

Dec. 27, 1955

M. QUERCIA ET AL
GAS FUELED SMOKER'S LIGHTER

2,728,213

Filed Oct. 25, 1951

2 Sheets-Sheet 1

FIG. 1.

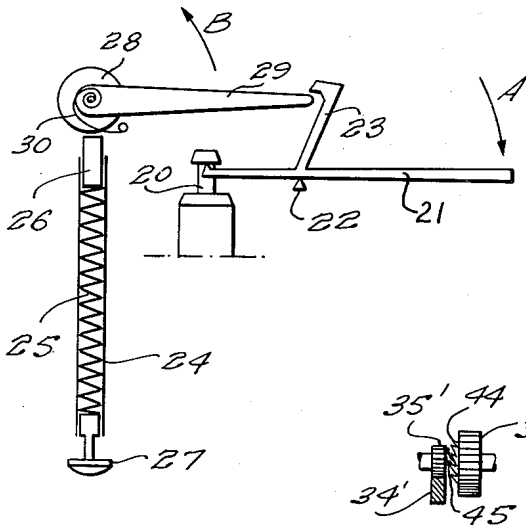


FIG. 3.

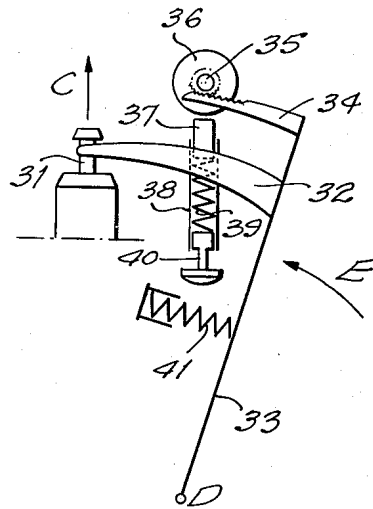


FIG. 5.

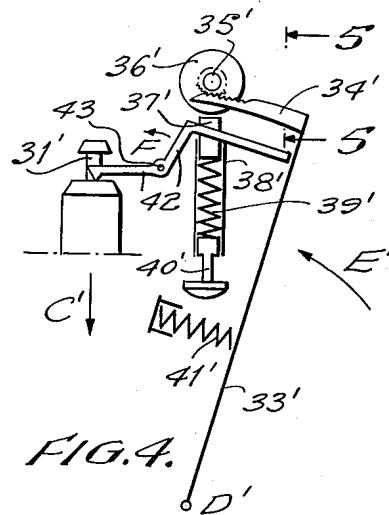
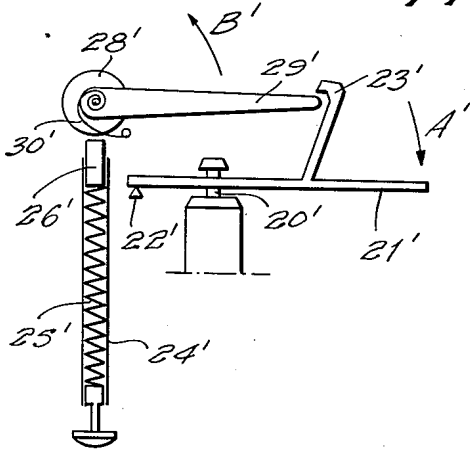


FIG. 2.

FIG. 4.

MARCEL QUERCIA AND INVENTORS:
GEORGES FERDINAND
BY

judall

Dec. 27, 1955

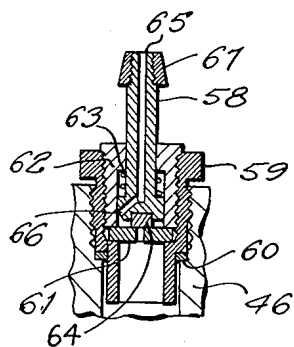
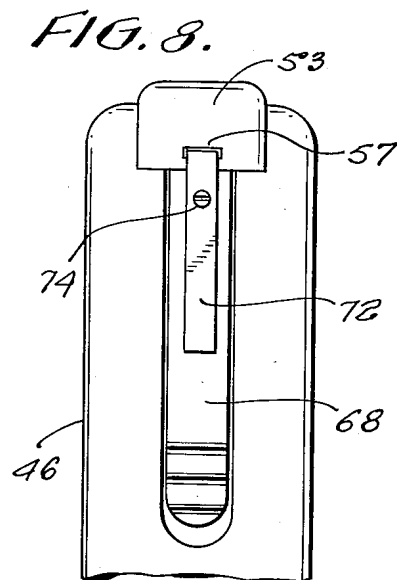
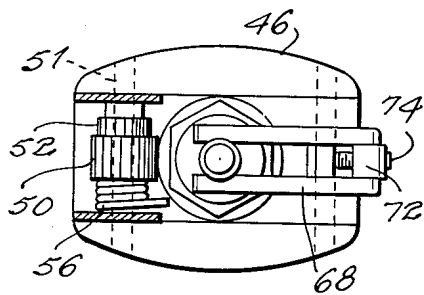
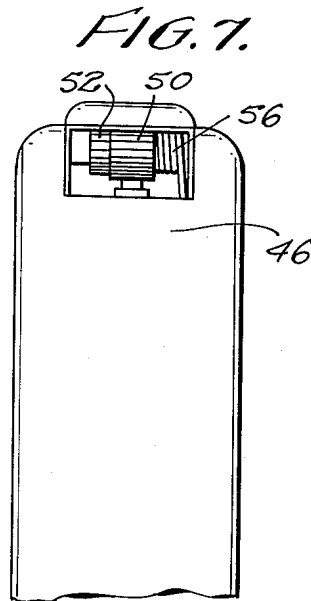
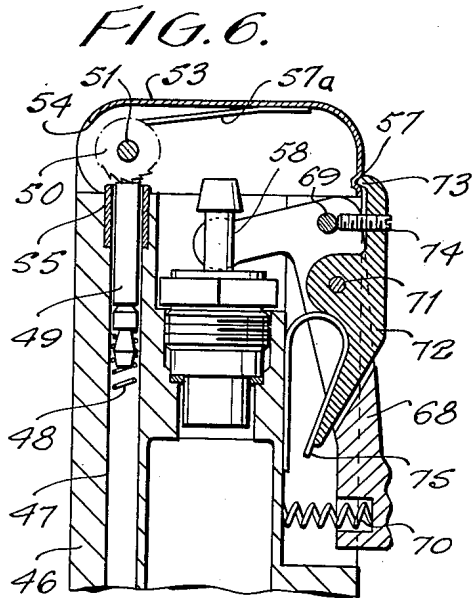
M. QUERCIA ET AL

2,728,213

GAS FUELED SMOKER'S LIGHTER

Filed Oct. 25, 1951

2 Sheets-Sheet 2



MARCEL QUERCIA INVENTORS:
AND GEORGES FERDINAND

BY

1

2,728,213

GAS FUELED SMOKER'S LIGHTER

Marcel Quercia, Paris, and Georges Ferdinand, Nogent sur Marne, France, assignors to Societe d'Etudes et de Recherches Techniques (S. E. R. T.), S. A. R. L., Paris, France, a society of France

Application October 25, 1951, Serial No. 253,021

Claims priority, application France January 7, 1950

3 Claims. (Cl. 67—7.1)

The present invention relates to lighters, such as cigarette lighters, for example, which are adapted to operate by the burning of a gas. This gas may be butane, for example.

This case is a continuation-in-part of the copending U. S. application Serial No. 154,224, filed April 6, 1950, and now abandoned.

More particularly the present invention relates to apparatus for operating a valve member to control the flow of the gas and for producing a spark simultaneously with the opening of the valve member.

One of the objects of the present invention is to provide a semi-automatic lighter of the above type.

Another object of the present invention is to provide a fully automatic lighter of the above type.

Still another object of the present invention is to provide a lighter of the above type which is completely operable simply by the movement of a lever.

An additional object of the present invention is to provide a lighter of the above type which is of an exceedingly simple and inexpensive construction and which is very reliable in operation.

With the above objects in view the present invention mainly consists of a lighter adapted to operate by the burning of a gas. This lighter includes a valve member movable between open and closed positions for controlling the flow of the gas. The lighter also comprises an operating or actuating member for operating the lighter, and means interconnecting the valve member and actuating member for holding the valve member in its closed position when the actuating member is in its inactive position and for opening the valve member when the actuating member is moved to its active position. This means interconnecting the actuating member and valve member may be a separate lever located between the actuating member and valve member, may be an extension of the actuating member which engages the valve member, or it may be a cam fixed to the actuating member and engaging the valve member for operating the same. The lighter comprises a cover which is movable between open and closed positions and a spark-producing means which may be associated either with the cover or with the actuating member, for producing a spark when the cover is moved to its open position or when the actuating member is moved into its active position. A spring means is associated with the actuating member to urge the same into its inactive position, and an additional spring means may be associated with the cover for moving the latter into its open position.

The novel features which are considered as characteristic for the invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawings, in which:

2

Fig. 1 shows a diagrammatic illustration of one possible embodiment of the invention;

Fig. 2 shows a diagrammatic illustration of a second possible embodiment of the invention;

Fig. 3 shows a diagrammatic illustration of a third possible embodiment of the invention;

Fig. 4 shows a diagrammatic illustration of a fourth possible embodiment of the invention;

Fig. 5 is a sectional view taken along line 5—5 of Fig. 4 in the direction of the arrows;

Fig. 6 is a fragmentary sectional view of an upper portion of a lighter constructed in accordance with the present invention;

Fig. 7 is a view of the structure of Fig. 6 as seen from the left-hand side thereof;

Fig. 8 is a view of the structure of Fig. 6 as seen from the right-hand side thereof;

Fig. 9 is a sectional plan view of the structure of Fig. 6 taken just beneath the top of the cover; and

Fig. 10 is a sectional view of the details of one of the valve members of the above embodiments.

Referring now to the drawings, there is diagrammatically illustrated in Fig. 1 a valve member 20 which is movable upwardly into an open position and downwardly into a closed position. The lever member 21 is pivotally mounted for turning movement about the fulcrum 22 so that when the lever 21 is moved in the direction of arrow A at its right-hand end, as viewed in Fig. 1, the left-hand end thereof engages the lever member 20 to move it upwardly into open position. Fixedly connected to the lever member 21 is the catch member 23.

The lighter diagrammatically illustrated in Fig. 1 includes a tube 24 in which is mounted the spring 25 which urges the flint 26 upwardly at the top end of the tube 24 so that a portion of the flint 26 extends beyond the top of the tube 24. Screw member 27 is threadedly mounted in the bottom of the tube 24 for adjusting the tension of the spring 25 and for permitting the flint to be replaced. This screw member 27 may have an enlarged lower end portion, as shown in Fig. 1, for permitting the user to turn the same.

Located over and against the flint 26 is the toothed wheel 28 for producing a spark by engagement with the flint 26. The wheel 28 is rotatably mounted on a shaft on which the arm 29 also is mounted, and a spring 30 is connected at one end to the arm 29 and at its other end to a stationary part of the lighter so as to tend to urge the arm 29 in the direction of arrow B shown in Fig. 1. Thus, when the lever 21 is moved in the direction of arrow A, the valve 20 is moved upwardly into its open position and the catch 23 automatically releases the arm 29 to the influence of the spring 30. The wheel 28 and the arm 29 are interconnected by a ratchet mechanism to be described below, so that when the arm 29 is released to the influence of spring 30 it carries the wheel 28 with it in the direction of arrow B so as to produce a spark and ignite the gas escaping from the valve 20. Any suitable supply of a gas, such as butane, may be associated with the valve 20, such as for example that described in my copending U. S. application Serial No. 154,224, filed April 6, 1950, and now abandoned.

When it is desired to return the lighter to its inoperative position, the arm 29 is moved against the action of spring 30 back to its original position in the opposite direction from arrow B, and during such movement the wheel 28 is not rotated as a result of the ratchet mechanism interconnecting the wheel 28 with the arm 29. When the arm 29 is again in the position shown in Fig. 1 the lever 21 is turned in the direction opposite to arrow A back to its original position and during such movement the left end of the lever, as shown in Fig. 1, engages the valve mem-

3

ber 20 to move it downwardly into closed position, and also the catch 23 again is located in the position shown in Fig. 1 where it engages the arm 29 to hold it in inoperative position against the action of spring 30. It is apparent therefore that the lighter structure diagrammatically illustrated in Fig. 1 is semi-automatic in that the arm 29 must be manually moved back to its original position in order to place the lighter in its inactive position. If desired, the valve member 20 may automatically move to its closed position under the action of a spring, as described below.

The embodiment of the invention which is diagrammatically illustrated in Fig. 2 is substantially the same as that illustrated in Fig. 1 and the corresponding parts thereof have been designated with the Fig. 1 numerals primed. The only difference of Fig. 2 over Fig. 1 is that the turning fulcrum 22' of the lever 21' is located at the left end of lever 21', as viewed in Fig. 2, rather than at an intermediate part thereof as in the embodiment of Fig. 1. The structure of valve 20' also is different from the valve 20 in that the valve 20' is in its open position when moved downwardly and is in its closed position when moved upwardly under the influence of a spring. The valve 20' may be of any suitable construction such as that shown in U. S. Patent No. 2,515,733 issued July 18, 1950. Thus, the embodiment of Fig. 2 is also semi-automatic and moves the valve into open position by moving the same downwardly.

The embodiments of Figs. 1 and 2 are semi-automatic. The embodiments of the invention which are diagrammatically illustrated in Figs. 3 and 4 are fully automatic.

In Fig. 3 there is shown the valve member 31 which may communicate with any suitable source of gas supply, such as that shown in my co-pending U. S. application Serial No. 154,224, filed April 6, 1950, and now abandoned, and this valve member is opened by upward movement thereof in the direction of arrow C, shown in Fig. 3. The valve member 31 is moved upwardly and downwardly into open and closed positions, respectively, by the cam 32 which is fixedly connected at one end thereof to an intermediate part of the lever 33.

The lever 33 is pivotally mounted adjacent its lower end at point D, and the valve 31 is moved into open position by movement of the lever 32 in the direction of arrow E which causes the upper surface of the cam 32 as viewed in Fig. 3 to engage the valve member 31 and move it upwardly into open position in the direction of arrow C.

Fixedly connected to the upper end of lever 33 is the rack member 34 which meshes with the gear 35 which is rotatably mounted on a shaft on which the toothed wheel 36 is also rotatably mounted. The wheel 36 is interconnected with the gear 35 by a ratchet mechanism, to be described below, which causes the turning of the gear 35 in a clockwise direction, as viewed in Fig. 3, upon movement of lever 33 in the direction of arrow E so as to also turn the toothed wheel 36 in the same direction of rotation.

Located beneath the toothed wheel 36 is the flint 37 which has a part thereof extending beyond the top of the tube 38 in which is mounted the spring 39 which urges the flint 37 against the toothed wheel 36. The tension of spring 39 may be adjusted by turning of the screw member 40 which is of substantially the same construction as the screw members 27 and 27', shown in Figs. 1 and 2, respectively.

The spring 41 abuts with its left end, as viewed in Fig. 3, against a stationary part of the lighter and abuts with its right end against the lever 33 so as to urge it about the pivot point D in a direction opposite to the arrow E.

The lighter structure diagrammatically illustrated in Fig. 3 is fully automatic in that the movement of the lever 33 against the action of spring 41 in the direction of arrow E simultaneously opens the valve 31 by means of the cam 32 and produces a spark by the turning of the toothed wheel 36 against the flint 37. When the operator

4

releases the lever 33 it automatically moves under the influence of spring 41 in the direction opposite to arrow E back to its original position, and during this movement the lower surface of cam 32 moves the valve member 31 downwardly to its closed position and the rack 34 also moves back to its original position without turning the toothed wheel 36, due to the ratchet mechanism to be described below. Valve member 31 may also move downwardly under the influence of a spring as described below.

The embodiment of the invention which is diagrammatically illustrated in Fig. 4 is substantially the same as that illustrated in Fig. 3 and the corresponding parts thereof are indicated with the Fig. 3 numerals primed. The structure of Fig. 4 differs from Fig. 3 in that the valve 31' moves downwardly into its open position, in the direction of arrow C', and the cam 32 is replaced by a pivotally mounted operating lever 42 which interconnects the lever 33' and valve 31'. Thus, when the arm 33' is moved in the direction of arrow E' so as to actuate the lighter, the lever 42 is turned above its pivotal mounting 43 in the direction of arrow F so as to move the valve member 31 downwardly into open position. This is accomplished by engagement of the right-hand end of lever 42, as viewed in Fig. 4, with the lever 33'. The valve member 31' may be of any suitable construction, such as that shown in U. S. Patent 2,515,733, issued July 18, 1950. When the user wishes to release the lighter structure shown in Fig. 4 so that it will automatically return to its rest position, he releases the lever 33' which automatically moves in the direction opposite to arrow E' under the influence of spring 41', and in this way the rack 34' moves back to its original position. The valve member 31' then automatically returns to its original position under the influence of the spring action shown in U. S. Patent 2,515,733, referred to above.

The ratchet mechanism interconnecting the toothed wheel 36' and the gear 35' is illustrated in Fig. 5. This same ratchet mechanism is used in the embodiments of Figs. 1, 2 and 3. As may be seen from Fig. 5, the toothed wheel 36', on the side thereof adjacent to the gear 35', is formed with a plurality of teeth 44 which engage the free end of a springy pawl 45 which is fixedly connected to the side of gear 35' adjacent to the toothed wheel 36'. Thus, when the gear 35' rotates in a counterclockwise direction, as when rack 34' is returning to the position shown in Fig. 4, the springy pawl member 45 rides over the teeth 44 and no turning movement is imparted to the toothed wheel 36'. However, when the gear 35 rotates in a clockwise direction, as when rack 34' moves to the left as viewed in Fig. 4, then the springy pawl member 45 engages one of the teeth 44 and carries the toothed wheel 36' around with the gear 35'. The same construction is provided in the structure of Figs. 1 and 2, except that the springy pawl member is fixed to a side of the arms 29 and 29'.

Figs. 6-9 show one practical embodiment for carrying out the invention diagrammatically illustrated in Figs. 1-4. In Fig. 6, there is shown the upper part of a lighter housing 46 which is formed with a tubular passage 47 in which the spring 48 is mounted. The spring 48 urges the flint 49 into engagement with the toothed wheel 50 which is mounted for rotation on the shaft 51. As is apparent from Fig. 9, the shaft 51 is mounted in the sides of the housing 46. Fixedly connected to the toothed wheel 50, as by being formed integrally therewith, is the ratchet wheel 52, shown in Fig. 9.

The cover member 53 is located at the top of the housing 46 and is pivotally mounted, at its opposite sides, on the shaft 51. The left end portion of the cover 53 is cut away, as shown in Fig. 6, so as to provide an edge 54 which is adapted to engage the tube 55 located at the upper end of the passage 47 so as to limit the opening movement of the cover 53. Mounted on the shaft 51 is the spring 56 which, at one end thereof, rests against the top of the housing 46 and which bears at the other end

thereof, against the underside of the top part of the cover 53 so as to urge this cover into open position. At the right-hand end of the cover 53, as viewed in Fig. 6, there is formed an opening 57. The springy pawl member 57 is fixed at one end thereof to the underside of the top part of cover 53, as shown in Fig. 6, and the free end of the springy pawl member 57 engages the ratchet wheel 52.

Mounted in the housing 46 is a valve member 58 which is adapted to open upon upward movement thereof, and this valve member is illustrated in detail in Fig. 10. The structure shown in Fig. 10 illustrates a valve which may be used in the structure of Figs. 1 and 3 where the valve also moves upwardly in its open position. As is shown in Fig. 10, the valve structure comprises an outer housing 59 which is threadedly mounted in an opening in the housing 46. This opening in the housing 46 continues downwardly along the length of the housing so that a gas cartridge of any suitable type may be removably mounted in the housing 46 to communicate with the valve structure. Such a gas cartridge and mounting therefor is shown in co-pending U. S. application Serial No. 154,224, filed April 6, 1950, and now abandoned. The gas may be butane, for example. The portion of the housing 46 beneath the valve part 59 is sealed by means of the washer 60 clamped in place by the valve part 59.

Located across the central opening passing through the valve part 59 is the centrally apertured plate 61 held in place by the valve cover member 62 which threadedly engages the valve part 59. The valve member 58 is slidably mounted in the cover member 62 and has a shoulder adjacent its lower end against which the spring 63 bears. This spring 63 also bears against the top part of the cover 62 so as to urge the valve member 58 into a downward direction, as viewed in Fig. 10. On the lower part of the valve member 58 there is located a resilient sealing member 64 which covers the central aperture in the plate 61 so as to prevent the escape of gas when the valve member 58 is in its downward closed position. The valve member 58 is formed with the passages 65 and 66 so as to permit the gas to escape through these passages when the valve member 58 is raised to its open position. Threadedly mounted on the upper end of valve member 58 is the part 67 which may be removed in order to assemble the valve parts. Thus, when the valve member 58 is raised, gas may escape through the central aperture of plate 61 and through the passages 66 and 65. When the valve is released from its open position, spring 63 automatically returns it to its closed position where the sealing member 64 covers the central aperture of plate 61.

The removable part 67 of the valve member 58 forms a shoulder which is engaged by an end of the lever 68 which is pivotally mounted in the housing 46 on the pivot pin 69. The spring 70 abuts with one end thereof against a part of the housing 46 and presses with the other end thereof against the lever 68 to urge the same in a counterclockwise direction, as viewed in Fig. 6. This lever 68 is shown also in Fig. 8. Thus, when the lever 68 is pressed by the finger of the user in a clockwise direction about the pivot 69, the left end thereof, as viewed in Fig. 6, which is bifurcated, as shown in Fig. 9, engages the part 67 of the valve member 58 so as to raise the latter against the action of spring 53 into open position.

Pivot pin 71 is mounted on the lever 68 and extends across the bifurcations thereof. Mounted for turning movement on the pivot pin 71 is the lever 72 which has a nose 73 at its upper end, as viewed in Fig. 6, which engages the opening 57 in the cover 53 to hold the latter in its closed position. The position of lever 72 with respect to lever 68 may be adjusted by means of the screw member 74 which is rotatably mounted in the lever 72 and threadedly engages a threaded opening in lever 68. By means of this screw 74 the parts of the lighter may be adjusted so as to produce proper opening and closing of the cover member and a proper spark when the valve is opened by movement of lever 68 in a clockwise direction.

The levers 68 and 72 are also urged in a counterclockwise direction toward their inactive position by leaf spring 75, shown in Fig. 6. The left side of the structure shown in Fig. 6 is illustrated in Fig. 7.

The operation of the embodiment of the invention shown in Figs. 6-10 is believed to be evident. When the lever 68 is turned in a clockwise direction about the pivot pin 69, the nose 73 of lever 72 moves out of opening 57 to release the cover 53 to the action of spring 56 so that the cover moves into its open position. Simultaneously therewith, the clockwise turning movement of lever 68 causes the valve member 58 to move upwardly to its open position so as to permit gas to escape. As the cover member 53 moves to its open position under the action of spring 56, the springy pawl member 57 forces the ratchet wheel 52 to turn in a counterclockwise direction, as viewed in Fig. 6, and this causes the toothed wheel 50 which is fixed to ratchet wheel 52 to also turn in a counterclockwise direction and to run against the flint 49 to produce sparks which ignite the gas escaping through the valve structure. When it is desired to return the lighter to its inactive position, the cover 53 is manually depressed against the action of spring 56 and the lever 68 is released to the action of springs 75 and 70 so that the nose 73 of lever 72 enters the opening 57 of cover 53 to maintain the cover 53 in closed position. As was mentioned above, the valve member is automatically moved into its closed position upon release of the lever 68 by the spring 63.

It will be understood that each of the elements described above, or two or more together, may also find a useful application in other types of cigarette lighters differing from the types described above.

While the invention has been illustrated and described as embodied in a lighter adapted to operate by the burning of gas, it is not intended to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of the present invention.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can by applying current knowledge readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the following claims.

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

1. In a lighter adapted to operate by the burning of a gas, in combination, a valve member movable between open and closed positions for controlling the flow of the gas; a pivotally mounted cover member movable between open and closed positions, said cover member being formed with an opening at one end portion thereof; first spring means engaging said cover member for urging the same into said open position thereof; lever means movable between active and inactive positions and engaging said valve member and cover member to locate said valve member in said closed position thereof and said cover member in said closed position thereof when said lever means is in said inactive position and for releasing said cover member to the influence of said first spring means and moving said valve member into said open position when said lever means is moved from said inactive position to said active position, said lever means comprising a first lever engaging said valve member, a second lever mounted on said first lever for movement therewith and having a projection engaging said opening in said cover member when the latter is in its closed position and when said lever means is in its inactive position, so as to maintain said cover member in closed position, and adjusting means interconnecting said first lever and second lever for adjusting the position of the latter on the former; and

second spring means engaging said lever means for urging the same into said inactive position.

2. In a lighter adapted to operate by the burning of a gas, in combination, a valve member movable between open and closed positions for controlling the flow of gas; a pivotally mounted cover member movable between open and closed positions, said cover member being formed with an opening at one end portion thereof; first spring means engaging said cover member for urging the same into said open position thereof; lever means movable between active and inactive positions and engaging said valve member and cover member to locate said valve member in said closed position thereof and said cover member in said closed position thereof when said lever means is in said inactive position and for releasing said cover member to the influence of said first spring means and moving said valve member into said open position when said lever means is moved from said inactive position to said active position, said lever means comprising a first lever engaging said valve member, a second lever mounted on said first lever for movement therewith and having a projection engaging said opening in said cover member when the latter is in its closed position and when said lever means is in its inactive position, so as to maintain said cover member in closed position, and adjusting means interconnecting said first lever and second lever for adjusting the position of the latter on the former; second spring means engaging said lever means for urging the same into said inactive position; and spark producing means associated with said cover member for producing a spark when said cover member moves under the influence of said first spring means from said closed position thereof to said open position thereof.

3. In a lighter adapted to operate by the burning of a gas, in combination, a valve member movable between open and closed positions for controlling the flow

of gas; a pivotally mounted cover member movable between open and closed positions, said cover member being formed with an opening at one end portion thereof; first spring means engaging said cover member for urging the same into said open position thereof; lever means movable between active and inactive positions and engaging said valve member and cover member to locate said valve member in said closed position thereof and said cover member in said closed position thereof when said lever means is in said inactive position and for releasing said cover member to the influence of said first spring means and moving said valve member into said open position when said lever means is moved from said inactive position to said active position, said lever means comprising a first lever engaging said valve member; a second lever mounted on said first lever for movement therewith and having a projection engaging said opening in said cover member when the latter is in its closed position and when said lever means is in its inactive position, so as to maintain said cover member in closed position; second spring means engaging said lever means for urging the same into said inactive position; and spark producing means associated with said cover member for producing a spark when said cover member moves under the influence of said first spring means from said closed position thereof to said open position thereof.

References Cited in the file of this patent

UNITED STATES PATENTS

2,153,432	Reich	Apr. 4, 1939
2,482,794	Peterson	Sept. 27, 1949
2,553,678	Rubin	May 22, 1951
2,571,435	Flamm	Oct. 16, 1951
2,612,033	Flamm	Sept. 30, 1952
2,616,277	Seguy	Nov. 4, 1952
2,626,517	Ward	Jan. 27, 1953