Oct. 29, 1935. T. M. GIBSON 2,019,436

LIGHTER MECHANISM

Filed Aug. 16, 1933

Fig. 1.

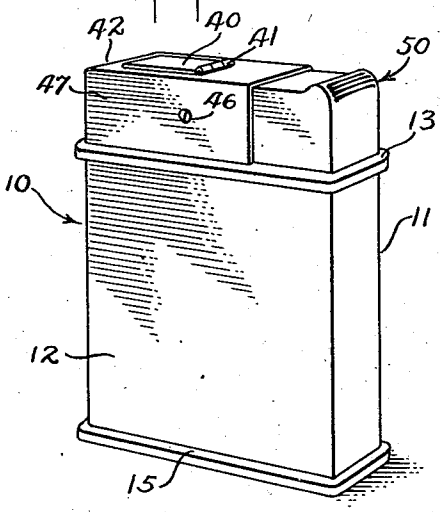


Fig. 2.

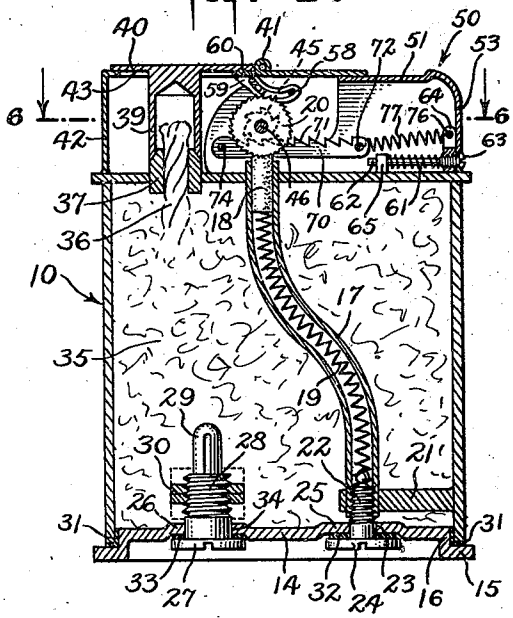


Fig. 3.

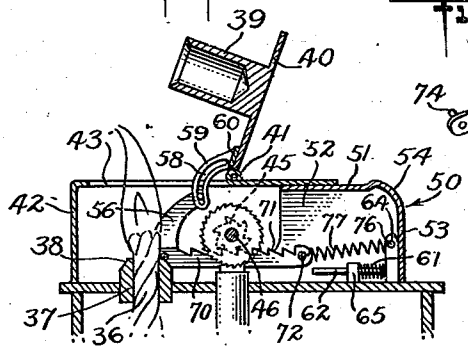


Fig. 8.

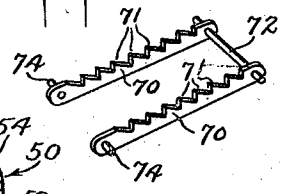


Fig. 7.

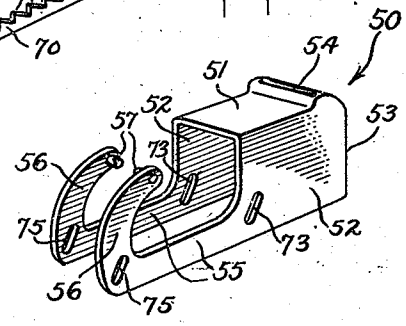


Fig. 4.

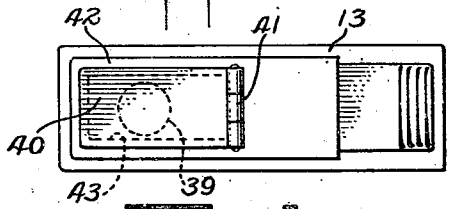


Fig. 5.

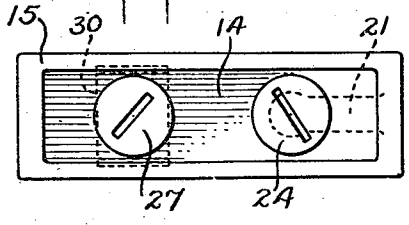
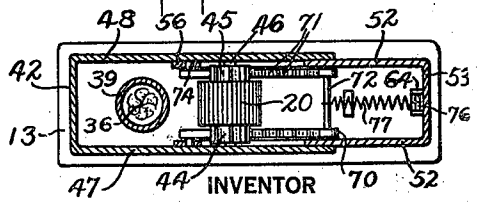


Fig. 6.



INVENTOR

Thomas M. Gibson

BY

Blair, Curtis & Dunn

ATTORNEYS

Patented Oct. 29, 1935 2,019,436

UNITED STATES PATENT OFFICE

2,019,436

LIGHTER MECHANISM

Thomas M. Gibson, North Attleboro, Mass., assignor to Evans Case Company, North Attleboro, Mass., a corporation of Massachusetts

Application August 16, 1933, Serial No. 685,313

6 Claims. (Cl. 67—7.1)

The invention relates to pyrophoric lighters, and with regard to its more specific features to a pocket lighter.

One object of the invention is to provide a lighter in which the operating parts can be easily assembled and disassembled. Another object of the invention is to provide a lighter in which the parts can be quickly replaced. Another object of the invention is to provide a lighter having a fuel receptacle which is readily accessible, for example to replace the absorbent cotton or the wick. Another object of the invention is to provide a lighter mechanism of simple inexpensive construction which shall be reliable in operation. Another object of the invention is to provide a lighter mechanism adapted for mounting on a very simple form of casing. Another object of the invention is to provide a simple manner and means for securing a removable bottom to a lighter. Another object of the invention is to provide a lighter of compact external form with the operating parts well protected. Another object of the invention is to provide an easily operated lighter. Other objects will be in part obvious or in part pointed out hereinafter.

The invention accordingly consists in the features of construction, combinations of elements and arrangement of parts as will be exemplified in the structure to be hereinafter described, and the scope of the application of which will be indicated in the following claims.

In the accompanying drawing, in which is shown one of various possible embodiments of the mechanical features of this invention.

Figure 1 is a perspective view of one embodiment of the invention;

Figure 2 is a vertical sectional view on an enlarged scale of the lighter of Figure 1;

Figure 3 is a view corresponding to the upper part of Figure 2 showing the snuffer removed from the wick;

Figures 4 and 5 are respectively the top and bottom plan views of the lighter on the same scale as Figure 2;

Figure 6 is a horizontal sectional view taken on a line 6—6 of Figure 2;

Figures 7 and 8 are perspective views respectively of the finger piece and the abrasive wheel operating pawl.

Similar reference characters refer to similar parts throughout the several views of the drawing.

Referring to Figure 1, I provide a fuel receptacle which is generally indicated by the numeral 10 and which desirably consists of a pair of channel shaped casing members 11 and 12 which may be pressed into shape from flat metal stock. The casing members 11 and 12 may be permanently secured together as by soldering. The fuel receptacle 10 also includes a top wall 13 which may comprise a single flat metal stamping insomuch as the igniting mechanism, to be hereinafter described, is extremely compact and adapted for mounting on a flat top wall. The top wall 13 may be permanently fastened to the casing members 11 and 12 as by soldering.

Referring now to Figure 2 in connection with Figure 5, I provide a removable bottom 14 for the receptacle 10 which may also comprise a single metal stamping. As shown in Figures 2 and 5 the bottom wall 14 has a circumferential flange 15 merging with a circumferential upwardly extending shoulder 16. Extending between the top wall 13 and the bottom wall 14 is a tube 17 to receive a piece of pyrophoric material 18 and a spring 19 to urge the pyrophoric material 18 into engagement with an abrasive wheel 20. The upper end of the tube 17 passes through an opening just large enough to receive it in the top wall 13 and the tube 17 is secured to the top wall 13 as by soldering. The lower end of the tube 17 is held by a bracket 21 secured to the inside of the casing members 11 and 12, these two connections being likewise desirably made by soldering. The inside of the tube 17 is threaded and receives a screw 22 which passes through a hole 23 in the removable bottom 14, the screw 22 having a slotted head 24 located in a dish-shaped portion 25 formed in the bottom wall 14.

Still referring to Figures 2 and 5, another dish-shaped portion 26 formed in the bottom wall 14 receives a slotted head 27 of a screw 28 having a diameter preferably substantially larger than that of the screw 22 and being hollow in order to receive a slit tubular cap 29 which comprises a compartment for extra pieces of pyrophoric material. The screw 28 is in threaded engagement with a bracket 30 secured, as by soldering, to the inside of the casing members 11 and 12.

The bottom may be removed by unscrewing both of the screws 22 and 28, the slots therein being desirably made of a size to fit a dime or a penny. The pressure exerted by the screws is transmitted directly to the brackets 21 and 30 and thus has no tendency to dislodge or bend the spring retaining tube 17. The bottom 14 can be secured very tightly to the receptacle 10 by means of the screws 22 and 28 thus to prevent the escape of fuel from the receptacle, and a leather washer 31 is desirably provided between the flange 15 and the bottom of the receptacle 10 to make a tight

seal. Likewise leather washers 32 and 33 are desirably provide above the heads 24 and 27 for the same purpose.

The foregoing constitutes a simple and effective means of securing a removable bottom to a lighter and has many advantages such as that the screws ordinarily used for filling closure and pyrophoric tube closure are utilized while the unscrewing of either of the screws 22 and 28 does not remove the bottom. Thus a new piece of pyrophoric material 18 may be placed in the tube 17 without removing the bottom 14, and likewise the receptacle 10 can be filled from the filling opening 34 through which the screw 28 extends. When the bottom 14 is removed ready access is afforded to the inside of the receptacle 10 for the replacement of absorbent material 35 or wick 36. Thus according to the invention the otherwise difficult matter of threading a wick through a wick tube is rendered very easy of accomplishment.

Referring now to Figure 3 and the upper part of Figure 2, the wick tube 37 which receives the wick 36 passes through and is secured to the top wall 13 as by soldering. The wick tube 37 has a conical seat 38 which is normally engaged by a snuffer cap 39 having an internal conical seat adapted to fit the seat 38. The cap 39 is secured, as by soldering, to a cover 40 which is pivotally mounted by means of a hinge 41 to a top casing 42 secured, as by soldering, to the top wall 13. The casing 42 forms an enclosure for the spark producing mechanism including the wheel 20 and also for the wick 36 and wick tube 37 and constitutes likewise a shield to prevent extinguishment of the flame by the wind. The casing 42 is open at the right hand end, Figures 1 and 3, and has a substantially rectangular opening 43 in the top thereof which is normally closed by the overlapping cover 40.

Referring now more particularly to Figure 6, the abrasive wheel 20 has rigidly secured to it a pair of ratchet wheels 44 and 45, one on either side of the abrasive wheel 20, the wheels 20, 44 and 45 being coaxial and having a bore for the reception of an axial shaft 46 in the form of a screw whose head is supported by one side wall 47 of the casing 42, and whose threaded end is in threaded engagement with the other side wall 48 of the casing 42, the wheels 20, 44 and 45 being thus freely mounted for rotation on the shaft 46 and being easily removable.

Referring now to Figures 1 to 7 inclusive, I provide a slidable finger piece 50 in telescopic relation with the casing 42 and closing the otherwise open end of said casing and mounted for horizontal sliding movement on the top wall 13. This finger piece 50 has a box-shaped portion comprising upper wall 51 and a pair of side walls 52, 52 and the back wall 53, all of which parts are integrally connected. The finger piece 50 further provides a finger engaging portion 54 which is preferably knurled as shown. The finger piece 50 is of a size to fit inside the casing 42 in sliding telescopic engagement therewith so as to permit free motion of the finger piece, to accurately align the finger piece with relation to the casing 42, and to keep dirt out of the operating mechanism.

Extending forwardly from the sides 52, 52 of the finger piece 50 are integral extensions 55, 55 which support upwardly extending integral extensions 56, 56. Substantially at the upper end of the extensions 56, 56 are located inwardly extending pins 57, 57 which normally fit in slots 58, 58 provided in downwardly extending arms 59, 59 secured to the underside of the cover 40. The arms 59, 59 are preferably formed from a single piece integral with connecting portion 60 which is soldered to the cover 40, the portion 60 being indicated by dotted lines in Figure 3. When the finger piece 50 is moved forwardly the pins 57 riding in the slots 58 move the arms 59 raising the cover 40 and lifting the cap 39 from the wick 36 as shown by a comparison of Figures 2 and 3.

Referring now to Figures 2 and 3, I provide a spring 61 normally to urge the finger piece 50 to the right as viewed in the drawing. At such times the finger piece exerts a pressure through the arms 56, pins 57, arms 59 and cover 40 to maintain the cap 39 in tight engagement with the tube 37 to prevent the evaporation of the fuel. I desirably mount the spring 61 on a stud 62 having a threaded portion near its slotted head 63, which threaded portion is in engagement with the rear wall 53 of the finger piece 50 and also with a bracket 64 secured to the inside of the wall 53 to provide additional screw threads and for a purpose which will hereinafter appear. The stud 62 extends through a bracket 65 secured to the top wall 13 thus providing a compression surface against which the spring 61 reacts, the bracket 65 also assisting in guiding the finger piece 50. The finger piece 50 can, however, be entirely removed from the casing 42 in the construction shown so far as the stud 62 is concerned.

To disconnect the arms 59 from the pins 57 is an easy matter as the arms 59 can be readily flexed inwardly for the required disengaging movement.

Referring now particularly to Figure 8, I provide a pair of multi-toothed pawls 70, 70 having pawl teeth 71, 71 and being in the form of a pair of bars connected by a cross-piece 72 at one end. The cross-piece 72 extends laterally beyond the bars 70, 70 and the ends thereof are, when the mechanism is assembled, received in opposite inclined slots 73, 73 in the side pieces 52, 52 of the finger piece 50, which slots are best shown in Figure 7. Referring again to Figure 8, at the other end of the bars 70, 70 are laterally extending pins 74, 74 which, when the parts are assembled, fit in inclined slots 75, 75 in the front ends of the extensions 55, 55 (refer again to Figure 7). Referring now to Figures 2 and 4, the bracket 64 supports a pin 76 and between this pin 76 and the cross-bar 72 extends a spring 77.

Thus the multi-toothed pawls 70 are mounted in the finger piece 50 for movement in an inclined direction, and by reason of the spring 77 the pawl members 70, 70 are urged upwardly and to the rear with respect to the finger piece 50. It is noted that the pawls 70, 70 may be quickly assembled and disassembled with respect to the finger piece 50 by merely slightly springing apart the sides 52 and extensions 55.

Considering now Figures 2, 3 and 6, the pawl members 70, 70 are in engagement with the ratchet wheels 44 and 45 and by reason of the inclination of the teeth and pawls when the finger piece 50 is moved forwardly and to the left in Figure 2, the pawl members rotate the wheels 44 and 45 and therefore also the abrasive wheel 20. As heretofore pointed out the abrasive wheel 20 is in engagement with the pyrophoric member 18, and thus movement of the finger piece 50 forwardly throws a shower of sparks upon the wick 36. When the finger is released, however, reverse rotation of the wheels 20, 44 and 45 is not effected, as the bar 72 and the pin 74 move forwardly in the slots 73 and 75 lowering the pawl teeth 71, 71

out of engagement with the wheels 44 and 45. A very light spring 77 will suffice to give the proper coaction between the pawl members 70 and the ratchet wheels, since the pressure between these parts in the forward direction urges them into engagement, and in the rearward or return direction urges them out of engagement, by reason of the inclination of the slots 73 and 75.

Rotation of the wheel 20 is exceedingly rapid and in fact can be increased by reducing the diameter of the wheels 44 and 45. Furthermore a quick and wide opening of the cover 40 is effected by movement of the finger piece since the arm 59 is relatively short. As shown in Figure 3 the cap 39 is completely removed from the flame.

Let it be assumed that the spark producing mechanism is completely disassembled, but that the cap 39 and cover 40 are mounted on the hinge 41. It will be seen that the casing 42 is readily accessible for cleaning or for any other purpose, and if the removable bottom 14 be removed the fuel receptacle may be reached and a fresh wick 36 very easily threaded in place. The pawls 70, 70 and associated parts may be quickly snapped into place in the finger piece 50, and the spring 77 connected, all this being done while said parts are completely removed from the casing 42. Now, assuming the stud 62 is in place with the spring 61 on it, the finger piece can now be slid into position in the casing 42, the stud 62 readily passing through the bracket 65. Holding the parts thus, the wheels 20, 44 and 45 are now inserted and the axial screw 46 screwed in place. The arms 59 may now be snapped into position on the pins 57, the the lighter is ready for operation. It will thus be seen that there has been provided by this invention an article in which the various objects hereinabove set forth, together with many thoroughly practical advantages, are successfully achieved.

As many possible embodiments may be made of the above invention and as many changes might be made in the embodiment above set forth, it is to be understood that all matter hereinbefore set forth or shown in the accompanying drawing is to be interpreted as illustrative and not in a limiting sense.

I claim:

1. In a lighter, a fuel receptacle being substantially a rectangular parallelepiped, a wick projecting from the top of said receptacle, a sparking wheel mounted on said receptacle, a finger piece and connecting means to operate said wheel to throw sparks upon said wick, a tube projecting through the top of said receptacle holding a piece of pyrophoric metal against said wheel, said tube being threaded at the bottom thereof, a removable bottom for said receptacle, a closure screw for said tube also acting to hold said bottom in place, a filling opening screw for said bottom also serving to hold said bottom in place, and means attached to said receptacle on the inside thereof having screw threads for cooperation with said closure screw.

2. In a lighter, a fuel receptacle, lighter mechanism on the top of said fuel receptacle including a wick, a sparking wheel and a finger piece and an operative connection between the finger piece and sparking wheel whereby actuation of the finger piece rotates the sparking wheel, a tube extending substantially the length of said fuel receptacle but terminating above the lower edges thereof and holding a piece of pyrophoric metal in engagement with said wheel, a removable bottom to said fuel receptacle, a spring in said tube, a closure screw for said tube holding said spring in place therein, there being a hole through said removable bottom, and the closure screw passing through said hole and having a head located under the removable bottom whereby to secure the removable bottom in place.

3. In a lighter, the combination with a fuel receptacle having a flat top wall, a wick tube extending into said fuel receptacle and projecting from the top wall, a tube extending through the receptacle, a sparking wheel mounted on a horizontal axis above said tube, a pair of ratchet wheels one on either side of said sparking wheel and connected thereto, a finger piece mounted upon the top of said receptacle, a pair of ratchet racks positioned to mesh with said ratchet wheels and each having both ends mounted on said finger piece for movement toward and away from said ratchet wheels, and means including a spring attached to said finger piece urging said ratchet racks into engagement with said ratchet wheels.

4. A pocket lighter comprising a flat rectangular parallelepipedal casing, an end wall of the casing constituting a top wall of the lighter and being itself an elongated rectangle, a second rectangular parallelepipedal casing mounted on said top wall, a cross-section thereof being substantially square, a lid or cover for one end of the top of the second rectangular parallelepipedal casing and hinged thereto, a wick located under said lid or cover, a wick tube for said wick, a snuffer cap attached to the under side of said lid or cover and so positioned thereon as to seat on said wick tube, an abrasive wheel under said hinge rotatable about a horizontal axis, pyrophoric metal in engagement with said wheel, actuating means for said lid or cover and for said abrasive wheel movably mounted relative to both of said casings and including a finger piece member, the finger contacting part of said finger piece member of said actuating means lying substantially in the plane of the side of the lighter when in normal position.

5. A pocket lighter comprising a fuel receptacle having a flat top wall, a sparking wheel horizontally journaled above said top wall, a pair of ratchet wheels secured to said sparking wheel one on either side thereof, a pair of multi-toothed pawls located in a horizontal plane above said top wall and under said ratchet wheel and in floating engagement therewith, a horizontally movable finger piece carrying both ends of said pawls, a snuffer pivotally mounted above said top wall, a pin and slot connection between said snuffer and said finger piece to lift said snuffer when the finger piece is moved to rotate said sparking wheel, the outer end of said finger piece being so positioned that its free end does not extend beyond the plane of the side wall of the receptacle from which it moves inwardly upon operation, and means completely encasing said sparking wheel, said ratchet wheels, said pawls, and said snuffer when said finger piece is in non-igniting position.

6. In a pocket lighter, the combination with a fuel receptacle having a flat top wall, a wick tube extending into said fuel receptacle and projecting from said top wall, a tube extending through the receptacle, a sparking wheel mounted on a horizontal axis above said tube, a pair of gear wheels one on either side of said sparking wheel and connected thereto, a finger piece mounted on the top of said receptacle and movable horizontally therealong, the outer end of said finger piece lying substantially in the plane

of the side wall of the receptacle when in non-operative position, a pair of racks engaging said gear wheels, a mounting for said racks on said finger piece permitting them to move away from said gear wheels, spring means on said finger piece urging said racks into engagement with said gear wheels, and means completely enclosing said top wall, said tubes, said gear wheels, said racks, said mounting, and said spring means when said finger piece is in non-igniting position.

THOMAS M. GIBSON.