May 8, 1951 C. L. METZLER ET AL 2,551,688

LIGHTER

Filed Nov. 1, 1949 3 Sheets-Sheet 1

Fig. 1

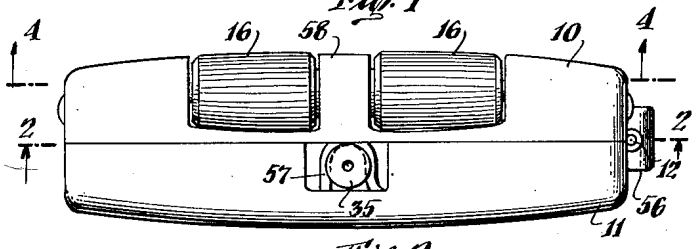


Fig. 2

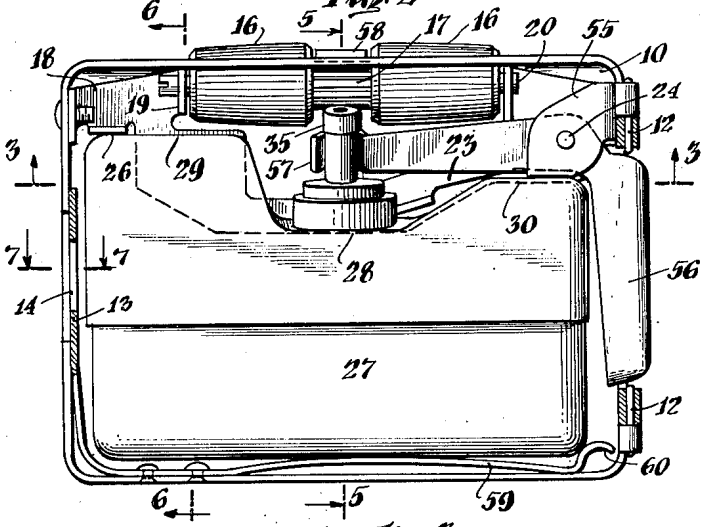


Fig. 3

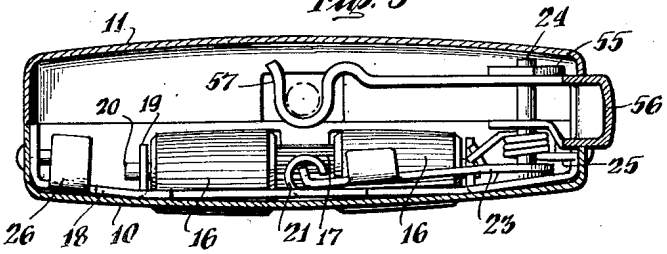


Fig. 4

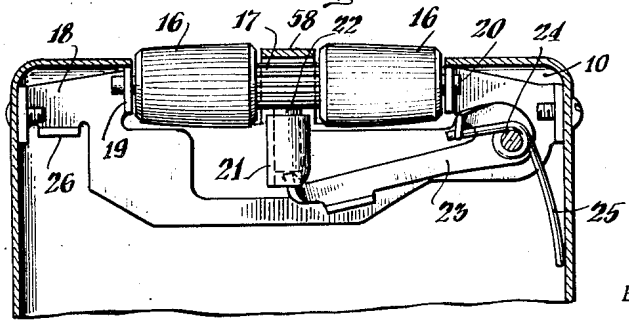


Fig. 5

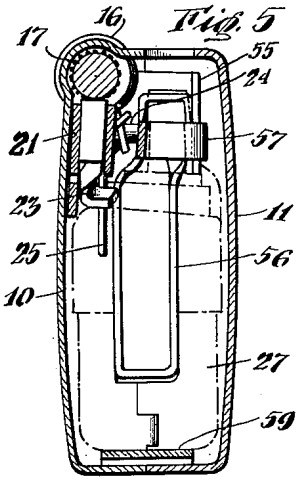


Fig. 6

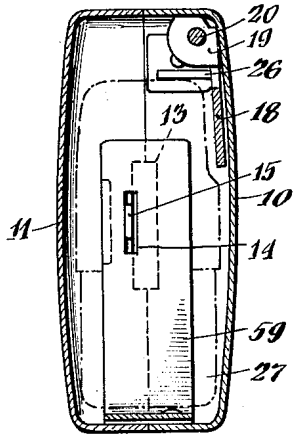
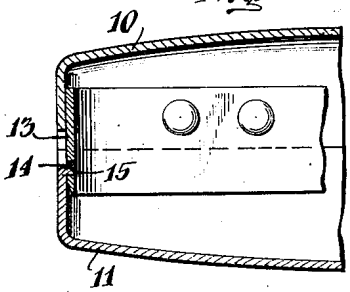


Fig. 7



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May 8, 1951 C. L. METZLER ET AL 2,551,688

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Fig. 8

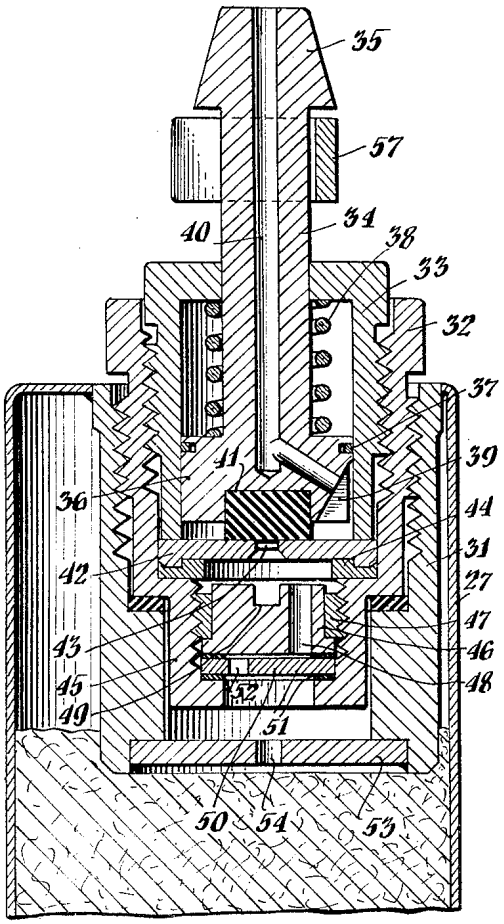

Fig. 9

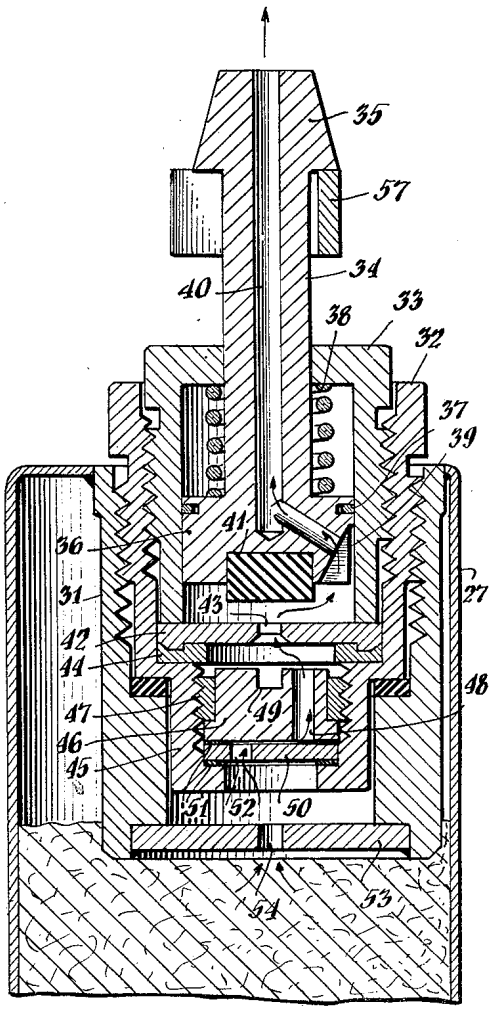

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Fig. 10

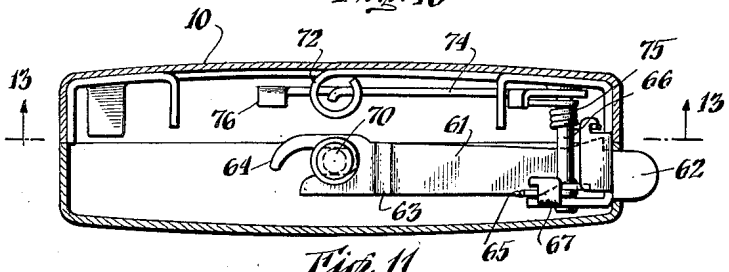


Fig. 11

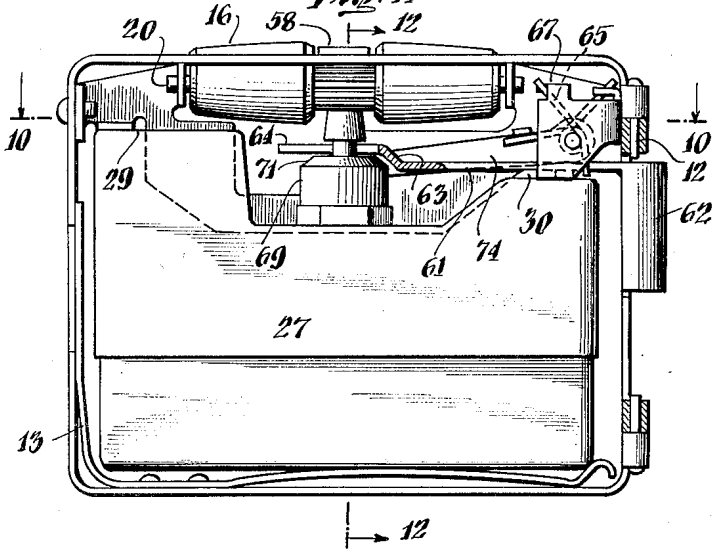


Fig. 12

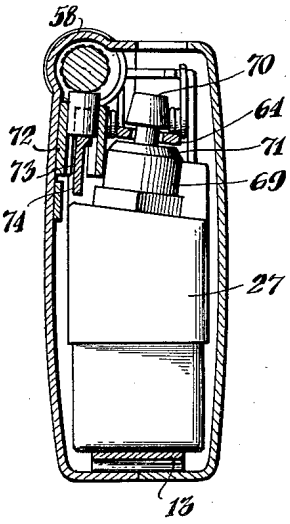


Fig. 13

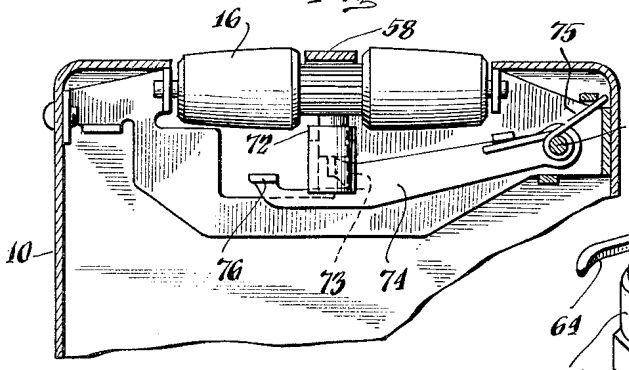
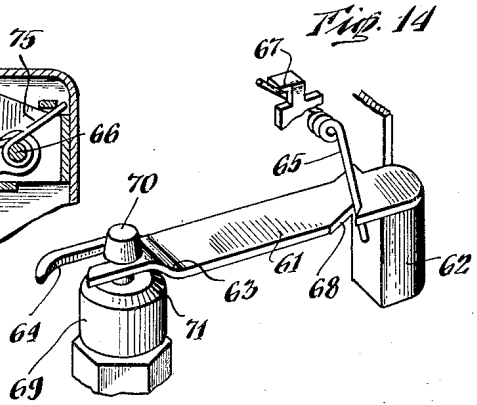


Fig. 14



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UNITED STATES PATENT OFFICE

2,551,688

LIGHTER

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Application November 1, 1949, Serial No. 124,752

4 Claims. (Cl. 67—7.1)

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This invention relates to a structurally and functionally improved lighter of the pocket type.

It is an object of the invention to furnish a lighter assembly which will be pleasing in appearance and include relatively few parts individually simple and rugged in construction, such parts combining to furnish a unitary mechanism operating over long periods of time with freedom from all difficulties.

A further object is that of furnishing a structure in which it will not be necessary for the user to fill a reservoir or similar part of the assembly with volatile fuel. Rather, an improved apparatus is furnished in which the fuel will be contained in a part which is renewable as a unit and which will ordinarily not require such renewal until after the lighter has been used several thousand times.

An additional object is that of furnishing a fuel-containing flask or cartridge of novel design which will cooperate with the mechanism of the lighter in a most advantageous manner.

With these and other objects in mind, reference is had to the attached sheets of drawings illustrating practical embodiments of the invention and in which:

Fig. 1 is a plan view of the lighter;

Fig. 2 is a sectional side view along the lines 2—2 and in the direction of the arrows as indicated in Fig. 1;

Fig. 3 is a sectional plan view along lines 3—3 and in the direction of the arrows as indicated in Fig. 2;

Fig. 4 is an upper section along the lines 4—4 and in the direction of the arrows as indicated in Fig. 1;

Figs. 5, 6 and 7 are sectional views taken respectively along the lines 5—5, 6—6 and 7—7 in the direction of the arrows as indicated in Fig. 2;

Figs. 8 and 9 are enlarged sectional views of the upper flask portion and showing the valve mechanism in different positions;

Fig. 10 is a sectional view showing alternative structure and taken along lines 10—10 of Fig. 11;

Fig. 11 is a sectional side view;

Figs. 12 and 13 are sectional views along lines 12—12 and 13—13 of Figs. 10 and 11 respectively; and

Fig. 14 is a perspective view of an actuating structure.

Referring primarily to Figs. 1 to 7, it will be seen that an exterior casing is provided which includes sections 10 and 11 hingedly connected to each other as at 12 and at their opposite ends being secured against separation by means of a

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suitable latch structure. This structure as shown in Fig. 7 conveniently includes an arm 13 of a spring and which is provided with an opening 14. This spring is secured to section 10 and extends beyond the same to overlap the inner face of section 11 when the casing is closed. In line with the opening 14 both sections may have their edges notched to provide an access opening. Section 11 is conveniently formed with an instruck portion 15, which provides a detent for cooperation with the edges of opening 14. It is thus apparent that as the casing sections are swung towards each other the detent 15 will override the edge of spring 13, which may be reduced in line with the opening 14 and will deflect this spring. Continued closing movement of the casing sections will cause the detent 15 to move into opening 14 to thus secure the parts against separation. If, thereupon, it is desired to open the casing this may be achieved by exerting pressure against the spring 13 at a point adjacent the opening 14 to deflect the latter inwardly. This will free detent 15 and the sections may then be swung around hinges 12.

Rotatably mounted by section 10 is an actuator. The latter preferably includes a shaft portion mounting a pair of spaced rollers 16 conveniently having their surfaces knurled and having a sparking wheel or hub 17 disposed between them. A frame 18 may be suitably secured to the inner face of casing section 10 and provide bracket portions 19 which rotatably support the shaft 20 mounting the actuating rollers 16 and the sparking wheel or hub. The bracket also supports a tube 21 within which a pyrophoric plug 22 is disposed to engage with the surface of sparking hub 17. A lever 23 is pivotally supported as at 24 by the frame 18 and has cooperating with it a spring 25 urging its inner end in an upward direction. This inner end underlying plug 22, maintains the latter in operative association with the sparking wheel. At this time it is to be noted that the frame is also provided with an extension 26 which functions as a stop in a manner hereinafter brought out.

The fuel for the lighter is contained within a cartridge or flask 27. The latter may be filled with propane or butane in liquid or gaseous form and at relatively low pressures. It may contain any fibrous material, should this be desired. As shown especially in Fig. 2, it is preferably formed with a centrally recessed portion 28 to each side of which it is provided with upward extensions 29 and 30. In line with the recessed portion 28 it is formed with an opening within which a valve

assembly is disposed. This assembly may take one of several different forms. For the purpose of the present disclosure it may be considered as embracing the structures shown in detail in Figs 8 and 9.

In these views, the casing has been indicated at 27 and the upper surface of the latter has been shown as presenting an opening. Fixed within this opening in any desired manner is a sleeve 31 having its inner face threaded and mounting a tube 32. In turn mounted by the threads formed in the inner face of this tube is a cap 33, formed with an upper opening through which there slideably extends a nozzle 34, preferably terminating in a head 35. Nozzle 34 has adjacent its lower end a guiding portion 36 slideably bearing against the inner face of cap 33 and conveniently mounting a packing ring 37. A spring 38 is interposed between the end of cap 33 and the portion 36. The latter may be notched or reduced as indicated at 39 and the inner end of bore 40 of the nozzle 35 communicates with this notch. Portion 36 may also have its lower face recessed to receive a block or disc of rubber 41 which may be formed of synthetic material.

Inward movement of portion 36 and sleeve 31 is limited by a stop plate 42 disposed adjacent the inner end of cap 33. Plate 42 in line with the block 41 is formed with an aperture 43 so that the block in cooperation therewith provides a valve structure. A spacing ring 44 is disposed between plate 42 and the reduced end portion 45 of tube 32. The plug 46 is rotatably mounted in a bushing 47 having threaded engagement with the threads of the reduced end portion 45 of tube 32. Plug 46 is formed with a transverse passage 48 disposed to one side of its center. It may also be provided with an actuating notch 49 suitable for engagement with an implement such as a screwdriver. Below plug 46 a disc 50 is fixed, the latter having spacing rings 51 disposed in contact with its upper and lower faces. This disc is also formed with an opening 52 disposed to one side of its center. Thus, the plug is maintained in a position materially above the lower end 45 of tube 32 and the latter in turn terminates substantially in advance of the lower end of sleeve 31. At that point the sleeve may have extending across its bore a plate 53 which is apertured as at 54. As shown, the assembly extends for a substantial distance into the body of the flask 27. This flask or cartridge, as afore brought out, is filled with suitable fuel.

When the parts are in the position shown in Fig. 8 a flow of fluid is arrested incident to the fact that plug 41 bears in sealing engagement with the surface of plate 42. When the nozzle 34 is elevated, as in Fig. 9, block 41 is spaced from aperture 43. Under these circumstances a flow will occur through openings 54, and 52, the space intervening discs 50 and plug 46, the bore 48 of the latter and aperture 43. In such flow it will pass through expansion chambers which exist as a consequence of the spacing between parts 53 and 50, parts 46 and 42 and the latter and guiding portion 36. Therefore, the fuel emerging from the end of the nozzle will be in the form of a gas suitabel for igniting. The volume of such flow may be controlled by rotating plug 46 to align its passage 48 to a greater or lesser extent with the opening 52 through disc 50. Control of the flow may also be achieved by tightening the bushing 47 to a greater or lesser extent.

Now with a view to providing means which will serve to establish and interrupt the flow of gas from the assembly, frame 10 may be provided with a bracket 55 which pivotally supports an actuating lever in the form of a bellcrank 56. The latter has a body portion 57 adjacent its inner end and which partially encircles nozzle 34 below head 35. The outer end of the lever extends to a point beyond casing sections 10 and 11, which for this purpose are formed with notches to permit its passage. Accordingly, this outer lever end may be engaged by the fingers of an operator and pressed to cause its inner end to be rocked upwardly. With such inner end coupled to the nozzle, the latter will be raised against the seating pressure of spring 38 to shift the parts from the position shown in Fig. 8 to that illustrated in Fig. 9. With the release of this pressure, the thrust of spring 38 will not alone serve to close the valve, but will also cause the actuating portion of lever 56 to again be swung out.

In operation it will be understood that with the parts assembled in the manner shown in Fig. 2, an operator desiring to use the apparatus will simply turn shaft 20 by engaging either of the rollers 16 and imparting thereto a rotation. Before, or simultaneously with this operation he will shift the outer end of lever 56 inwardly to open the valve assembly. Therefore sparks will be directed inwardly from the surface of the wheel or hub 17 towards end of nozzle 34. As shown, an extension or flap 58 forming a part of section 10 may overlie the hub 17 to act as a deflector for the glowing particles projected thereby. The gas will therefore be ignited and after the device is used lever 56 may be released. This will interrupt the gas flow and extinguish the flame. Due to the capacity of the flask or cartridge, the apparatus may be operated several thousand times without renewal of the fuel supply.

The spring of which arm 13 forms a part, is preferably secured to the casing section by rivets. Its lower leg may be bowed, as indicated at 59. This will cause it to yieldingly bear against the flask. The movement of the latter will in turn be limited by the stop 26. At the end spring-leg 59 may be offset as at 60 to furnish a recess for the reception of a spare plug 22. The pivots of the actuator 56 and the lever 23 are preferably aligned; these elements being conveniently supported on a single shaft.

As will be apparent, when a renewal of the flask is necessary, the operator may simply bring pressure to bear through the opening in the flange of the casing against spring 13 to deflect the latter. This will cause the opening 14 formed in that spring to clear the detent 15. Accordingly, the latch structure will be released and the casing sections may thereupon be swung to open position. The spent flask may be removed. Thereupon a new flask may be inserted. Such insertion occurs in a convenient and sidewise direction. It automatically establishes a coupling between the stem or operating element 34 of the valve assembly and the actuator 56. As afore brought out, the relatively projecting parts 29 and 30 on the flask will bear against adjacent portions supported by the casing so that the flask will be properly positioned. Additionally, the portions 29 and 30 of the flask will provide for increased capacity of the latter. With the casing sections again latched, the operator, by simply engaging and moving one or both of the rollers 16, will cause the sparking hub or wheel 17 to direct sparks toward the outlet of the nozzle.

In Figs. 10 to 14 an alternative form of struc-

ture has been shown. In these views similar reference numerals have been used to identify parts heretofore described. Thus, it will be observed that there is again involvd a casing the sections of which are hingedly connected and which receives a flask the flow of fuel from which is controlled by a valve mechanism. However, certain parts of that mechanism have in these views been altered as has also the actuator of that mechanism.

Referring primarly to Fig. 14 the actuator may embrace in lieu of the bell crank 56, an arm 61 to which there is coupled a crank portion 62 extending beyond the side wall of the casing. This arm is provided with an angularly offset end portion 63 terminating in a slotted or forked part 64. A spring 65 may encircle a shaft 66 and bear against a stop 67 as well as the base of a notch 68 formed in arm 61. Therefore, the latter, together with its actuator crank 62 will be urged in an outward direction.

In this form of construction there extends from the centrally recessed part of the flask a housing 69. Projecting above the latter is a headed actuator 70 which may control the valve mechanism in the same manner as heretofore described in connection with Figs. 8 and 9. The upper surface of the housing may be bevelled as at 71 for cooperation with the angularly extending surface 63 of arm 61. With the head of actuator 70 extending within the fork 64 it is apparent that under normal conditions spring 65 will assist in shifting the arm 61 to a point at which the valve is maintained in closed position. However, if actuator crank 62 is pushed inwardly, the angularly extending surfaces 63 and 71 will cooperate to raise the forked portion 64. The latter engaging against the under surface of the head portion of the actuator 70, it follows that with such inward movement the actuator will be raised and the valve will thus be opened.

As is also apparent incident to the forked construction the flask valve—as it is shifted into position within the casing—will be automatically and operatively coupled with arm 61. In this connection it will be observed that the surface of the flask from which housing 69 extends is preferably inclined, and housing 69 extends perpendicularly therefrom. With such inclination and the inclination of the forked end portion 64 the parts are automatically guided as the flask is positioned. Additionally, any flame generated will be directed to one side of the spark producing mechanism.

As will also be seen in these views the socket portion 72 receiving the pyrophoric plug may be slotted in its lower surfaces as at 73. Arm 73 is pivotly mounted upon shaft 66 and urged upwardly by a spring 75. This arm has an offset portion riding within slot 73 and bearing against the base of the plug. The arm may also be provided with an extension 76 which permits of its ready engagement by the finger of the operator for purposes of retraction while positioning a new plug.

Thus, among others, the several objects of the invention as specifically aforenoted are achieved. Obviously numerous changes in construction and rearrangement of the parts might be resorted to and the steps of the method might be varied in numerous particulars without departing from the spirit of the invention as defined by the claims.

We claim:

1. A lighter including in combination a pair of sections, each of said sections comprising a substantially longitudinal side wall and flanges extending inwardly from the edges of said wall, a hinge connecting adjacent side flanges of different sections whereby the latter may be swung to positions adjacent each other to provide a casing, the area and outline of said walls and flanges being such that the casing provided thereby is relatively long in width and narrow in depth, a shaft rotatably mounted by one of said sections with its axis extending longitudinally of and adjacent the upper flange thereof, a sparking wheel and actuating roller carried by said shaft, a pyrophoric plug support carried by said section at a point adjacent said wheel, a bell-crank pivotally supported by said one section at a point adjacent the hinged connection of said sections, said bell-crank having one of its arms extending inwardly of said casing to a point adjacent said sparking wheel and coupling means secured to said arm for connection with a valve part provided by a flask disposable in said casing.

2. A lighter including in combination a pair of sections, each of said sections comprising a substantially longitudinal side wall and flanges extending inwardly from the edges of said wall, a hinge connecting adjacent side flanges of different sections whereby the latter may be swung to positions adjacent each other to provide a casing, the area and outline of said walls and flanges being such that the casing provided thereby is relatively long in width and narrow in depth, a shaft rotatably mounted by one of said sections with its axis extending longitudinally of and adjacent the upper flange thereof, a sparking wheel and actuating roller carried by said shaft, a pyrophoric plug support carried by said section at a point adjacent said wheel, a bell-crank pivotally supported by said one section at a point adjacent the hinged connection of said sections, said bell-crank having one of its arms extending inwardly of said casing to a point adjacent said sparking wheel, coupling means secured to said arm for connection with a valve part provided by a flask disposable in said casing and the second arm of said bell-crank extending through an opening formed in the side flange of at least one section and adjacent said hinge.

3. A lighter including in combination a casing presenting an upper flange and an inner wall face, a frame secured to said face, spaced brackets extending from said frame, a shaft, an actuating roller and a sparking wheel secured to said shaft, said shaft being rotatably mounted by said brackets to dispose its axis and the axes of said roller and wheel substantially parallel to said upper flange and with the periphery of said roller projecting beyond said flange, a support for a pyrophoric plug mounted by said frame at a point adjacent said wheel, a further bracket forming a part of said frame to one side of said first named brackets, a pivot associated with said further bracket, an arm swingingly supported by said pivot to cooperate with a pyrophoric plug in said support, a bell-crank also swingingly mounted by said pivot, one arm of said crank lying adjacent an edge of said wall, the other crank arm having its outer end extending adjacent said wheel and support and a coupling portion carried by said outer end for connection with a valve-actuating mechanism.

4. A lighter including in combination a pair of sections, each of said sections comprising a substantially longitudinal side wall and flanges extending inwardly from the edges of said wall, a

hinge connecting adjacent side flanges of different sections whereby the latter may be swung to positions adjacent each other to provide a casing, the area and outline of said walls and flanges being such that the casing provided thereby is relatively long in width and narrow in depth, a shaft rotatably mounted by one of said sections with its axis extending longitudinally of and adjacent the upper flange thereof, a sparking wheel and actuating roller carried by said shaft, a pyrophoric plug support carried by said section at a point adjacent said wheel, a bell-crank pivotally supported by said one section at a point adjacent the hinged connection of said sections, said bell-crank having one of its arms extending inwardly of said casing to a point adjacent said sparking wheel, a flask shiftable into position within said casing, a movable valve assembly supported by said flask, a coupling portion forming a part of said assembly and a coupling at the end of the inwardly extending arm of said bell-crank and automatically connectible with the coupling portion of said valve assembly as said flask reaches a position wholly within said casing.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,995,380	Dodge	Mar. 26, 1935
2,376,404	Thoms	May 22, 1945
2,495,345	Quercia et al.	Jan. 24, 1950
2,509,744	Quercia et al.	May 30, 1950

FOREIGN PATENTS

Number	Country	Date
135,370	Austria	Nov. 10, 1933
338,224	France	Mar. 14, 1904
622,094	Germany	Nov. 19, 1935
787,706	France	July 8, 1935
810,535	France	Dec. 28, 1936
923,219	France	Feb. 17, 1947