Jan. 6, 1959 H. H. QUANDT 2,867,753

LIGHTER WITH ELECTRIC IGNITION

Filed Nov. 17, 1955 2 Sheets-Sheet 1

Fig. 1.

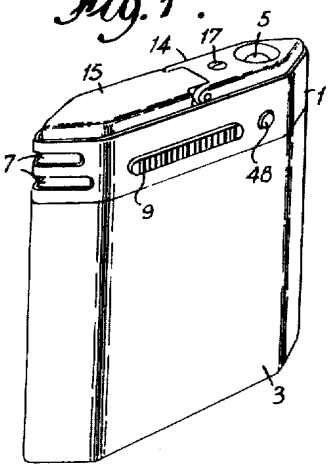
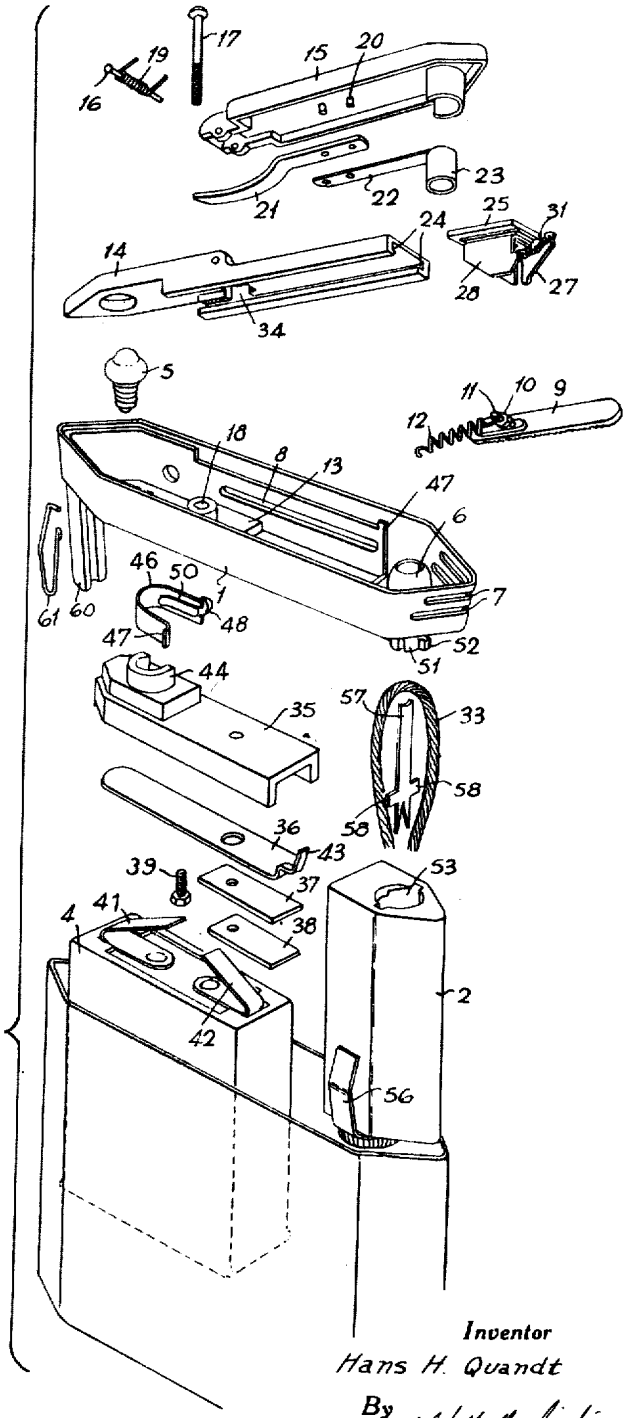


Fig. 5.



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LIGHTER WITH ELECTRIC IGNITION

Filed Nov. 17, 1955 2 Sheets-Sheet 2

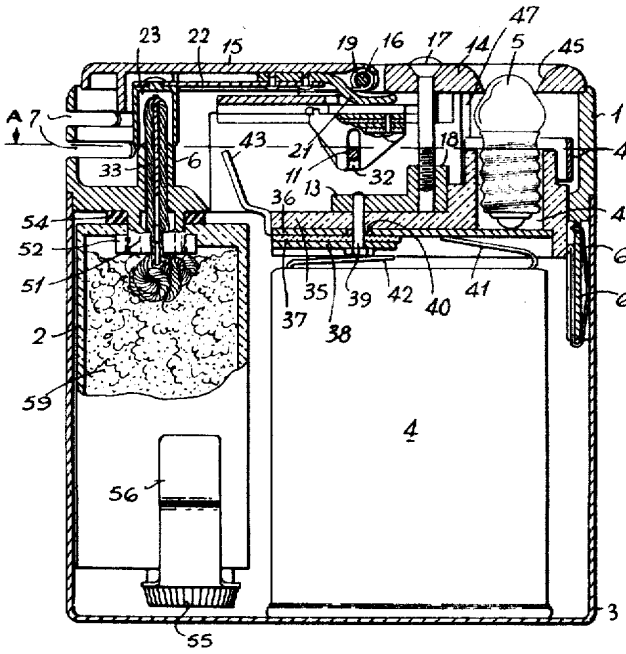

Fig. 2.

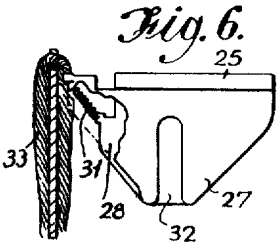

Fig. 6.

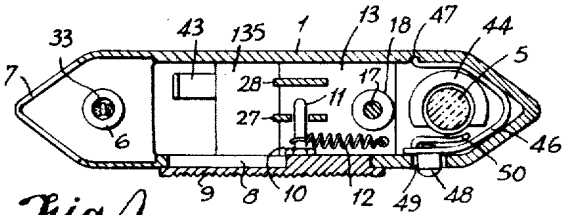

Fig. 4.

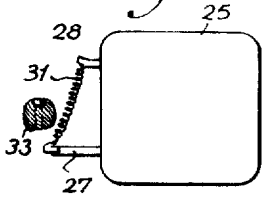

Fig. 7.

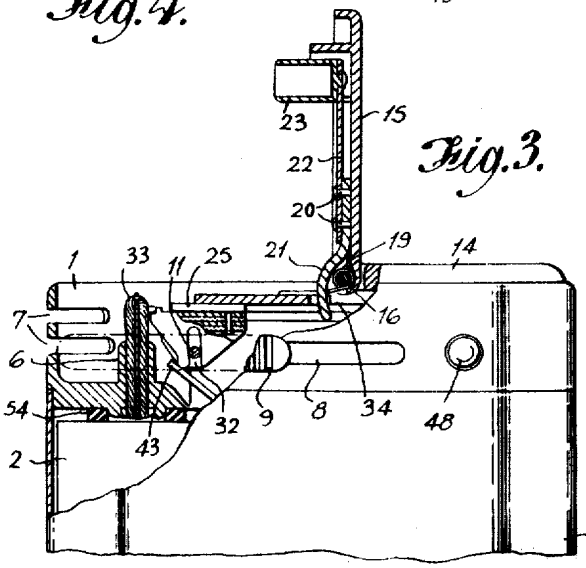

Fig. 3.

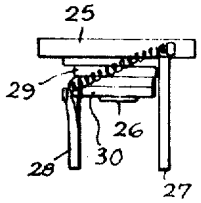

Fig. 8.

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LIGHTER WITH ELECTRIC IGNITION

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Application November 17, 1955, Serial No. 547,574

Claims priority, application Germany May 23, 1952

11 Claims. (Cl. 317—91)

The present invention relates to electrically ignited cigarette lighters of the kind in which a liquid or gaseous fuel is ignited by a glowing filament which is energized by a battery or other source of electric current.

Where a liquid fuel, such as benzine, is used it is fed to a wick which is ignited by the filament. When a gas fuel, such as butane, is used, it is stored under pressure in a container and is discharged through a nozzle when the lighter is to be used, the discharging gas being ignited by the filament.

From one aspect the present invention consists in a lighter having electric ignition of the fuel by means of a filament mounted on a carrier slidable by an actuator from a normal position where the filament is de-energized to an igniting position where the filament is heated by current passing therethrough to ignite the fuel, wherein the burner, which may be a fuel wick or nozzle, and the filament carrier are positioned in a space surrounded by walls at the top of the lighter casing, said space being normally covered at the top by a movable cover and fuel sealing device which is moved to an open position to expose the wick or discharge the gas by or upon the movement of the actuator to move the filament towards the igniting position, and wherein one or more of said walls is/are provided with one or more apertures for the admission of air to said space to assist the fuel to burn.

The invention also consists in a lighter having electric ignition of the fuel by means of a filament mounted on a carrier slidable by an actuator against the action of a spring from a normal position where the filament is de-energized to an igniting position where the filament is heated by current passing therethrough to ignite the fuel, wherein the fuel wick or nozzle and the filament carrier are arranged in a hollow head of elongated shape (in plan) adapted to be mounted on a casing which accommodates an electric battery, and the fuel container, the wick or nozzle being positioned adjacent one end of the space within the head and the filament carrier being slidable along guides longitudinally within the head, and wherein the top of the head is provided with a movable cover which is moved to expose the wick or nozzle by or upon the movement of the actuator to move the filament towards the igniting position, the wall of the head at the end adjacent the wick or nozzle being provided with one or more apertures for the admission of air to the space within the head to assist the fuel to burn.

The invention also consists in a lighter having electric ignition of the fuel by means of a filament mounted on a carrier slidable by an actuator against the action of a spring from a normal position where the filament is de-energized to an igniting position where the filament is heated by current passing therethrough to ignite the fuel, wherein the fuel wick or nozzle and the filament carrier are arranged in a hollow head of elongated shape (in plan) adapted to be mounted on a casing which accommodates an electric battery and the fuel container, the wick or nozzle being positioned adjacent one end

of the space within the head and the filament carrier being slidable along guides longitudinally within the head, and wherein the top of the head is provided with a movable cover which is moved to expose the wick or nozzle by or upon the movement of the actuator to move the filament towards the igniting position, the wall of the head at the end adjacent the wick or nozzle being provided with one or more apertures for the admission of air to the space within the head to assist the fuel to burn.

The invention further consists in a lighter having electric ignition of the fuel by means of a filament mounted on a carrier slidable by an actuator from a normal position where the filament is de-energized to an igniting position where the filament is heated by current passing therethrough to ignite the fuel, wherein the fuel wick or nozzle and the filament carrier are surrounded by walls forming part of the lighter casing, one or more of which walls is/are provided with one or more apertures adjacent the fuel wick or nozzle for the admission of air to the burning fuel, and wherein the actuator is slidable on the outside of a side wall and is connected to actuate the filament carrier by a member movable in a slot in said side wall, the said slot being covered by the actuator when the carrier is in its normal position and being uncovered by the actuator when the carrier is advanced to the igniting position to provide an additional aperture for the admission of air to the burning fuel.

The invention also consists in a lighter having electric ignition of the fuel by means of a filament mounted on a carrier slidable by an actuator against the action of a spring from a normal position where the filament is de-energized to an igniting position where the filament is heated by current passing therethrough to ignite the fuel, wherein the fuel wick or nozzle and filament carrier are arranged in a hollow head adapted to be mounted on a casing which accommodates an electric battery and a fuel container, and the carrier is slidable along guides beneath a plate which, in conjunction with the walls of the head, encloses and protects the filament except when the latter is in the igniting position and the filament projects beyond the edge of the plate, the carrier being moved by the spring at all times, when the actuator is released, so that the filament lies beneath and is protected by the protective cover plate, and wherein one or more apertures are provided in the wall of the head adjacent the fuel wick or nozzle for the admission of air to the space surrounding the fuel wick or nozzle.

According to a feature of the invention, the movement of the filament towards the igniting position causes a fuel sealing device (a wick cover in the case of liquid fuel or a nozzle seal in the case of gas fuel) to move to an open position out of the path of movement of the filament and also completes the electric circuits through the filament as it reaches the igniting position. The said movement of the fuel sealing device moves a stop into the return path of the carrier so that the stop will prevent the carriers, when the actuator is released, from returning fully to its normal position but will retain it in an intermediate position where the electric circuit to the filament is open and where the slot in which the actuator slides still remains partly uncovered. The stop may be moved out of the return path of the carrier by the closing of the fuel sealing device. This may be effected by manually moving the actuator to its initial position which moves the stop and causes the fuel sealing device to close; or the fuel sealing device may be manually closed thereby moving the stop to allow the carrier to return to its initial position and hold the fuel sealing device in its closed position.

According to a feature of the invention, the contact for completing the circuit to the filament is in the form

of a leaf spring which is engaged by a contact part of the filament carrier as the latter is advanced, the leaf spring flexing to allow the filament carrier to be further advanced to the igniting position whilst still maintaining the contact.

The filament is preferably made of or coated with a catalytic material such as platinum, whereby the filament will be caused to glow more brightly, when it comes into contact with fuses of the lighter fuel, so as to facilitate the igniting of the fuel. The position of the fuel fumes in relation to the wick or nozzle may vary for various reasons, for example due to draughts or as the fuel becomes more expended. In order to ensure that the filament will, as far as possible, always move into a zone where fuel fumes are present, according to a feature of the invention, the filament is mounted on the movable carrier by which it is advanced towards the wick or nozzle in such a manner that it is inclined in the horizontal direction to the normal to the direction of movement of the filament carrier, and preferably also in the vertical direction to the axis of the wick or nozzle. In this way the various parts of the filament are caused to move into positions which extend both vertically and around the axis of the wick or nozzle, thereby ensuring that the filament will be moved into a fume zone so that the catalytic action will produce the required brightening of the filament to ignite the fuel.

From another aspect, therefore, the invention consists in an electrically ignited cigarette lighter of the kind referred to in which a catalytic igniter filament is movable towards and away from the wick or nozzle, the filament being inclined both with respect to the normal to its direction of movement and with respect to the axis of the wick or nozzle.

The lighter may also incorporate an electric torchlight. To this end a small electric lamp is incorporated in the lighter and a switch is provided so that this lamp can be energised from the same battery as energises the igniter filament.

Another feature of the invention consists in resiliently mounting the wick cap relative to the lighter cover so that when the lighter cover is closed the wick cap will be pressed resiliently over the wick holder to enclose the wick and reduce evaporation.

A still further feature of the invention consists in detachably securing the container for liquid fuel to the underside of the head for example by a kind of bayonet joint, whereby the container can be readily detached from the head by turning, for example through an angle of 90°. The fuel container may also be provided with an opening at its end remote from the head through which the container can be charged with fuel, said opening being closed by a closure screw the hand of which is such that, to remove the closure screw, it must be turned in a direction opposite to that in which the container has to be turned to detach it from the head.

Further features of the invention relate to construction of the lighter as will be more fully hereinafter described.

An embodiment of the invention will now be described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 shows a perspective view of a combined lighter and electric torch according to the invention;

Figure 2 shows a longitudinal section through the lighter with the cover closed;

Figure 3 shows a view of the top of the lighter, partly in longitudinal section, with the cover open;

Figure 4 shows a section along the line A—A in Figure 2;

Figure 5 is an exploded view of the various components of the lighter;

Figures 6, 7 and 8 show a side view, a plan view, and an end view respectively of the igniter carrier.

Referring to the drawings, the lighter comprises a head **1** which accommodates the lighter mechanism and has a liquid fuel tank **2** depending from its underside, the head **1** frictionally fitting into the top of a casing **3** into which the fuel tank **2** extends and which also accommodates an electric battery or non-spillable accumulator **4** for energizing the igniter and also the electric torch bulb **5**.

The head **1** is formed as a die-casting of generally hollow boat-shaped form with a wick holder **6** adjacent one end, which end is formed with openings **7** to admit air to the wick. The openings **7** are preferably formed as slots extending around the end and sides of the head adjacent the wick holder **6**. The head is formed with a slot **8** extending horizontally along one side thereof into which fits the sliding actuating member **9** which is retained in position by the nut **10** screwed on to a projection **11** extending inwardly thereof. The projection **11** is connected by a spring **12** to the transverse bridge **13** of the head casting **1** so that the actuating member **8** will normally be pulled towards the right as shown in Figures 1, 2 and 4.

The top of the head casting **1** is closed by a cover comprising a fixed part **14** and a movable part **15** hinged to the fixed part by the pin **16**. The parts **14** and **15** are also made as die-castings and have the shapes shown more clearly in Figure 5. The cover part **14** is held in position at the top of the head **1** by the screw **17** threaded into the socket **18** on the bridge-piece **13**. A coil spring **19** surrounds the pin **16** and acts in a direction tending to move the cover part **15** to its open position as shown in Figure 3. To the underside of the cover part **15** is secured, by means of spigots **20** formed as part of the die-casting, a finger **21** and a leaf spring **22** to the end of which is secured the wick cap **23**. The ends of the spigots **20** are rivetted over to secure the parts **21** and **22**. The spring **22** resiliently urges the wick cap **23** over the wick holder **6** when the cover part **15** is in closed position as shown in Figure 2.

The cover part **14** is formed on its underside with two channels **24** forming a slide for the igniter carrier, the construction of which is more clearly shown in Figures 6, 7 and 8. The igniter carrier comprises a top metal plate **25** adapted to slide in the channels **24**, to the underside of which plate are secured, by means of the rivet **26**, two L-shaped metal members **27**, **28** and two plates of insulating material **29** and **30**. The member **27** is in electrical contact with the plate **25** but the member **28** is insulated therefrom by the insulating plates **29** and **30**, the hole in the member **28** through which the rivet **26** passes being of larger diameter than this rivet so that the rivet and member **28** do not electrically contact with one another. Across the front ends of the members **27** and **28** is secured the igniter filament **31**, consisting of a coil of platinum wire, in such a manner that the direction of the filament is inclined both with respect to the plane of the plate **25** and to the normal to the direction of movement of the plate **25** in the channels **24**. The member **27** is formed with a slot **32** which is adapted to engage with the projection **11** when the parts are assembled together so that movement of the actuating member **9** will move the igniter carrier in the channels **24** towards and away from the wick **33**.

The finger **21** on the underside of the movable cover part **15** is adapted to extend through an opening **34** in the part **14** and to be engaged with the plate **25** of the igniter carrier so that, when the igniter carrier is in its retracted position as shown in Figure 2, the finger **21** will be retained thereby so as to hold the movable cover part **15** in the closed position. When the actuating member **9** is advanced to move the igniter carrier towards the left (see Figure 3), the finger **21** is released and allows the spring **19** to turn the cover part **15** to the raised position.

When the actuating member 9 is released the spring 12 will retract it and the igniter carrier towards the right until the plate 25 engages with the finger 21. By lowering the cover part 15 the igniter carrier will be released and it and the igniting member 9 will move further towards the right under the action of the spring 12 to retain the cover part 15 in the closed position. Alternatively, by manually moving the actuating member 9 to its fully retracted position, the cover part 15 will be closed.

Beneath the bridge piece 13 of the head 1 is secured a member 35 of insulating material which is moulded to the shape shown in Figure 5. The moulding 35 has a channel therebeneath into which are fitted in turn a metal contact 36, an insulating plate 37 and a metal contact 38, these three members and the moulding 35 being secured to the bridge 13 by the screw 39. The hole in the contact 36 is larger than the holes in the other members and actually fits around a spigot 40 on the underside of the moulding 35 so that the contact 36 is insulated from the contact 38 which latter is electrically connected to the metal of the head 1 and hence to the metal of the cover part 14, the plate 25 and the member 27. The battery terminals 41, 42 contact respectively with the contacts 36 and 38 when the head is fitted on the casing 3 with the battery 4 in position.

The contact 36 is provided with an upwardly extending contact finger 43 which acts as a leaf spring and is adapted to be engaged by the member 28 when the igniter carrier is advanced towards the wick, thereby completing the electric circuit through the filament 31 and causing the same to glow. The finger 43 flexes to allow the igniter carrier to be advanced to the igniting position, adjacent the wick 33 (Figures 3, 6 and 7) whilst maintaining the electric circuit. When the actuating member 9 is released and returns to its intermediate position with the plates 25 abutting against the finger 21, the member 28 will have moved away from the finger 43 to open the electric circuit through the filament 31.

The contact 36 also extends across the bottom end of an aperture in the socket portion 44 of the moulding 35, which socket is adapted to receive the torchlight bulb 5 which is held in position by the base contact of the lamp engaging with the contact 36 and the glass bulb fitting into an aperture 45 in the fixed cover part 14. Fitted around the internal walls of the head 1 at the end adjacent the lamp 5 is a U-shaped spring 46 having one end bent over and engaging in a slot 47 on the internal surface of the head 1 and its other end provided with a button 48 extending through a hole 49 in the wall of the head. The end of the spring which carries the button 48 has a backwardly bent contact leaf 50 which when the button 48 is depressed is adapted to engage the side contact of the lamp 5, part of the moulding surrounding the socket portion 44 being omitted to allow this contact to be made. Thus by depressing the button 48, the lamp 5 may be illuminated by current from the battery 4.

The fuel container 2 is detachably fitted to a spigot 51 cast integrally with and depending from the underside of the head 1 directly beneath the wick holder 6. This spigot 51 has two diametrically opposed fingers 52 projecting therefrom which are adapted to pass through corresponding slots formed in an opening 53 in the top of the container 2 when the container is at right angles to its normal position relative to the head. After the fingers 52 have been inserted through the opening 53, the container 2 is turned through 90° to lock the two parts together. The underside of the top surface of the container 2, surrounding the opening 53, is made in the form of cam surfaces so that this turning movement will urge the container 2 upwards to compress a flexible sealing washer 54 between the top of the container and the underside of the head 1. The cam surfaces are provided with stops to limit the extent of turning of the container about the spigot 51.

The bottom of the fuel container is provided with an opening closed by a closure screw 55 which is so threaded that, to unscrew it from the container, it has to be turned in the same direction as is necessary to secure the container 2 to the spigot 51 so that the action of unscrewing the closure screw 55 will not separate the container 2 from the spigot 51. The closure screw 55 holds a U-shaped spring 56 in position with its limbs at opposite sides of the container 2 and bearing against the inside of the casing 3.

The wick 33 is folded about a strip metal member 57 and the wick assembly is inserted into the wick holder 6 by pushing it upwardly through the aperture in the spigot 51. The lugs 58 on the member 57 fit into recesses in the edge of the spigot 51 to locate the wick assembly in position, the free ends of the wick being inserted into the container 2 which is filled with cotton wool or other absorbent material 59. The member 57 keeps the wick 33 rigid and at the correct height for ignition by the filament.

The head 1 is provided with a downwardly depending guide portion 60 at its end opposite to the fuel container, and a spring 61 may be fitted into this guide portion and be arranged to bear against the inside of the casing 3 to assist, in conjunction with the spring 56, in frictionally holding the head 1 and the casing 3 together.

The operation of the lighter is as follows: By moving the actuator 9 towards the left (Figures 1–4) the igniter carrier first releases the finger 21 and allows the cover part 15, under the action of the spring 19, to move to the open position shown in Figure 3. Further forward movement of the slider causes the metal member 28 of the igniter carrier to engage with the leaf spring contact 43 to complete the circuit through the filament and cause it to glow. The flexible finger 43 allows the filament, whilst still glowing, to be further advanced towards the wick until it reaches the igniting position. By reason of the double inclination of the filament and the fact that it is glowing as it moves over a short distance adjacent the igniting position, the filament is moved through regions where the fuel-air mixture varies and a region can easily be found where the catalytic action of the fuel-air mixture on the platinum filament is the optimum for causing it to glow brightly and ignite the fuel, which then burns at the wick.

The actuator 9 is then released. The igniter carrier, however, does not immediately return, under the action of the spring 12 to its initial or normal position but is retained by the finger 21 in an intermediate position in which the contact 43 is disengaged from the member 28 so that the filament is de-energised. This partial return movement to the intermediate position is relatively short so that even with a sudden release of the actuator 9, there is no harmful impact on the hot filament, as would be the case if the spring 12 accelerated the igniter carrier right back to its initial or normal position whilst the filament was still hot. When in this intermediate position, as when in the normal position, the filament lies beneath the cover part 14, which acts as a protective cover plate therefor. The filament is only exposed when it is in or adjacent the igniting position and projects beyond the edge of the cover part 14.

When the actuator 9 is in the intermediate position, the slot 8 is partially uncovered and serves as an opening, additional to the openings 7, for the admission of air to the burning fuel.

The flame is extinguished when the cover part 15 is closed either by the finger, in which case the finger 21 is moved to a position which releases the igniter carrier, or by moving the actuator 9 to the right, in which case the igniter carrier pushes the finger 21 and causes the cover part 15 to close. The igniter carrier is thus moved

below the finger 21 and the cover part 15 is secured in the closed position.

This application is a continuation-in-part of my co-pending application Serial No. 354,838, filed May 13, 1953.

I claim:

1. Lighter comprising a container for volatile, inflammable liquid fuel; a wick arranged to be fed with fuel from said container; a casing for housing said container; a head member assembled on said casing, a supporting plate on the head member, a lid pivotally mounted on the supporting plate and adapted to move from a closed position overlying the wick to an open position; said lid being formed as a double-armed lever having a first arm carrying a means for sealing the wick and a lug forming a second arm which is shorter than said first arm and extends beyond the pivotal point of the lid; guide means arranged on the underside of the supporting plate, an igniter carrier carrying an igniter wire said igniter carrier being adapted to slide along said guide means from a rest position to an igniting position near the wick, in open position of the lid, and back to the rest position in which the carrier is located under the lug and is adapted to lock the lid in its closed position, a handle slidable externally of the head, and a pin connecting said handle and said carrier for causing movement of the carrier by manual movement of said handle

2. Lighter as claimed in claim 1, in which the pin and handle are held in the rest position by a spring.

3. A lighter comprising in combination, a head member having a substantially horizontal supporting plate, a two-armed lever pivoted to said supporting plate, said two-armed lever having a long arm and a short arm formed as a lug, said two-armed lever being movable between a first position in which said lug is substantially vertical with respect to said supporting plate and projects below the same, and a second position in which said lug and said long arm are substantially horizontal; and a slide movably arranged underneath said supporting plate between two end positions, said slide in one of the end positions thereof being in engagement with said lug and pressing the same into said second position; and in the other end position thereof releasing the lug and allowing the lever to move to its vertical position.

4. A lighter as claimed in claim 3, a pin connected with said slide, a slot in one of the side walls of said head member; and a handle arranged outside said side wall of said head member and connected with said pin and being movable substantially parallel to said slot in said side wall of said head member.

5. A lighter as claimed in claim 4, and a tension spring connected to said pin, said tension spring urging said pin into the end position thereof corresponding to said one end position of said slide.

6. A lighter comprising a combination, a hollow head member, a wick arranged within said hollow head member and towards one end thereof, a supporting plate partially covering the top of said head member and leaving an opening above said wick, a lid pivotally mounted on the supporting plate and adapted to move from a closed position in which the lid closes the opening above said wick, to an open position, said lid being formed as a double arm lever of which the longer arm is adapted to overlie said opening when the lid is closed and carries means for sealing the wick when in the closed position, and the second arm of which is shorter than said first arm and extends beyond the pivotal point of the lid, guide means arranged on the underside of the supporting plate, an igniter carrier carrying an igniter wire, said igniter carrier being adapted to slide along said guide means from a rest position to an igniting position near the wick, said carrer when in the rest position being located beneath the shorter arm and holding the latter in the closed position of the lid, and when in said igniting position releasing the shorter arm and allowing the lid to move to its open position, a horizontal slot in a side wall of the head member, a handle movable in said slot, means connecting the handle, and carrier for causing movement of the carrier by movement of the handle, and a spring for urging the carrier towards its rest position.

7. A lighter comprising an elongated hollow chamber open at its top, a fuel burner arranged within said hollow chamber and towards one end thereof, apertures in a wall of the chamber adjacent said burner for the admission of air to assist the fuel to burn, a supporting plate partially covering the open top of said chamber and leaving an opening above said burner, a lid pivotally mounted on the supporting plate and adapted to move from a closed position in which the lid closes the opening above said burner to an open position, said lid being formed as a double-armed lever of which the longer arm is adapted to overlie said opening when the lid is closed and carries means for sealing the burner when in the closed position, and of which the second and shorter arm extends beyond the pivotal point of the lid, a first spring urging the lid to its open position, two guide rails arranged on the underside of the supporting plate, an igniter carrier carrying an igniter wire, said igniter carrier being mounted to slide along and between said two guide rails from a rest position to an igniting position near the burner, a second spring for urging the carrier towards its rest position, means for completing an electrc circuit through the igniter wire as it reaches the igniting position, said carrier when in the rest position being located beneath and engaging the said shorter arm, thereby holding the lid in its closed position, and when in the igniting position releasing the shorter arm and allowing the lid to be moved by said first spring to its open position in which the shorter arm extends between said two guide rails and forms a stop for retaining the carrier in an intermediate position, between the rest and igniting positions, in which intermediate position the igniter wire lies below and is protected by the supporting plate and the electric circuit to the igniter wire is opened, and an actuator slidable on the outside of a wall of said chamber and connected to move the carrier by a part movable in a slot in said wall, said slot being covered by the actuator when the carrier is in its rest position and being uncovered by the actuator when the carrier is in the igniting and intermediate positions to provide an additional aperture for the admission of air to the burner.

8. A lighter as claimed in claim 7, wherein the hollow chamber is constructed as a hollow metal head adapted to be mounted at the top of a casing adapted to enclose an electric battery, a moulding of insulating material secured to the underside of the head and carrying two battery contacts which are insulated from one another and are adapted to engage the contacts of the battery when the head is fitted to the casing, one of said battery contacts being electrically connected to the head and the other contact carrying a leaf spring which is adapted to engage with a metal part of the igniter carrier as the latter is advanced towards the igniting position, said part being insulated from another metal part of the carrier which slides in the guides and thus forming an insulated contact on the carrier to which one end of the igniter wire is connected, the other end of the igniter wire being connected to the metal part of the carrier which slides in the guides and thus being electrically connected to the head.

9. A lighter as claimed in claim 8, wherein the insulating member also contains a socket for receiving the cap of a small electric bulb which is retained in position in the socket by the supporting plate, the end contact of the bulb engaging with the insulated battery contact on the underside of the moulding and the circuit to the side contact of the bulb being completed by a leaf spring mounted within and in electrical contact with the head

and adapted to be moved into engagement with the side contact of the bulb by a member projecting externally of the head.

10. A lighter as claimed in claim 9, for use with petrol fuel, wherein a wick holder is cast integrally with the head and has an aperture extending vertically therethrough.

11. A lighter as claimed in claim 10, wherein the bottom end of the wick holder is provided with fingers adapted to engage with an aperture in the top of the fuel container in the manner of a bayonet joint.

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