

Nov. 7, 1950

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2,529,326

AUTOMATIC LIGHTER WITH ELONGATED FLINT

Filed June 28, 1946

2 Sheets-Sheet 1

Fig. 1

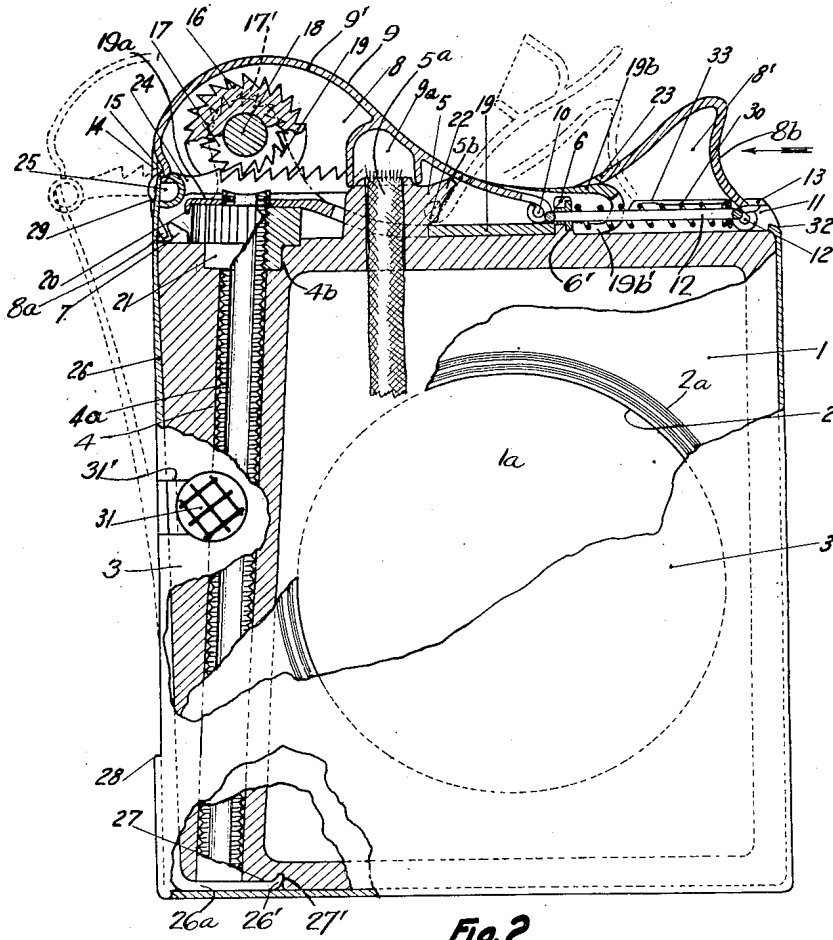
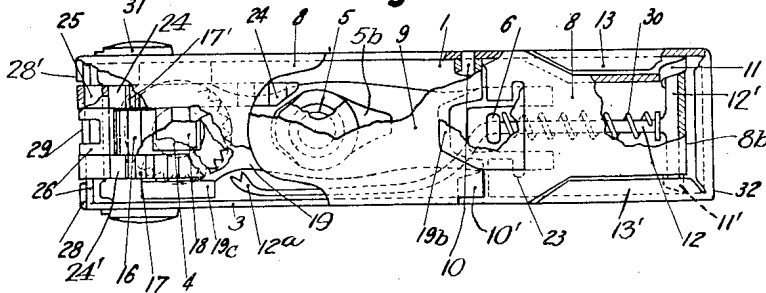


Fig. 2



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Nov. 7, 1950

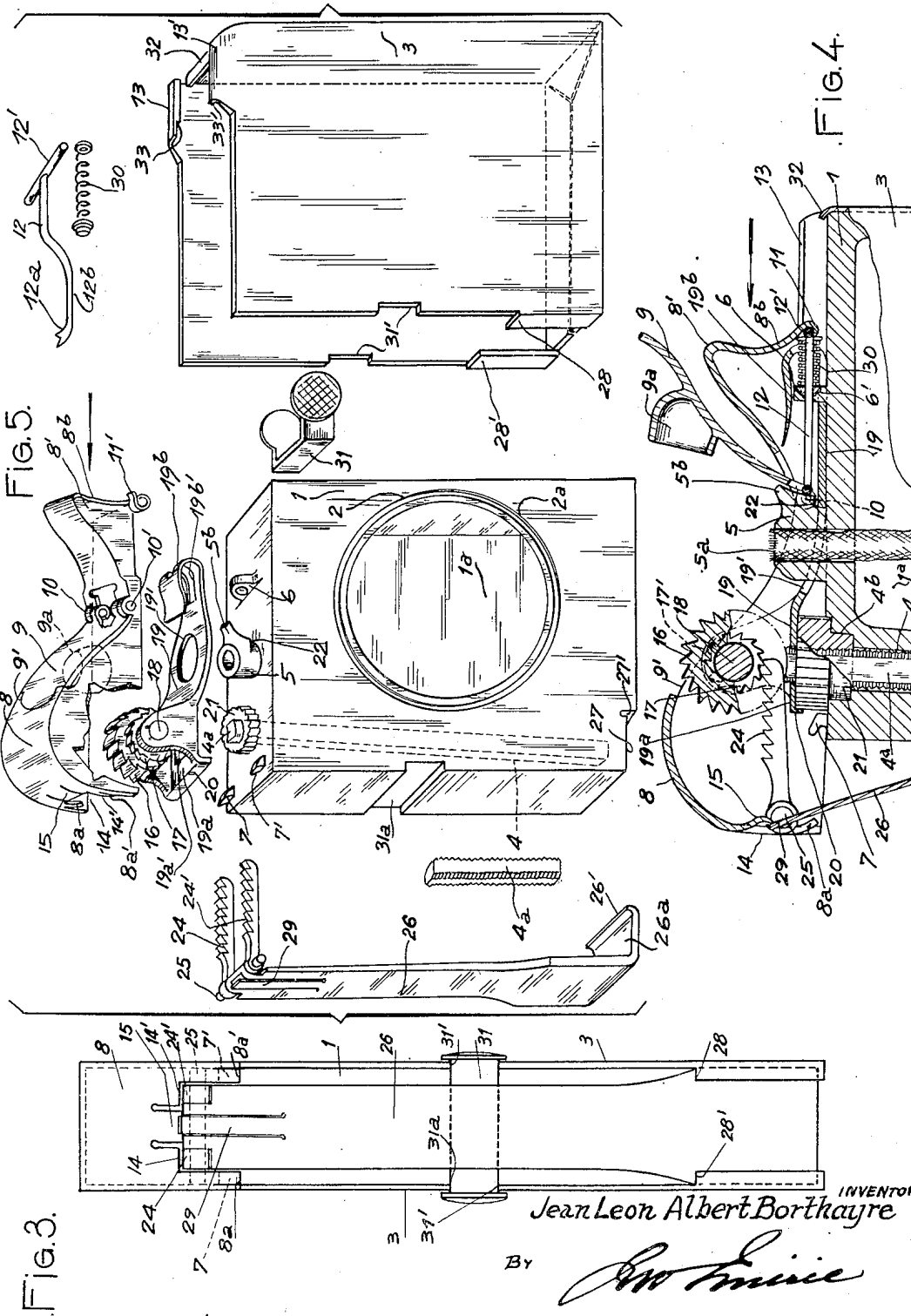
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2,529,326

AUTOMATIC LIGHTER WITH ELONGATED FLINT

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Application June 28, 1946, Serial No. 679,959
In France July 11, 1945

8 Claims. (Cl. 67—7.1)

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This invention relates to lighters for use with cigarettes, cigars and the like, and more particularly to that class of lighter which is operated automatically upon the opening movement of a wick cover.

The primary object of the invention is to provide a lighter wherein the flint is originally of substantially equal length with that of the body of the lighter and is automatically advanced toward the abrasive wheel each time the lighter is operated.

It is another object of the invention to provide a lighter having a unique filling arrangement to permit ready and easy filling of the reservoir with lighter fluid and without a waste of the fluid.

It is a further object of the invention to provide a lighter wherein the parts are readily assembled and disassembled without the use of tools.

It is a still further object of the invention to provide a lighter that embodies simplicity of design, economy of construction, and efficiency in operation.

The novel features that are considered characteristic of the invention are set forth with particularity in the appended claims. The invention itself, however, both as to its organization and its method of operation, together with additional objects and advantages thereof, will best be understood from the following description of a specific embodiment when read in connection with the accompanying drawings, wherein like reference characters indicate like parts throughout the several figures and in which:

Fig. 1 is a side view, partially in elevation and partially in cross-section, of a lighter embodying the present invention;

Fig. 2 is a top plan view of the lighter with parts broken away to show the construction thereunder;

Fig. 3 is an end view in elevation of the lighter as seen from the left side of Fig. 1;

Fig. 4 is a fragmentary cross-sectional view of the top portion of the lighter and corresponding to Fig. 1 but with the parts moved to operative position; and

Fig. 5 is an exploded view in perspective of the lighter.

Referring now to the drawings, specifically to Figs. 1 and 5, a lighter in accordance with the present invention comprises a body 1, preferably of molded material, such as light metal, which is removably mounted in the casing 3. The body 1 is partially hollow to form a reservoir 1a for containing a wick supply or cotton filler which may be impregnated by a liquid fuel. Only the

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end of a wick 5a is shown in Fig. 1. The body 1 is provided in one side with a circular filling opening 2, preferably having a minimum diameter of 27 mm., for the admission of a supply of fuel to the reservoir 1a. The opening 2 is preferably of a size to receive the complete mouth of a fuel container, so that the body 1 may be placed on the container with the opening 2 surrounding the mouth thereof and then inverted until the wick material therein is completely saturated. A plurality of concentric grooves 2a are cut into the outer surface of the body 1 and surrounding the opening 2 to provide a fluid tight joint with the adjacent wall of the casing 3. If desired, a plastic material may be seated in one or more of the grooves 2a to form a gasket for cooperation with the adjacent wall of the casing 3.

A square bore or channel 4 extends longitudinally from bottom to top through the body 1 adjacent one edge thereof. A flint 4a is slidably mounted in the bore 4 and is preferably of a length to extend completely through the bore when initially inserted. A circular recess 4b is formed in the top of the body 1 and surrounding the square bore 4. An internally threaded, round nut-like member 21 having a serrated or ratchet toothed periphery is rotatably seated in the recess 4b with its center substantially coaxial with the bore 4. The flint 4a is substantially square in cross section to coincide with the bore 4 to prevent its turning within the bore but has threads cut across its corner portions for cooperation with the internal threads of the nut 21. The flint 4a may comprise a rod of ferrocerium or other suitable material. Due to the smaller area of the threaded corner portion of the flint, these areas may be hardened as by a superficial chroming or the like.

A neck 5 extends upwardly from the top of the body 1 adjacent the flint bore recess 4b and has a passage in communication with the reservoir 1a to receive the free end of the wick 5a in the customary manner. The neck 5 is provided with a laterally protruding abutment 5b that overlies and forms, with the top of the body 1, a groove 22. The abutment 5b extends from the neck 5 on the side opposite the flint bore 4 or, in other words, towards the rear edge of the body. An apertured boss 6 extends upwardly from the top of the body, spaced from the abutment 5b and between the neck 5 and the rear edge of the body 1. In addition, two hook-shaped stops 7-7' extend upwardly from the top of the body adjacent the front edge thereof and are inclined or hooked toward the front edge of the body. The front portion of the bottom of the body 1 has a

recess 27 across the bottom of the flint bore 4 and is provided with a transverse groove 27' at the inner end of the recess.

The casing 3 is preferably formed of a metal sheet which is substantially rectangular and folded over at the rear edge portion or that portion which is to be opposite the lighter flint when assembled. It covers the body 1 somewhat in the manner of a hook cover and bears on the body 1 in direct contact on both sides and the rear and bottom edges thereof, with portions projecting over the front and top edges. As best shown in Fig. 5, the side walls and rear edge wall are solid with the bottom edge wall that is formed by juxtapositioned flanges. In addition, upright flanges 28—28' are formed inwardly from both side walls across the bottom portion of the front of the casing and a narrow flange 32 is formed over transversely across the top of the rear edge wall. The side walls of the casing are extended at the top adjacent the rear edges thereof and these extensions are formed over to provide inwardly extending flanges 13—13' which are spaced above the top proper of the casing 3 and above the top of the body 1 when the body and casing are assembled. The flanges 13—13' are provided with notches 33—33' in their under sides at their inner or forward ends.

An abrasive wheel 16 is carried by a plate 19 that is mounted on top of the body 1. The plate 19 is provided with a central aperture 19' to fit over the wick neck 5, and with a formed over U-shaped end 19b that is provided with a slot 19b' for receiving the boss 6. The plate 19 is positioned flat on the body with the inner end of the slot 19b' seated against the boss 6 and the peripheral edge of the aperture 19' fitted with a removable snap-catch connection in the slot 22 at the base of the neck 5. The plate 19 extends upwardly and forwardly to form a thin platform 19a that overlies and bears down on the flint nut 21, thereby holding the nut 21 in the recess 4b. The platform 19a is provided with a square aperture 19a' for snugly passing and frictionally engaging the flint 4a, and terminates in a downward flange 20 which bears against the periphery of the nut 21 to hold the plate in position and seated in the slot 22.

A pair of upstanding ears 19c are carried on each side of the thin platform 19a and a stub shaft 18 is journaled in said ears and transversely positioned directly above the flint bore 4. The usual abrasive wheel 16 is mounted on the shaft 18 for engagement with the upper end of the flint 4a. Ratchet wheels 17—17' are mounted on the shaft 18, one on each side of the abrasive wheel 16. The ratchet wheels 17—17' are fixed to the wheel 16 to drive the abrasive wheel 16 against the flint 4a and create and throw a spark to the wick 5a, but this treble wheel is removably mounted on the shaft 18 for ease of assembly. The plate 19 is preferably formed of resilient steel and, being clamped down by the notch 22, the front portion including the platform 19a is biased down against the nut 21 and thereby presses the abrasive wheel 16 against the flint 4a.

The ratchet wheels 17—17' mesh with and are driven by a pair of racks 24—24', respectively, which are fixed at their front ends on a cross pin 25 that is parallel with the shaft 18. The pin 25 is pivotally supported by the upper end of a leaf spring 26, and is provided at its center with a flat for cooperation with an upstanding tongue 29 that is centrally cut longitudinally from the top of the spring 26. This tongue 29 bears on the flat

of the pin 25 and thereby biases the pin 25 to urge the racks 24—24' against the ratchet wheels 17—17'. By this arrangement, the racks 24—24' drive the ratchet wheels 17—17' only in the direction that will provide for the ignition of the wick 5a, that is from left to right in Figs. 1 and 4.

The leaf spring 26 fits against the front and extends the height of the body 1, the spring terminating at its bottom in a right angular bend 26a, which seats in the recess 27 and covers the bottom of the flint bore 4, and terminates in an upstanding lip 26' which seats in the groove 27'. When the spring 26 is seated against the body 1, the end 26a fills the recess 27 to be substantially flush with the bottom of the body, and the spring 26 is partially covered and retained in position by the casing 3 which covers the bottom end 26a and holds the bottom portion of the spring by the front flanges 28—28'. Thus, the spring 26 is held flat against the front of the body 1 by the flanges 28—28', but, as these flanges extend only a small portion of the height of the casing 3, as best shown in Fig. 3, the spring is permitted free and easy flexure away from the body 1. After the casing 3 is mounted over the body 1, it is retained by a removable U-shaped clip 31 that spans the free front edges of the casing, this clip 31 being seated in a transverse slot 31a in the body 1 and notches 31' in the front of the casing walls 3 to position the clip 31 behind the spring 26 so that the latter can lie flat against the front edge of the body 1.

A shell-shaped, flat-sided hood 8 is slidably mounted on the top of the body 1, the flat sides of the hood being closely juxtapositioned to the outer sides of the upstanding ears 19c so that the front end of the hood is guided thereby. The rear end 8' of the hood is reduced in thickness to fit between the casing flanges 13. The central top portion of the hood 8 has an opening 9' above the wick neck 5, this opening extending completely across the top of the hood and being closed by a cover 9 that is pivotally mounted at its rear end by hinges 10—10' on the side walls of the hood. The cover 9 carries an inverted cup 9a for surrounding the top of the neck 5 to snuff the wick 5a. The hood 8 terminates at its rear end 8' in an upstanding portion that defines a rearwardly facing thumb or finger piece 8b. The hood 8 is inclined downwardly along the opening 9' so that the cover 9 is positioned closely to the abutment 5b for quick engagement therewith upon forward movement of the hood, and the overturned end 19b, of the plate 19, is tapered to increase its resilience and extends to contact the cover 9 when the hood 8 is in normal position to hold the cover down in closed position.

The rear wall or thumb piece 8b of the hood 8 is extended at its bottom corners in two laterally disposed strips that are helically coiled to form trunnions 11—11' which are slidably longitudinally under the flanges 13—13' to hold down and guide the rear portion of the hood 8 during its slidable movement, the trunnions having a slight frictional engagement between the body 1 and flanges 13—13'. The trunnions 11—11' surround a cross-branch 12' of a T-shaped member 12, the main bar of which is slidable in the aperture of the boss 6 and is surrounded by a helical spring 30 that is compressed between the boss 6 and the cross-branch 12'. Thus the hood 8 is moved forwardly by thumb or finger pressure on the rear wall 8b and is retracted by the spring 30. As the trunnions 11—11' are widely spaced and loosely surround

the cross-bar 12', this bar 12' may be easily assembled and dismantled by sliding longitudinally until one end is freed from its trunnion and after inclining the free end beyond said trunnion, sliding in the opposite direction. As best shown in Fig. 5, the strips forming the trunnions 11-11' terminate at the tops of the trunnions and are turned up slightly to seat in the notches 33-33', respectively, in the flanges 13-13', upon a slight upward movement of the thumb piece 8b, and thus hold the hood 8 in forward position.

The forward end of the hood 8 is doomed to cover the abrasive wheel 16 and curves downwardly into a front wall coinciding with the front surface defined by the spring 26. This front wall is provided with a notch which is slightly divided by an incurved catch 15 into two passages 14-14' for respectively passing the racks 24-24'. The catch 15 lies in the path of the tongue 29 of the spring 26. The bottom portions of the front wall on the outer side of the passages 14-14' are bent inwardly to define hooks 8a-8a' for cooperating with the stops 7-7' in limiting the spring retraction of the hood 8. It will be noted that the catch 15 curves inwardly and then outwardly at the tip thereof and that the tip is below the top of the tongue 29.

When the hood 8 is pushed forward by pressure on the rear wall 8b, as shown in Fig. 4, the tip of the catch 15 engages the tongue 29 and swings it outwardly, releasing the pressure on the flat of the pin 25 to permit lowering of the racks 24-24', and biasing the spring 26 outwardly to move the racks 24-24' forwardly beneath the ratchet wheels 17-17'. After a given amount of movement, the tongue swings below the catch 15 and is released to engage the flat of the pin 25 and swing the racks up against the ratchet wheels, and the spring 26 returns to normal position, driving the racks 24-24' which drive the wheels 17-17' to actuate the abrasive wheel 16. Upon release of the hood 8, it is returned by the spring 30, and the catch 15 is cammed up over the tongue 29 by the outward curve of its tip.

The T-shaped member 12 has a portion 12b that extends forwardly beyond the boss 6 and is curved to pass the wick neck 5, terminating in a pawl 12a for cooperating with the toothed periphery of the nut 21. Upon movement of the T-member 12, by movement of the hood 8, the pawl 12a is advanced against the nut 21, engaging the teeth thereof and thereby rotating the nut to thread the flint 4a upwardly against the abrasive wheel 16. The portion 12b is resilient so that the pawl 12a will spring away from the teeth of the nut 21 upon maximum resistance against the flint by the wheel 16 and the resilience of the supporting plate 19, whereupon the pawl 12a will advance freely beyond the nut 21. It should be noted that the boss 6 of the body 1 has an aperture of sufficient size to pass the pawl 12a and thereby permit removal and assembly of the T-shaped member 12, the member being slidably surrounded by a collar 6' which abuts the boss 6 and forms an end bearing for the spring 30.

In operation, the flint 4a having been loaded and the wick 5a having been inserted and saturated with fuel, the operator presses the thumb piece 8b to move the hood 8 forwardly. This movement carries the T-member 12 forwardly to engage the pawl 12a with the nut 21 and thread the flint 4a up against the abrasive wheel 16. Almost immediately with the initial movement

of the hood 8, the cover 9 is lifted by engagement with the abutment 5b, removing the snuffer cap 9a from the wick 5a. The catch 15 engages the tongue 29 and biases the tongue and its spring 26 outwardly and this carries the racks 24-24' forwardly, as shown in Fig. 4.

Almost before maximum movement of the hood 8, the tongue 29 slips under the catch 15 and releases the spring 26. Immediately, the tongue 29 engages the flat of the pin 25 and swings the racks 24-24' up into engagement with the ratchet wheels 17-17' and, simultaneously, the spring 26 snaps back against the body 1 so that the racks drive the ratchet wheels which in turn drive the abrasive wheel 16 in contact with the flint 4a to create and throw sparks to the wick 5a and thereby ignite the wick.

If it is desired to hold the lighter in operation, the hood 8 is moved to maximum position and the thumb piece pressed upwardly to engage the ends of the trunnions 11-11' in the notches 33-33'. When use of the lighter is completed, the thumb piece 8b is pressed down to release the trunnions 11-11' from the notches 33-33' and the thumb piece is released and the hood returned by the spring 30 to normal position wherein the hooks 8a-8a' engage the stops 7-7', as shown in Fig. 1. When the hood 8 moves back to normal position, the cover 9 engages the forwardly extending end 19b of the plate 19 and is swung thereby into closed position and the cap 9a snuffs the wick 5a. Obviously, the return of the hood 8 retracts the T-member 12 and its pawl 12a to operative position, and the catch 15 is pulled over and behind the tongue 29.

In order to refuel or reload flint in the lighter, the thumb piece 8b is pressed to advance the hood 8 and swing the spring 26 away from the body 1 and the clip 31 is removed from the casing 3. Usually the hood 8 is locked in open position to permit easy removal of the clip 31. The hood 8 is then released and returned to normal position, and the sides of the casing are sprung apart sufficiently to permit the removal of the body 1, spring 28 and hood 8 as a unit. Fuel may then be poured through the opening 2 into the reservoir 1a or, if the fuel is contained in an open neck bottle or like container, the body 1 may be turned to place the opening 2 down over the container neck, and the container and body inverted until the reservoir 1a and wick 5a or cotton filler are filled and saturated, after which the container and body are re-inverted and the container removed. To reload flint, the spring end 26a and lip 26' are removed from the recess 27 and groove 27' to uncover the bottom of the bore 4. A long stick of flint is then inserted up through the bore 4 and threaded into the nut 21 by manually rotating the nut until the upper end of the flint engages the abrasive wheel 16. The flint stick is then broken off flush with the bottom of the bore 4 or recess 27, and the spring end 26a and lip 26' replaced in the recess 27 and groove 27', respectively. The side walls of the casing 3 are then separated and the body 1 and assembly are reinserted.

In view of the foregoing description, it is readily evident that the lighter parts may be readily assembled and dismantled manually, for purposes of cleaning, repairing, replacing parts or the like, no tools of any type being necessary for this operation.

Although a certain specific embodiment of the invention has been shown and described, it is obvious that many modifications thereof are pos-

sible. The invention, therefore, is not to be restricted except in so far as is necessitated by the prior art and by the spirit of the appended claims.

I claim:

1. A lighter comprising a reservoir body formed with a flint bore extending through the entire height of said body and adapted to slidably and non-rotatably guide therein a flint having screw threads on its periphery, an abrasive wheel rotatably mounted on said body above said flint bore, a wick passage extending from the reservoir through the top of said body, a nut rotatably mounted at the upper opening of said flint bore and adapted to engage by its internal threads said screw-threads of the flint and to advance said flint into engagement with said abrasive wheel when said nut is rotated, an actuating device for imparting rotation to said abrasive wheel, and means operated by said actuating device for imparting rotation to said nut.

2. A lighter as claimed in claim 1, wherein said nut is externally toothed, and said means for imparting rotation to said nut is a pawl adapted to engage the external teeth of said nut when said actuating device is operated.

3. A lighter as claimed in claim 1, wherein said nut is externally toothed, said means for imparting rotation to said nut is a pawl adapted to engage the external teeth of said nut when said actuating device is operated, and a resilient support for said pawl to permit disengagement of said pawl from said teeth when the pressure exceeds a predetermined limit.

4. A lighter comprising a reservoir body formed with a flint bore extending through the entire height of said body and adapted to slidably and non-rotatably guide therein a flint having screw threads on its periphery, an abrasive wheel rotatably mounted on said body above said flint bore, a wick passage extending from the reservoir through the top of said body, an externally toothed nut rotatably mounted at the upper opening of said flint bore and adapted to engage by its internal threads said screw-threads of the flint and to advance said flint into engagement with said abrasive wheel when said nut is rotated, an actuating device for imparting rotation to said abrasive wheel, and means operated by said actuating device for imparting rotation to said nut, said actuating device comprising at least one ratchet wheel connected with said abrasive wheel, a hood slidably mounted on said body, spring means for holding said hood in its position of rest, a wick covering cap pivotally mounted on said hood, a second spring means for holding said cap in its closed position, an abutment formed on said body and adapted to engage and lift said cap when said hood and cap are displaced forwardly with respect to said body, a rack for each of said ratchet wheels and adapted to slip in its forward stroke

over the teeth of said ratchet wheel and to engage in its backward stroke the teeth of said ratchet wheel, a third spring means biasing said racks backward towards their position of rest, a tongue on said cover and being adapted to engage and push said third spring means and racks forward, during the forward stroke of said hood, and to release said third spring means and racks after a predetermined forward displacement of said hood for the backward stroke in which said rack causes rotation of said ratchet wheel, and said means for imparting rotation to said nut being a pawl connected to said slidable hood and adapted to engage the external teeth of said nut when said actuating device is operated, and a resilient support for said pawl to permit disengagement of said pawl from said teeth when the pressure exceeds a predetermined limit.

5. A lighter as claimed in claim 4, comprising releasable retaining means for retaining said cover in its forwardly displaced position.

6. A lighter as claimed in claim 4, wherein one of the side walls of said body is provided with a large opening into said reservoir, and a removable outer casing enclosing said body and adapted to close and seal said opening.

7. A lighter as claimed in claim 4, wherein one of the lateral walls of said body is formed with a large opening into the reservoir and surrounded by concentric grooves in said lateral wall, and a removable outer casing enclosing said body and adapted to close said opening and form a seal with said grooves.

8. A lighter as claimed in claim 4, wherein one of the lateral walls of said body is formed with an opening of at least 1 inch in diameter into the reservoir and surrounded by concentric grooves in said lateral wall, plastic material filling at least one of said grooves, and a removable outer casing enclosing said body and adapted to close said opening and form a seal with said grooves and plastic material.

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