Oct. 27, 1931. L. V. ARONSON 1,828,887

LIGHTER CONSTRUCTION

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Fig. 1.

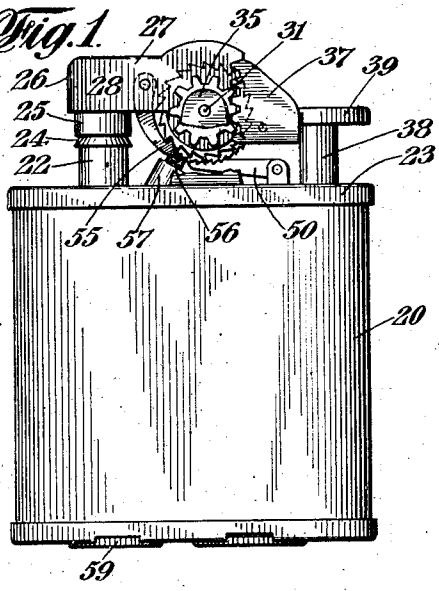


Fig. 2.

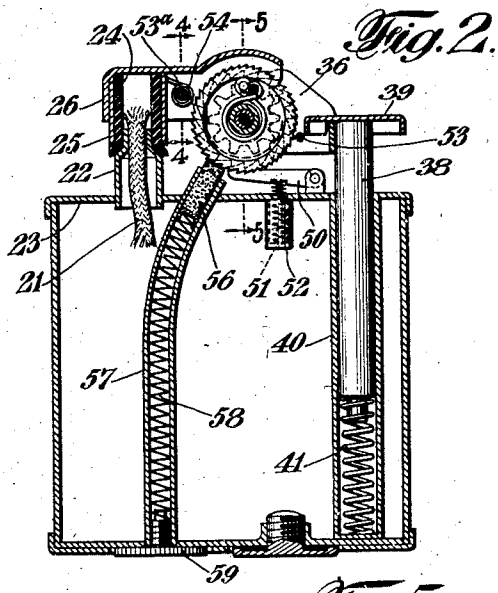


Fig. 3.

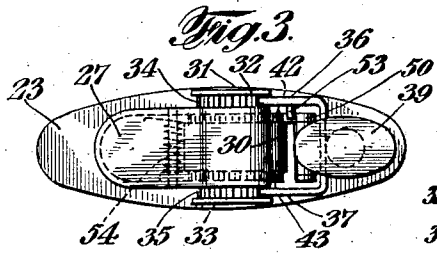


Fig. 4.

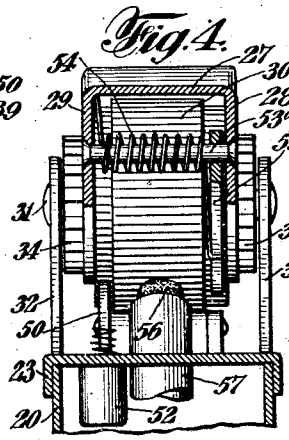


Fig. 5.

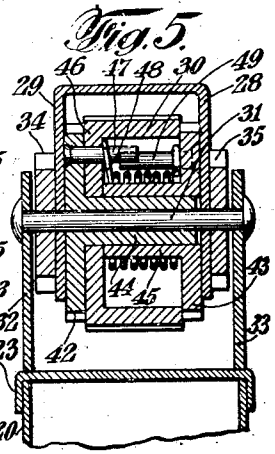


Fig. 6.

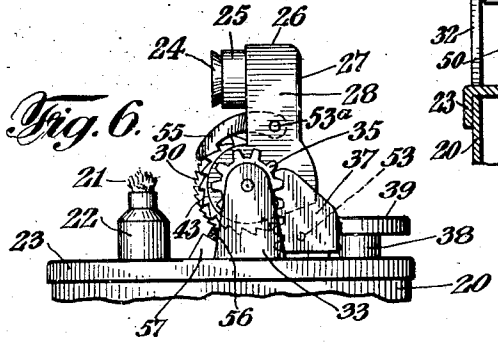


Fig. 7.

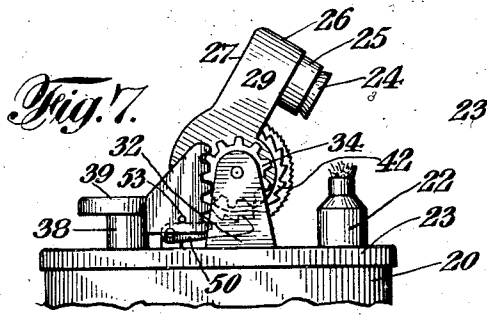
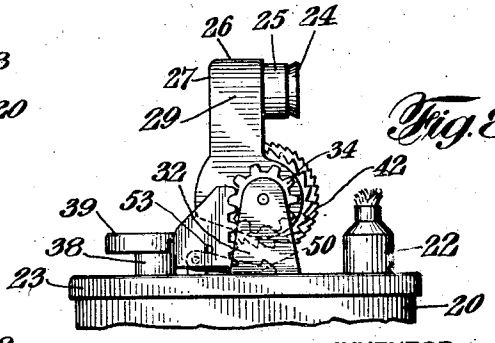


Fig. 8.



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Fig. 9.

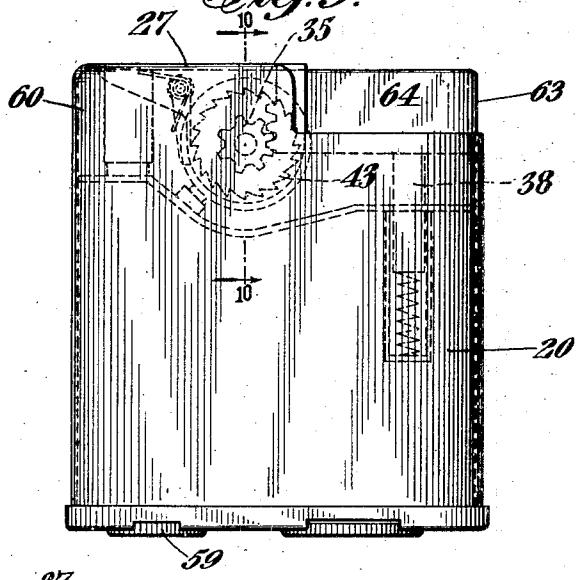


Fig. 10.

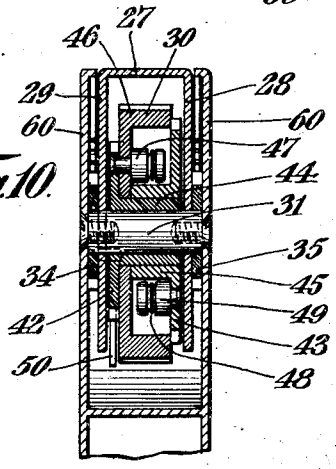


Fig. 11.

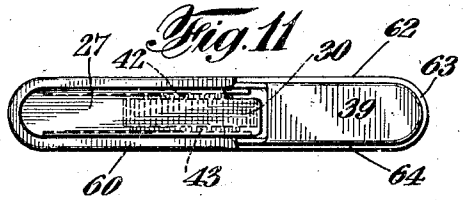


Fig. 12.

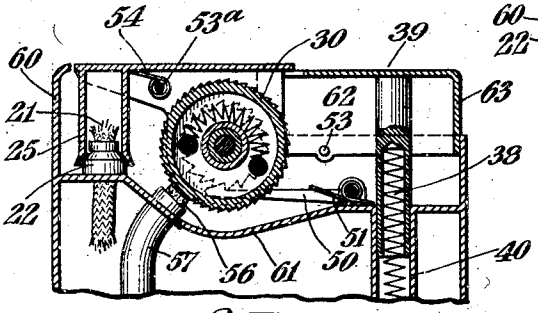
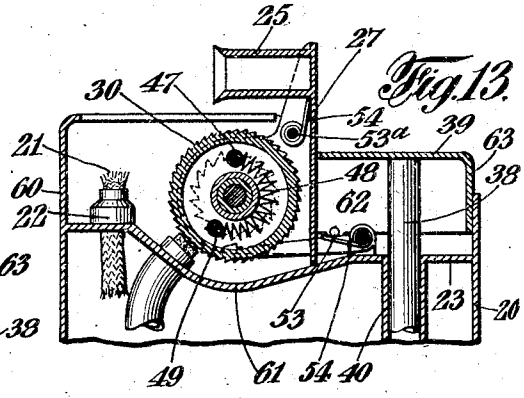


Fig. 13.



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Fig. 15.

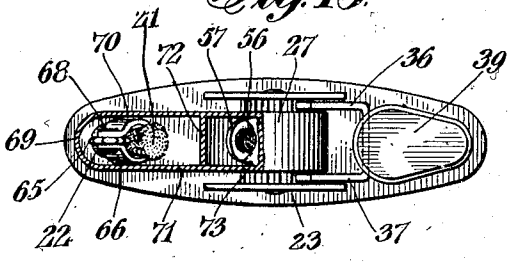


Fig. 14.

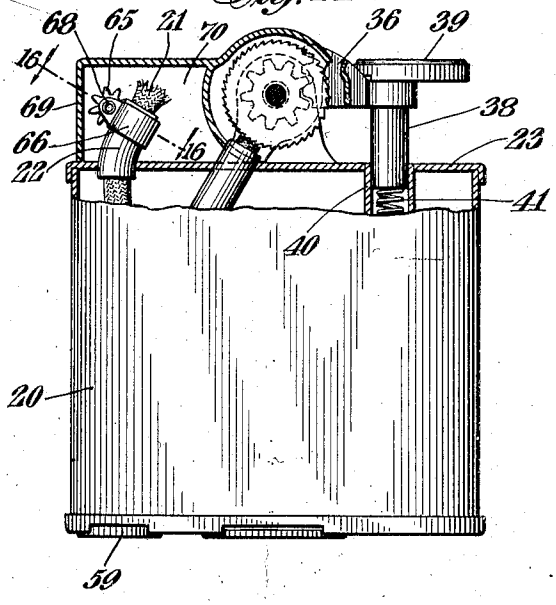
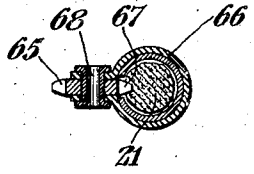


Fig. 16.



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UNITED STATES PATENT OFFICE

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LIGHTER CONSTRUCTION

Application filed November 17, 1928. Serial No. 320,042.

This invention relates to lighters and has particular reference to the type of lighter in which a sparking unit is manually operated to throw sparks on a wick moistened by an inflammable liquid.

The particular example of the invention here shown includes a suitable pyrophoric means cooperating with a rotatable abrasive or "sparking" wheel, the latter being in turn actuated by the depression of a manually operated plunger so as to cause sparks to be thrown on to an adjacent wick. In this example a snuffer is also provided for the wick and operatively connected to be controlled by the manually operated plunger.

The objects of this invention include the provision of an exceptionally efficient and dependable operating mechanism for controlling the movement of the abrasive wheel and snuffer, and also the provision of a convenient wick adjusting means, all embodied in a compact and relatively simple device of good appearance.

Further and more specific objects, features and advantages will more clearly appear from the detailed description given below taken in connection with the accompanying drawings which form part of the specification, and illustrate preferred embodiments of the invention, and in which,

Fig. 1 is a side elevation of a preferred form of lighter embodying the invention in one of its examples;

Fig. 2 is a vertical sectional view taken through the form of lighter shown in Fig. 1;

Fig. 3 is a top view of the lighter shown in Fig. 1;

Fig. 4 is a vertical transverse section taken substantially on the line 4—4 of Fig. 2;

Fig. 5 is a similar section taken substantially on the line 5—5 of Fig. 2;

Fig. 6 is a partial side elevational view of the lighter showing the snuffer in an elevated position;

Fig. 7 is a similar view showing the snuffer in another and intermediate elevated position;

Fig. 8 is a view similar to Fig. 6 showing the opposite side of the device;

Fig. 9 is a side elevational view showing another example of the invention in which a substantially smooth exterior is presented when the parts are in their inoperative positions;

Fig. 10 is a vertical transverse section taken substantially on the line 10—10 of Fig. 9;

Fig. 11 is a top view of the lighter shown in Fig. 9;

Fig. 12 is a vertical partial sectional view of the lighter shown in Fig. 9, showing the parts in their normal positions;

Fig. 13 is a similar view showing the parts in their actuated positions;

Fig. 14 illustrates a further example of the invention showing the top of the lighter in section, and as provided with a wick controlling means which may if desired be embodied in various other forms of lighters including those above mentioned;

Fig. 15 is a top view of the device shown in Fig. 14; and

Fig. 16 is a transverse section taken substantially on the line 16—16 of Fig. 14.

The example of the invention shown in Figs. 1 to 8 inclusive, comprises a relatively tall thin casing 20 forming a chamber within which is contained a suitable fuel to be drawn up through a wick 21. A wick sleeve 22 is fastened to the top plate 23 of the casing 20. When the device is not in use the sleeve at the top is engaged by a snubber means including a rubber sleeve 24 disposed within a metallic sleeve 25 dependent from a snuffer carrying member 26. This member comprises a top wall 27 and side walls 28 and 29, and extends rearwardly from the snuffer sleeve 25 for forming a housing for a sparker wheel 30 mounted on top of the lighter. The snuffer member and the sparker wheel are mounted on a shaft 31 journalled at its ends in spaced supporting lugs or plates 32 and 33 projecting upwardly from the top plate 23 of the casing 20. Fastened to the outer sides of the walls 28 and 29 and concentric with the shaft 31 are pinions 34 and 35 rotatable with the snuffer carrying member. These pinions are engaged by rack teeth on wing-arms 36 and 37 connected to and operated by a plunger shaft 38 having a finger piece or head 39. The plunger 38 extends downwardly into a

tube 40 within the casing 20 and beneath it is a spring 41 tending to force it out of the tube. This spring, therefore, it will be observed, will normally keep the parts in the position shown in Fig. 2. When the plunger is depressed, the rack teeth on the arms 36 and 37 will turn the pinions 34 and 35 and with them the snuffer carrying member 26 thus uncovering the wick 21.

Between the side walls 28 and 29 of the member 26 and loosely mounted around the shaft 31 are ratchet pinions 42 and 43 on opposite sides of the sparking wheel 30. The ratchet 42 has a hub 44 extending axially therefrom and on the outer end of which ratchet 43 rotates. The ratchet 43 has a hub 45 extending axially therefrom around the hub 44. The sparking wheel 30 is bored to receive the hub 44 and along its closed side 46 is fastened to ratchet 42 by means of a pin 47 which projects into the hollow interior of the wheel 30. On its inner end this pin 47 engages the end of a coiled spring 48 which is wrapped around the hub 45 and the other end of which is connected to a pin 49 fastened to the ratchet 43. The teeth of the ratchet 42 are normally engaged by a pawl 50 pivoted at one end to a lug on the top plate 23 of the casing 20 and held in engagement with these teeth by means of a spring 51 housed in a tube 52. A short pin 53 on the wing arm 36 is in position to engage with the pawl 50 when the plunger 38 is depressed nearly to its lowermost position so as to force the pawl out of engagement with the teeth of the ratchet 42.

Beneath the top wall 27 of the snuffer carrying member is disposed a short stub shaft 53*a* around which is coiled a spring 54, one end of which bears against the inner face of the wall and the other end of which bears against a pawl 55 pivoted on the shaft 53*a* and having an end engaging the teeth of the ratchet 43. The ratchet 43 closes the opening within the sparking wheel 30. This ratchet is permitted to turn to a limited extent independently of the wheel 30. When the plunger 38 is depressed by the operator, the snuffer member is elevated and as this movement starts, the pawl 55 is raised and turns the ratchet 43. This causes the spring 48 to be wound up since the other end of it is engaged by the pin 47 connected to the ratchet 42 which is then being held stationary by the pawl 50. When the plunger reaches nearly or substantially its lowermost position and the snuffer member has been elevated to a position remote from the wick, as shown in Fig. 8, then the short pin 53 on the wing arm 36 will engage the pawl 50 and remove it from engagement with the teeth of the ratchet 42. This release of the ratchet 42 which is connected to the sparking wheel 30 will permit the wound up spring 48 to snap the sparking wheel around and produce sparks by contact with a suitable pyrophoric element at 56. This element projects from the upper end of a tube 57 extending through the casing 20 to the bottom thereof and is backed by a spring 58. The lower end of the spring 58 is held in position by a closure cap 59 threaded into the lower end of the tube 57. The angle of engagement of the pyrophoric element and the sparking wheel 30 is such as to throw sparks in the direction of the wick 21.

With the sparking wheel operated as above described, the sparking effect may be intensely concentrated within a very short space of time, during which the sparking wheel is caused to move much more rapidly than would be generally feasible with direct manual pressure even when applied through gearing. Accordingly the efficiency of the pyrophoric means is not only enhanced as a result of the concentration of the sparking within a limited time, but the intensity of the sparking may also be substantially increased due to the increased speed of movement of the sparking wheel made possible by the snap action thereof. By this operation the snuffer member may be removed from the neighborhood of the wick before the wick is ignited and therefore the snuffer member and particularly the rubber sleeve 24 is safeguarded against damage by burning.

In the modification shown in Figs. 9 to 13 inclusive, most of the parts are numbered for clearness, with the same numerals as used with corresponding parts as above described, since they are constructionally related in the same general manner, and need not be further described. However, in this example of the invention the spring 48 between the pins 47 and 49 is not wound around the hub 45 but is stretched circumferentially around the hub as appears in Fig. 12. The walls of the casing 20 are extended upwardly around the wick 21 on three sides thereof to form a windshield 60 therefor. This windshield also extends around the sparking wheel. The top of this shield is normally closed by the top wall 27 of the snuffer carrying member which lies flush with the top of the windshield. Also the top or finger piece 39 of the plunger 38 in this example is so shaped that when in its upper position, it will lie substantially in the same plane as the top of the windshield and the top of the snuffer as shown in Fig. 9. The top 23 of the casing is depressed as at 61 to permit the sparking wheel to be journalled closely adjacent the reservoir as for compactness. The finger piece 39 is also provided with dependent end and side walls 62, 63 and 64, so that when the parts are in their normal positions, the entire top of the lighter will be substantially closed and flat.

The entire lighter construction may therefore be provided with an exterior contour

substantially continuous except for the right angular corners. Such construction not only makes possible an enhanced appearance, but also eliminates the use of any protruding parts which might interfere with the proper operation of the device in the hand of the user or bring about accidental operation with its attendant dangers.

In the modification shown in Figs. 14 to 16 inclusive, the wick 21 is engaged by the teeth of a small spur gear 65 mounted on a strap 66 extending around the top of the wick tube 22. The tube 22 has a slot 67 therein to permit the teeth of the spur gear to pass through. The gear 65 is rotatably mounted on a sleeve 68 secured in openings in the adjacent ends of the strap 66, as shown in Fig. 16. This spur gear may be easily turned by engagement with one's finger and thereby the elevation of the wick may be accurately adjusted to insure efficient ignition. In this form also the snuffer member is provided with dependent end and side walls 69, 70 and 71 which, when the snuffer is in its closed position as shown in Fig. 14, will entirely cover the top of the casing around the wick 21 and form a housing therefor as well as for the spur gear and associated parts. The bottom edges of these dependent snuffer walls rest on the top 23 of the casing 20. The housing has a rear wall 72 which closes the fourth side thereof and separates the housing from the sparking wheel enclosure. This rear wall has a slot 73 in its lower portion to receive the top of the tube 57 as shown in Figs. 14 and 15. This wick control device may of course be used on other types of lighters than those shown in the drawings.

Constructions may thus be provided in which the snuffer element is removed from the region of the wick before the sparking takes place which ignites the wick and therefore the snuffer and its associated parts are not damaged by repeated subjection to the heat of the flame; also, the snap action given to the sparking wheel by the associated spring is effective to produce highly efficient sparking.

The smooth exterior presented in one of the modifications avoids the use of projecting portions which tend to wear or tear the linings of the user's pockets or other receptacles into which the lighter may be kept, and the wick and the flame are conveniently and effectively guarded to prevent interference by the wind.

Various other forms and other features of my invention are disclosed and claimed in my Patent No. 1,673,727, dated June 12, 1928, and in my copending applications Ser. No. 176,159, filed March 17, 1927, and in Ser. No. 196,255, filed June 3, 1927 (the latter being now involved in interference proceedings).

While the invention has been described in detail with respect to a particular preferred example thereof 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 of the United States is:

1. In a lighter, a casing, a wick projecting therefrom, a pivoted snuffer member for the wick, a sparking wheel, a pinion on the snuffer member, a depressible plunger head, a rack on said head to engage said pinion to elevate the snuffer as the head is depressed, means for holding the sparking wheel stationary as the snuffer is being elevated, means tending to exert an operating force on the sparking wheel as the snuffer is elevated, and means operative when the head is depressed a predetermined distance to release the sparking wheel for operation with a snap action by said force.

2. In a lighter, a casing, a wick projecting therefrom, a snuffer for said wick, means for elevating said snuffer, a sparking wheel associated with said snuffer, a ratchet rotatable with the snuffer, a second ratchet connected to the sparking wheel, a spring between said ratchets, means for holding said second ratchet while the snuffer is being elevated and said spring is being tensioned, and means for releasing said holding means when the snuffer has been elevated a predetermined distance above the wick to permit the spring to operate the sparking wheel with a snap action.

3. In a lighter, a casing, a wick projecting therefrom, a snuffer for said wick, means for elevating said snuffer, a sparking wheel associated with the snuffer, a ratchet rotatable with the snuffer, a second ratchet connected to the sparking wheel, securing means on said ratchets respectively, a spring connected between said securing means, a pawl for holding said second ratchet stationary while the snuffer is being elevated and stretching said spring, a depressible operating member, a rack on said member, a gear on said snuffer meshing with said rack to elevate the snuffer as the member is depressed, and means operated when said member is depressed a predetermined distance to release the holding pawl from the second ratchet and allow the spring under tension to operate the sparking wheel with a snap action.

4. In a lighter, a casing, a wick projecting therefrom, a snuffer for said wick, means for elevating said snuffer, a sparking wheel associated with said snuffer, a ratchet rotatable with the snuffer, a second ratchet connected to the sparking wheel, a spring connected between said ratchets, a pawl for holding said second ratchet stationary while the snuffer

is being elevated and said spring is being tensioned, a depressible head, racks on said head, gears on said snuffer meshing with said racks to elevate the snuffer as the head is depressed a pyrophoric element in contact with the sparking wheel, and means on said depressible members to contact with said holding pawl when said member is depressed a predetermined distance, to release said second ratchet whereby said spring under tension will operate the sparking wheel with a snap action to throw sparks in the direction of the wick at a time when the snuffer is elevated.

5. In a lighter, a casing, a wick projecting therefrom, a snuffer for said wick having side walls, a gear fastened to a side wall of the snuffer, a depressible head, a rack on said head meshing with said gear on the snuffer to elevate the snuffer as the head is depressed, ratchets disposed within the side walls of the snuffer, a sparking wheel disposed between said ratchets, one of said ratchets being connected to the sparking wheel, the second ratchet being rotatable independently of the sparking wheel, a pawl on the snuffer engaging said second ratchet to move it with the snuffer, a spring interconnecting said ratchets, a pawl engaging said first ratchet to hold it stationary as the snuffer is being elevated and while said spring is being tensioned, and a release member operated by said head to release said holding pawl from said second ratchet when the snuffer is elevated a predetermined amount to permit the spring to operate the sparking wheel with a snap action.

6. In a pyrophoric lighter, a casing, relatively movable members one of which is a sparking wheel and another of which is a snuffer-carrying member disposed for pivotal movement above the top wall of said casing, a pyrophoric element coacting with said wheel, an actuating member separate from said snuffer-carrying member but connected thereto, said actuating member being disposed above said top wall, a spring connected to said relatively movable members, movement of said actuating member in one direction tilting said snuffer-carrying member and storing energy in said spring, and a latch for retaining said sparking wheel in stationary position against the force of said spring, movement of said actuating member to a predetermined position releasing said latch.

7. In a pyrophoric lighter, a casing relatively movable members one of which is a sparking wheel and another of which is a snuffer-carrying member, the respective relatively movable members having hubs telescopically disposed and rotatable with respect to each other, a pyrophoric element coacting with said wheel, an actuating member separate from said snuffer-carrying member but connected thereto, a spring wound around said hubs and connected to said relatively movable members, movement of said actuating member in one direction tilting said snuffer-carrying member and winding said spring, and a latch for retaining said sparking wheel in stationary position against the unwinding tendency of said spring, movement of said actuating member to a predetermined position releasing said latch.

In testimony whereof I have signed my name to this specification.

LOUIS V. ARONSON.