Fig. 8. After engagement has thus been effected, continued downward movement of the torch-forming member T causes the lever arrangement 25 to be swung in a clockwise direction from the position shown in Fig. 8 to that shown in Figs. 2 and 6. As a result of such movement, the lever 29 is returned to its upper position, the ratchet teeth 29c thereof idling with respect to the stationary ratchet wheel 32 and, under the influence of the springs 30 and 40, the levers 29 and 39 are disengageably connected at their respective sections 29b and 39c. This operation returns the various parts to their normal position and the mechanism as a whole is in condition for subsequent operation.

Although the spring 40 biases the lever 39 in a clockwise direction from its position shown in Fig. 8, the extent of such movement is slight due to the fact that the lever section 29b serves as a stop surface. Accordingly, the lug 39b of lever 39 is permitted to move only to a slight extent into the vertical space defined by the standards 18, the intrusion thereof into said space being insufficient to permit ready downward movement of the section 41a of the torch-forming member. In this connection, it will be observed that the end of the lug 39b is inclined, that the periphery of said section 41a is curved and that the upper ends of the standards 18 are curved. Due to the fact that these parts are shaped in this manner, the torch section 41a may readily be passed downwardly past the lug 39b while at the same time being effective to actuate said lug on its upward stroke.

Mechanism of the character herein described is reliable and efficient in operation. The simple act of inserting the torch-forming member in the casing stores energy in the spring from which the power is to be obtained for the subsequent automatic operation. Withdrawal of the torch-forming member from its normal position trips the automatic mechanism and causes the production of sparks which ignite the charge of fuel carried by said member. The various parts are of simple character and they coact with each other in an efficient manner for the purpose intended.

While the invention has been described with respect to a certain particular preferred example which gives 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 combination, a casing, a cover member therefor, a supporting member disposed in said casing below said cover member, said casing being provided with a plurality of perforations permitting the free passage of air above said supporting member, spark-producing mechanism in said casing above said supporting member, a torch-forming member carrying a charge of fuel, means for operating said spark-producing mechanism in response to movement of said torch-forming member as it is withdrawn from said casing, and means whereby said spark-producing mechanism and said operating means are secured to said supporting member.

2. In combination, a casing, a cover member therefor, a supporting member disposed in said casing below said cover member, said casing being provided with a plurality of perforations permitting the free passage of air above said supporting member, spark-producing mechanism in said casing above said supporting member, spring means for operating said spark-producing mechanism, a torch-forming member adapted to be passed into said casing to wind said spring means, latching means comprising a part extending above said supporting member for restraining operation of said spring means, movement of said torch-forming member as it is withdrawn from said casing actuating said latching means, and means whereby said spark-producing mechanism and the operating means therefor are secured to said supporting member.

3. In combination, a casing, a cover member therefor, a supporting member disposed in said casing below said cover member, spark-producing mechanism in said casing above said supporting

member, a torch-forming member carrying a charge of fuel, means for operating said spark-producing mechanism in response to movement of said torch-forming member as it is withdrawn from said casing, and means disposed both above and below said supporting member for guiding said torch-forming member during withdrawal thereof from said casing, and means whereby said spark-producing mechanism and said operating means are secured to said supporting member.

4. In combination, a casing, pyrophoric spark-producing mechanism, a supporting member, a fixed tubular member depending vertically from said supporting member, a reciprocatory member associated with said tubular member, a bracket depending from said supporting member, a lever pivoted to said bracket and connected to said reciprocatory member, a spring operated by said lever and adapted to have energy stored therein in response to downward movement of said reciprocatory member, and means whereby the energy stored in said spring operates said spark-producing mechanism.

5. In combination, a casing, pyrophoric spark-producing mechanism, a supporting member, a fixed tubular member depending vertically from said supporting member, a reciprocatory member associated with said tubular member, a bracket depending from said supporting member, a lever pivoted to said bracket and connected to said reciprocatory member, a spring operated by said lever and adapted to have energy stored therein in response to downward movement of said reciprocatory member, and means whereby the energy stored in said spring operates said spark-producing mechanism, said last named means comprising a latching member for restraining operation of said spark-producing mechanism, said latching member being operable in response to movement of a torch-forming member as it is withdrawn from said casing.

6. In combination, a casing, a cover member therefor, a supporting member disposed in said casing below said cover member, said casing being provided with a plurality of perforations permitting the free passage of air above said supporting member, pyrophoric spark-producing mechanism comprising a ratchet wheel disposed above said supporting member, a plurality of vertical standards disposed above said supporting member and arranged to define a vertical passage, a fixed tubular member depending vertically from said supporting member and having the passage therethrough alined with said vertical passage, a reciprocatory member disposed in said tubular member, a bracket depending from said supporting member, a lever pivoted to said bracket and connected to said reciprocatory member, a spring operated by said lever and adapted to have energy stored therein in response to downward movement of said reciprocatory member, a lever pivoted to said first named lever and having a series of ratchet teeth adapted to mesh with said ratchet wheel, a spring for biasing said second named lever toward said ratchet wheel, a latching lever disengageably connected to said second named lever, the upper end of said latching lever being adapted to extend into said vertical passage, and a torch-forming member adapted to be passed downwardly through said vertical passage and tubular member to thereby depress said reciprocatory member, depression of said reciprocatory member rocking said first named lever, storing energy in said first named spring, moving said second named lever into operative relation with said ratchet wheel and connecting the same to said latching lever, removal of said torch-forming member from said tubular member and vertical passage effecting movement of said latching lever to disengage the same from said second named lever whereby said first named spring becomes effective to operate said spark-producing mechanism and produce a shower of sparks which ignite a charge of fuel carried by the lower end of said torch-forming member.

7. In combination, a casing, a cover member therefor, a supporting member disposed in said casing below said cover member, spark-producing mechanism in the chamber defined by said cover member and said supporting member, a torch-forming member carrying a charge of fuel, means for operating said spark-producing mechanism in response to movement of said torch-forming member as it is withdrawn from said casing and while the part thereof carrying said charge of fuel is passing through said chamber, and means whereby said spark-producing mechanism and said operating means are secured to said supporting member.

8. In combination, a casing, a cover member therefor, a supporting member disposed in said casing below said cover member, spark-producing mechanism in the chamber defined by said cover member and said supporting member, a torch-forming member carrying a charge of fuel, means for operating said spark-producing mechanism in response to movement of said torch-forming member as it is withdrawn from said casing and while the part thereof carrying said charge of fuel is passing through said chamber, means forming a path for guiding said torch-forming member through said chamber, and means whereby said spark-producing mechanism, said operating means and said guiding means are secured to said supporting member.

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