Aug. 25, 1936. L. V. ARONSON 2,051,934

SPARK PRODUCING MECHANISM

Filed May 10, 1932

Fig. 1.

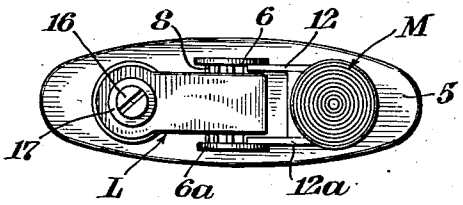


Fig. 2.

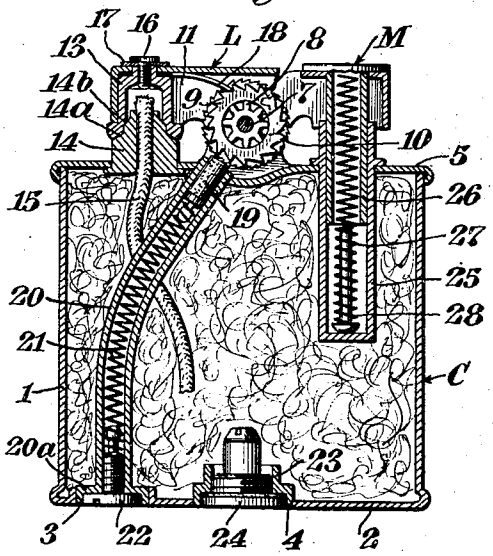


Fig. 3.

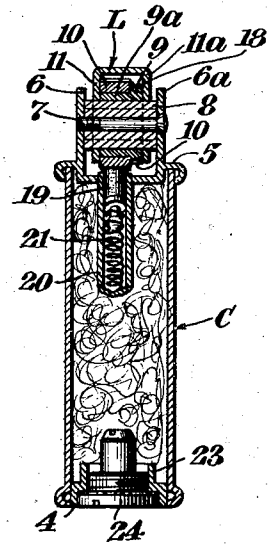


Fig. 4.

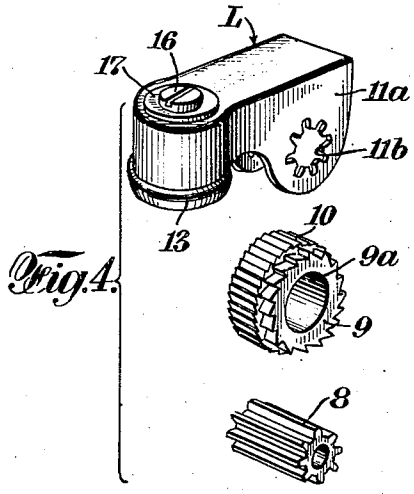
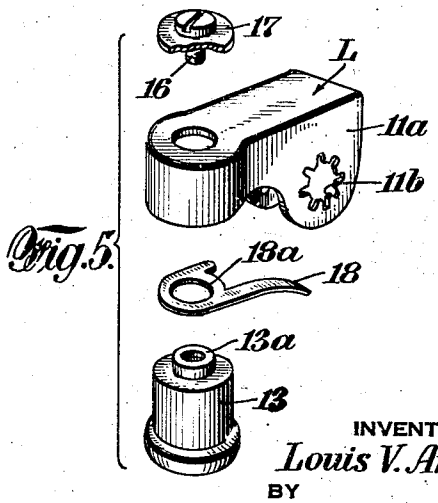


Fig. 5.



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SPARK PRODUCING MECHANISM

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11 Claims. (Cl. 67—7.1)

My invention relates to spark-producing mechanism such, for example, as that which forms a part of cigarette or cigar lighters, spark-producing toys or the like.

My invention relates to improved features and arrangements whereby the spark-producing mechanism is more efficient in operation and more readily assembled than the devices of the prior art.

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

My invention resides in the spark-producing mechanism, features of construction and combination of parts 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 drawing, in which:

Figure 1 is a plan view of pyrophoric lighting mechanism as constructed and arranged 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 transverse vertical sectional view, partly in elevation, of the mechanism shown in Fig. 1;

Fig. 4 is a perspective view showing parts of my novel mechanism in non-assembled relation; and

Fig. 5 is a perspective view showing other parts of my novel mechanism in non-assembled relation.

Referring to the drawing, C represents a fuel-containing casing which, in accordance with a preferred form of my invention is formed by a suitable shaping operation from a single piece of metal so that it comprises circumferentially complete side wall structure 1 and a bottom wall 2, the latter being suitably provided with the openings 3 and 4. Soldered or otherwise suitably secured to the side wall structure 1 of the casing C is the top wall 5 which carries the main operating parts of the lighting mechanism.

Upstanding from the top wall 5 are the standards 6, 6a through which a supporting pin or axle 7 laterally extends. In accordance with my invention, the pin 7 has a pinion 8 mounted thereon in freely rotatable relation and, as shown in Fig. 3, it is desirable that the length of this pinion 8 should be only slightly less than the transverse distance between the inner surfaces of the standards 6 and 6a. Freely rotatable on the pinion 8 is the hub 9a of a ratchet wheel 9, said ratchet wheel hub 9a having a wheel 10 suitably secured thereto for rotatable movement therewith, said wheels 9 and 10, therefore, being disposed in side-by-side relation and the wheel 10 being provided with a serrated or roughened exterior peripheral surface.

As herein illustrated, my invention is shown as forming a part of pyrophoric lighting mechanism and, therefore, the apparatus comprises an oscillatory snuffer lever L provided with a top section having depending parallel side sections 11 and 11a, each of said side sections being provided with a transversely alined gear aperture 11b as appears from a consideration of Figs. 4 and 5.

For operating the movable parts hereinbefore described, there may be utilized a vertically reciprocatory member M which comprises rack sections 12, 12a extending toward and meshing with the opposite end sections of the aforesaid pinion 8.

The hereinbefore described snuffer lever L forms a chamber which, at its end, receives a snuffer cap 13 adapted to rest upon a tube 14 upstanding from the top casing wall 5, said tube 14 having a wick 15 extending therethrough. In accordance with a preferred form of the invention, the aforesaid snuffer cap 13 is provided with an internally threaded shank 13a which extends through a perforation formed in the top wall section of the snuffer lever L. A screw 16, which carries a washer 17, is threaded into the snuffer cap shank 13a whereby the latter is securely yet detachably held in assembled relation to the snuffer lever L. Preferably, the pawl 18 which coacts with the ratchet wheel 9 is formed from sheet steel as illustrated in Fig. 5, this pawl 18 comprising a base section 18a perforated so as to readily pass over the snuffer cap shank 13a whereby the pawl base section 18a rests upon the shoulder formed at the lower surface of said shank 13a. When assembling these various parts, the base section 18a of the pawl 18 is disposed around the shank 13a and upon the aforesaid shoulder whereupon the snuffer cap 13 together with the pawl 18 are moved into position interiorly of the snuffer lever L as shown in Fig. 2. Thereafter, the screw 16 is inserted into its intended position whereby the various parts are securely maintained in their proper operative positions.

Coactable with the serrated wheel 10 is a pyrophoric element 19 which in part projects from a tube 20 extending longitudinally through the cas-

ing C, the lower bushing surface 20*a* of said tube 20 being suitably secured in the aforesaid opening 3. The pyrophoric element 19 is suitably biased toward and into engagement with the serrated wheel 10 by a helical spring 21 which is maintained in the position shown in Fig. 2 by a plug 22 threaded into the lower surface of the tube 20.

The aforesaid opening 4 which is formed in the bottom casing wall 2 has a bushing 23 suitably secured therein, said bushing 23 receiving a threaded closure cap 24. The latter may be removed to introduce fuel of any suitable character interiorly of the casing C which preferably contains a mass of cotton or other suitable absorbent material.

The top casing wall 5 carries a vertical tube 25 closed at its lower end and open at its upper end, said tube 25 having a section thereof extending well above the upper surface of the wall 5. Reciprocatory in the tube 25 is a plunger 26 which depends from and forms a part of the hereinbefore described member M. As shown, a helical spring 27 is disposed in the chamber formed by the tube 25 and plunger 26 whereby the latter is biased in an upward direction, Fig. 2. Preferably, a pin 28 is disposed axially within the convolutions of the spring 27, the head of said pin resting upon the lower surface of the tube 25. The use of this pin 28 is very desirable because greatly contributing to smooth operation since the pin greatly decreasts spring "grind".

A spark-producing mechanism of the character hereinbefore described is readily assembled from the various component parts thereof. Preliminarily, the wheels 9 and 10 are disposed between the depending sections 11 and 11*a* of the lever L with the passage through the hub section 9*a* aligned with the gear openings 11*b*. The pinion 8 is then passed into and through said hub section 9*a* until opposite ends thereof extend slightly beyond the respective exterior surfaces of the lever sections 11 and 11*a*. As a result, the teeth of the pinion 8 come into meshing relation with the slots of the apertures 11*b*, and the end of the pawl 18 comes into operative relation with respect to the ratchet wheel 9. The parts as thus assembled are now positioned in proper relation at the top of the casing with the snuffer cap 13 seated on the tube 14 and with the snuffer lever sections 11 and 11*a* disposed between the standards 6 and 6*a*. After the spring 27 and pin 28 have been inserted into the tube 25, the plunger 26 of the member M may be pushed downwardly into said tube 25 until the rack sections 12, 12*a* come into meshing relation, as shown in Fig. 2, with the opposite respective ends of the pinion 8. When the parts have thus been assembled and positioned as shown in Fig. 2, the pin 7 may be brought into the position shown in Fig. 3 wherein opposite ends thereof are supported by the respective standards 6, 6*a*, and with the pinion 8 freely rotatable thereon.

Upon depression of the member M, the rack sections 12, 12*a* thereof rotate the pinion 8 in a clockwise direction, Fig. 2. Due to the fact that said pinion 8 is in meshing relation with the gear openings 11*b* of the snuffer lever L, it results that depression of said member M causes clockwise movement, Fig. 2, of the snuffer lever L. As a consequence, the upper end of the wick 15 is exposed and wheels 9 and 10 are rotated as a unit under the influence of the pawl 18, the wheel 10 coacting with the pyrophoric material 19 to produce a shower of sparks which are directed toward the upper end of the wick 15 to effect ignition of the fuel carried thereby. When pressure on the member M is released, the spring 27 moves the same upwardly to cause counter-clockwise movement, Fig. 2, of the lever L until the snuffer cap 13 seats upon the wick tube 14. During the movement last noted, the pawl 18 idles over the teeth of the ratchet wheel 9 and, accordingly, no movement of the wheels 9 and 10 occurs at this time.

In addition to the features of my invention hereinbefore described, it is important to note that the provision of the one-piece casing C constitutes a distinct advantage over the prior art casings. This one-piece casing may readily be produced by a stamping or other suitable operation, and the openings 3 and 4 in the bottom wall thereof may readily be produced by a punching operation or the like. This is a highly practical and efficient manufacturing operation greatly conducive to the improvement generally of devices of this character and also contributing toward economy of manufacture.

Another important feature of the present invention involves the provision of a plurality of surfaces for sealing the snuffer cap 13 with respect to the wick tube 14. To this end, and as shown in Fig. 2, the wick tube 14 is provided with a plurality of spaced angular surfaces 14*a* and 14*b* with which flushly engage correspondingly shaped surfaces on the wick tube 13. An arrangement of this character is highly advantageous because preventing leakage of fuel and extending the life of any particular supply of fuel which is disposed within the fuel casing.

Another feature of the invention relates to the construction of the ratchet wheel 9, together with its hub 9*a*, of brass, or equivalent, the pinion 8 being constructed of steel, or equivalent. Since the wheel 9 is movable with respect to the pinion 8 during operation of the device, it results that a smooth, non-wearing action is obtained by the use of dissimilar metallic materials of the character specified. For a similar reason, it is desirable that the tube 25 be constructed of brass and that the plunger 26 be constructed of steel.

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 pyrophoric spark-producing mechanism, a casing, a wick tube carried thereby, and a snuffer cap adapted to seat on said wick tube, said wick tube having a plurality of spaced inclined surfaces engaged, respectively, by correspondingly spaced surfaces of said snuffer cap whereby a plural-seal joint is produced between said snuffer cap and wick tube.

2. In pyrophoric spark-producing mechanism, a casing, a spark-producing unit carried thereby, and means for operating said spark-producing unit, said means comprising a tube depending into said casing, a plunger reciprocatory in said tube, a helical spring in said plunger and tube, and a pin inserted axially within the lower convolutions of said spring, said pin resting upon the lower surface of said tube and being adapted, upon depression of said plunger, to enter the

same and the convolutions of said spring disposed therein, said spring preventing said pin from engaging said plunger.

3. In pyrophoric spark-producing mechanism, a snuffer lever forming a chamber having an apertured upper wall, a snuffer cap in said chamber and having a shank extending into the aperture of said upper wall, a screw threaded into said snuffer cap shank, and a pawl having an apertured base confined on said snuffer cap shank.

4. In pyrophoric spark-producing mechanism, a serrated wheel, pyrophoric material coactable therewith, a ratchet wheel at one side of said serrated wheel, said ratchet wheel having a hub extending axially through said serrated wheel and secured thereto for rotatable movement therewith, and a pinion disposed axially of said wheels.

5. In pyrophoric spark-producing mechanism, a serrated wheel, pyrophoric material coactable therewith, a snuffer lever having sections depending at opposite sides of said wheel, a pinion disposed axially of said wheel and extending beyond opposite sides thereof, said pinion extending through and being geared to said snuffer lever sections, and movable rack means meshing with the extensions of said pinion.

6. In pyrophoric spark-producing mechanism, a serrated wheel, pyrophoric material coactable therewith, a ratchet wheel at one side of said serrated wheel, said ratchet wheel having a hub extending axially through said serrated wheel and secured thereto for rotatable movement therewith, a snuffer lever having sections depending at opposite sides of said wheels, a pinion disposed axially of said wheels and extending beyond opposite sides thereof, said pinion extending through and being geared to said snuffer lever sections, and movable rack means meshing with the extensions of said pinion.

7. In pyrophoric spark-producing mechanism, a serrated wheel, pyrophoric material coactable therewith, a pinion disposed axially and interiorly of said wheel and extending beyond one side thereof, movable rack means meshing with the extension of said pinion, and means whereby rotative movement imparted to said pinion transmits a step of movement to said serrated wheel, said last named means being operatively connected to said serrated wheel independently of said pinion.

8. In pyrophoric spark-producing mechanism, a serrated wheel, pyrophoric material coactable therewith, a pinion disposed axially and interiorly of said wheel and extending beyond one side thereof, and a snuffer lever, the extension of said pinion extending through and being geared to a section of said snuffer lever.

9. In pyrophoric spark-producing mechanism, a serrated wheel, pyrophoric material coactable therewith, a pinion disposed axially and interiorly of said wheel and extending beyond one side thereof, a snuffer lever, the extension of said pinion extending through and being geared to a section of said snuffer lever, and movable rack means meshing with the extension of said pinion.

10. In pyrophoric spark-producing mechanism, a serrated wheel, pyrophoric material coactable therewith, a pinion disposed axially of said wheel and extending beyond the opposite sides thereof, a snuffer lever, opposite respective ends of said pinion extending through and being geared to sections of said snuffer lever, and movable rack means meshing with the respective extensions of said pinion.

11. In pyrophoric spark-producing mechanism, a serrated wheel, pyrophoric material coactable therewith, a pinion loosely disposed interiorly of said wheel and extending beyond the opposite sides thereof, a snuffer lever, opposite respective ends of said pinion extending through and being geared to sections of said snuffer lever, the remote ends of said pinion extending beyond said snuffer lever sections respectively, and movable rack members meshing with the respective remote ends of said pinion.

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