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LIGHTERS

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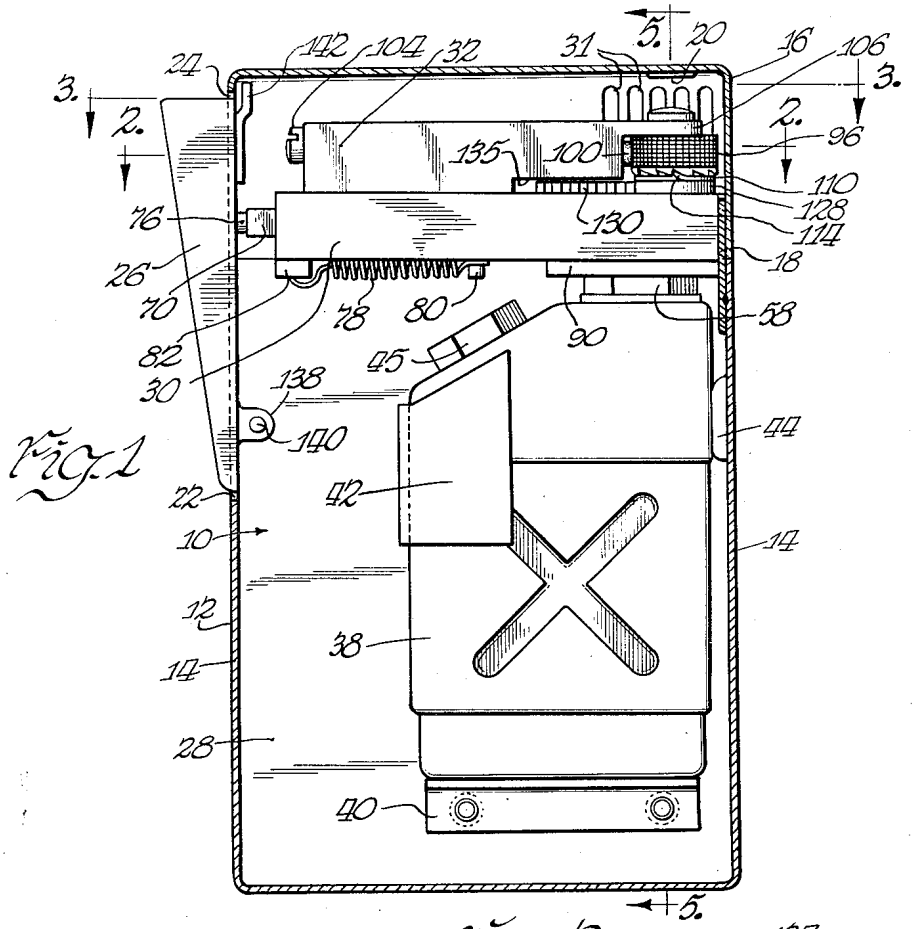

Fig. 1

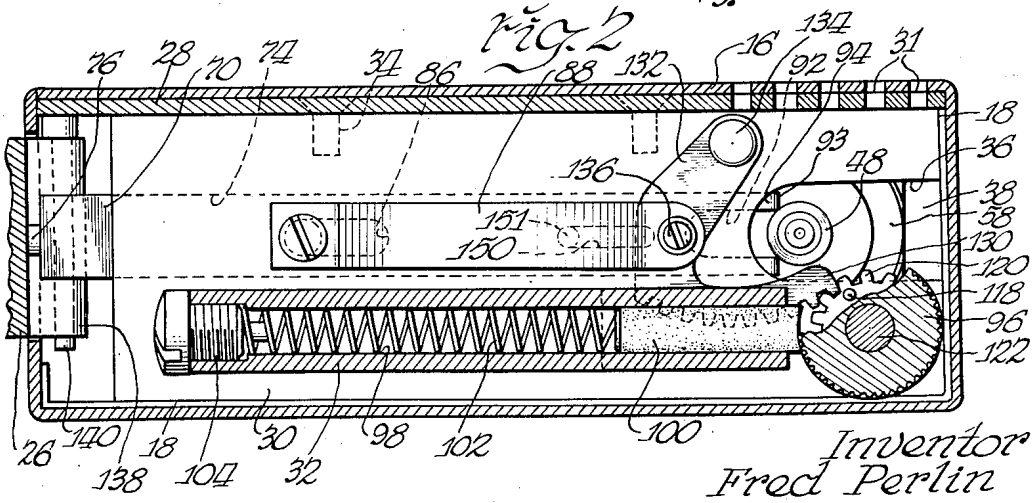

Fig. 2

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Fig. 3

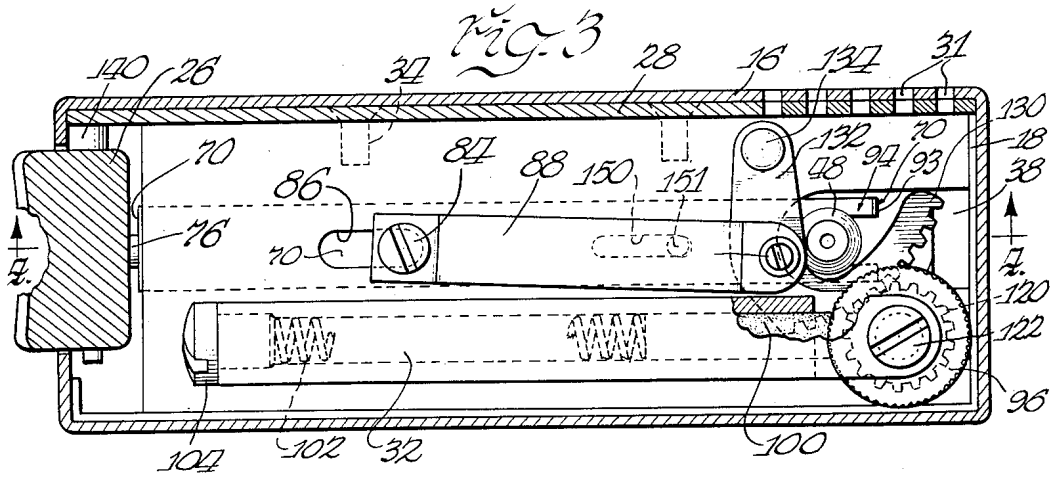

Fig. 4

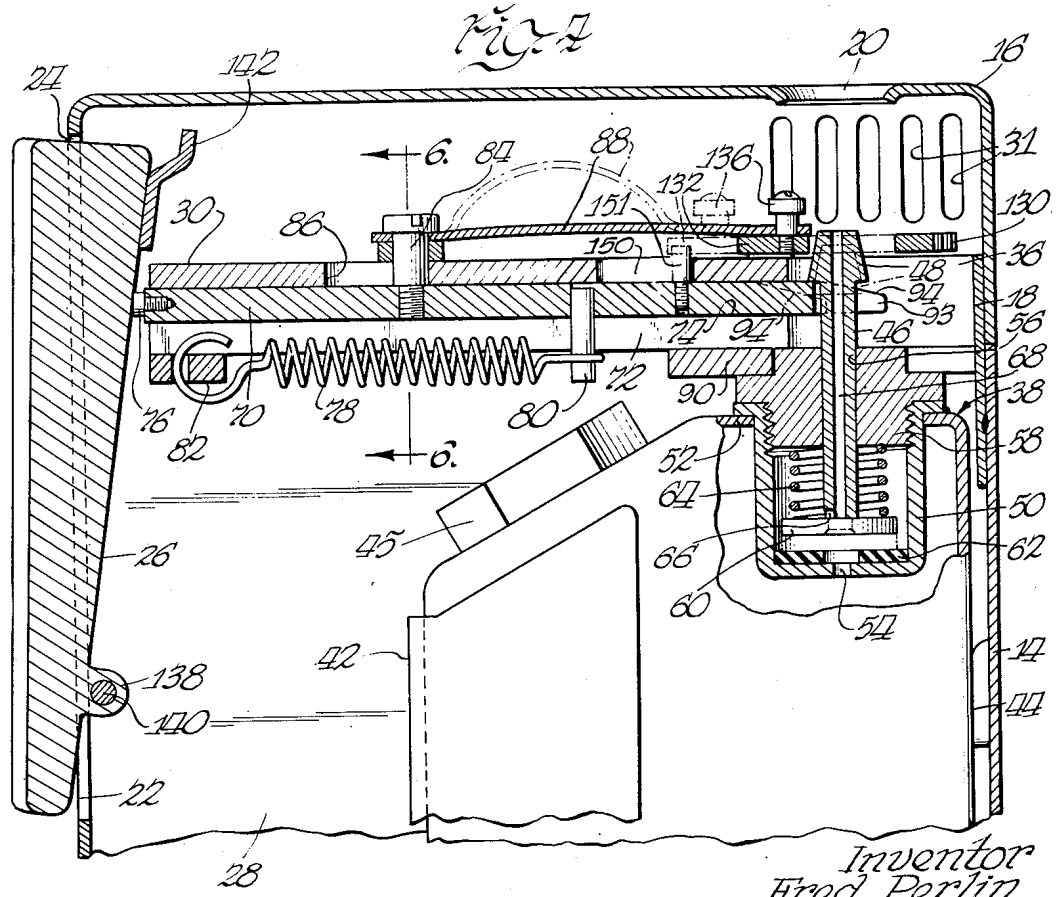

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Fig. 5

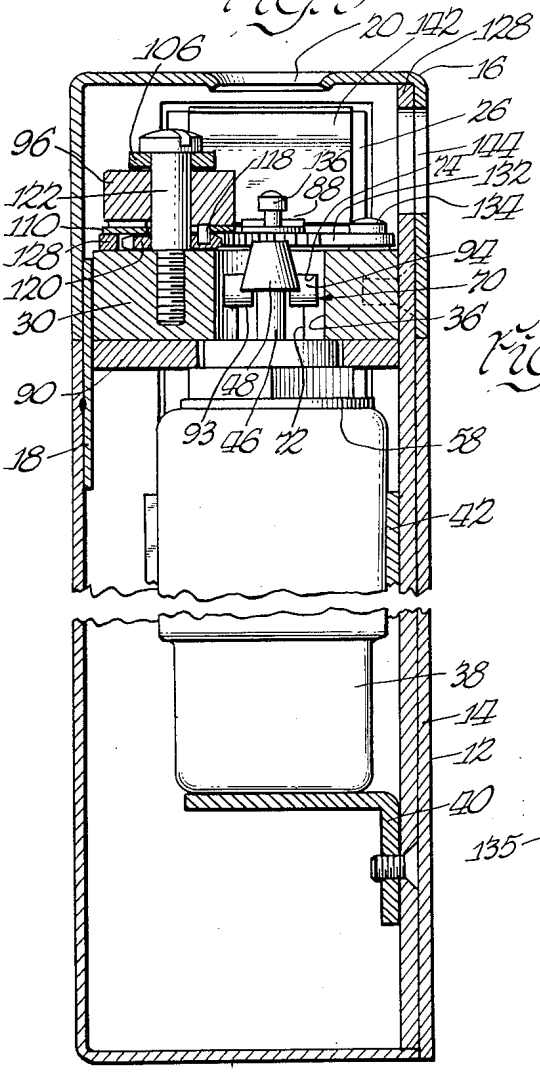


Fig. 7

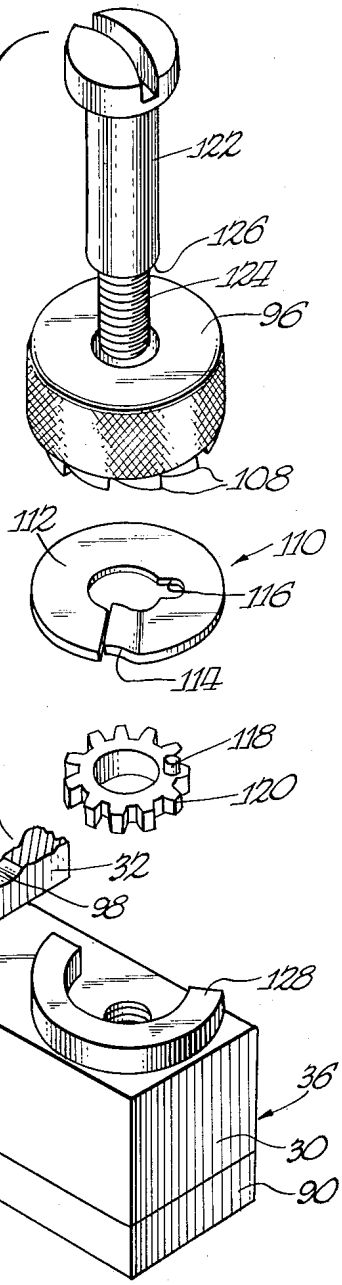
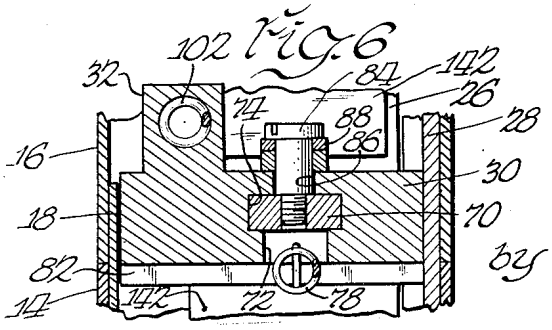


Fig. 6



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United States Patent Office 2,779,180 Patented Jan. 29, 1957

2,779,180

LIGHTERS

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Application April 30, 1954, Serial No. 426,783

7 Claims. (Cl. 67—7.1)

The present invention relates to lighters of the type commonly employed for lighting cigars and cigarettes, and has to do particularly with novel actuating mechanism for producing sparks and controlling flow of fuel from a tank in the lighter to a position for lighting.

An object of the invention is to provide a lighter having means actuatable by the hand for producing sparks, and novel means for effecting rapid and uniform actuation of the spark producing means in response to movement of the character usually produced by the hand.

Another object is to provide in a lighter, means actuatable by the hand for producing sparks and including a novel arrangement whereby the spark producing means is retarded in the fore portion of the manipulation for actuating it, and as a consequence actuated rapidly in the latter portion, in response to a substantially constant pressure of the character usually applied by the hand.

Another object is to provide in a lighter, a flint and a rotatable friction wheel engageable with the flint for producing sparks, and means for rotating the friction wheel by a single manipulating movement of the hand, wherein the friction wheel is frictionally retarded in the fore portion of the single hand movement, and rapidly rotated in the latter portion of the hand movement.

A further object is to provide in a lighter, a flint and a movable friction element frictionally engageable with the flint, and a hand actuated means for moving the friction element, wherein resilient means is interposed between the hand actuated means and friction element, the friction element is frictionally retarded in the fore portion of the movement of the hand actuated element in response to which energy is stored in the resilient means, whereupon in the latter portion of the movement of the hand actuated element, the energy stored in the resilient means effects rapid movement of the friction element.

Another object is to provide a lighter having a fuel tank and valve means for controlling flow of fuel from the tank to a position for lighting, wherein novel means is provided for controlling the valve means.

Still another object is to provide a lighter having spark producing means and valve means for controlling flow of fuel from a tank to a position for lighting, both actuated and controlled by hand actuated means, wherein a novel arrangement is provided for opening the valve means immediately prior to production of the sparks in a single manipulating movement of the hand.

A further object is to provide a lighter having a fuel tank, and conduit and valve means for controlling the flow of fuel from the tank to a position for lighting, and a flint and movable friction element engageable therewith for producing sparks, wherein hand manipulable means is provided for actuating and controlling the valve means and friction element in a single hand movement, and said manipulable means includes a rigid element effective for opening the valve means beginning substantially concurrently with movement of the manipulable means, and resilient means is interposed between the manipulable means and friction element, enabling a frictional retarding

action on the movement of the friction element in the fore portion of the movement of the manipulable means and storing of energy in the resilient means whereupon and after the valve is opened the energy stored in the resilient means effects rapid movement of the friction element for producing sparks and directing them into a stream of fuel issuing from the conduit means.

Still another object is to provide a lighter having an improved construction of chassis and casing.

A further object is to provide a lighter having an improved chassis including operating parts, especially adapted for easy insertion in and removal from a casing.

Other objects and advantages of the invention will be apparent from the following detail description taken in conjunction with the accompanying drawings in which:

Figure 1 is a side elevational view of the lighter, showing the casing in section;

Fig. 2 is an enlarged, horizontal, sectional view taken on line 2—2 of Fig. 1, showing the driving member and associated parts in inactive or retracted position;

Fig. 3 is an enlarged, horizontal sectional view taken on line 3—3 of Fig. 1, and showing the driving member and associated parts in advanced or active position;

Fig. 4 is a fragmentary view taken on line 4—4 of Fig. 3, showing the upper portion of the lighter;

Fig. 5 is an enlarged sectional view taken substantially on line 5—5 of Fig. 1, the fuel tank being shown in elevation;

Fig. 6 is a fragmentary sectional view taken on line 6—6 of Fig. 4; and

Fig. 7 is an exploded perspective view of certain of the operating parts of the lighter including the sparking wheel and associated elements and the means for mounting them.

Referring in detail to the drawings, the lighter includes a chassis **10** which carries all of the operating parts, and a casing **12** in which the chassis is enclosed except for an actuating member which projects through an opening in the casing to the exterior for engagement by the hand for operating the lighter. The casing **12** is dimensioned in suitable proportions as shown in Figs. 1 and 2, and includes a lower or base portion **14** and a cover or cap **16** removably and frictionally held on the lower portion. The lower portion **14** constitutes the major portion and is preferably of relatively deep cup-shaped form, while the cover or cap, also cup-shaped, is preferably of lesser height. An upward extension **18** of the lower portion of the casing serves as a means for frictionally retaining the cover or cap on the lower portion. For convenience in manufacturing the extension **18** may be formed as a separate sheet metal strip secured as by soldering to the inner surface of the lower portion **14** adjacent to the top thereof and projecting thereabove. The alignment strip **18** extends along at least two sides of the casing and is frictionally engaged by the inner surface of the cover for normally retaining the cover on the portion **14**, the cover being flush with the lower portion when fitted thereto. As shown in Figs. 2 and 3 the alignment strip extends substantially along two sides and a short portion of a third side. The cover **16** is provided with a top opening **20** for projection of the fuel flame therethrough, and the two casing portions are provided with matching openings **22** and **24**, respectively, together forming an aperture for the projection therethrough of a manual actuating member **26** which is positioned for engagement by the hand or thumb for moving it inwardly and operating the lighter.

The chassis **10** includes a mounting plate **28** serving as a base member or means for mounting all of the operating parts of the lighter. The plate has outline dimensions similar to the length and breadth of the casing and thereby dimensioned for engagement at its edges with the respective wall surfaces of the casing. The plate

28 thereby is retained in the casing against displacement in any direction in the plane thereof. The plate 28 is retained against one side wall of the casing by means of a mounting member or shelf 30 which also serves to mount and support certain of the operating parts of the mechanism of the lighter. The mounting member 30 is preferably positioned adjacent the upper portion of the plate so that it is disposed adjacent the top open end of the lower portion 14 of the casing when the chassis is positioned therein and is of appropriate width in a direction perpendicular to the plane of the plate for engagement with one side wall of the casing for retaining the chassis in the casing.

Since the plate 28 is appropriately dimensioned in length and width for engagement with the respective walls of the casing including the cover, it projects through the open top of the lower portion of the casing when the cover is removed, whereby the upper end of the plate serves as a means for grasping by the hand for removing the chassis, and all the elements mounted thereon, out of the casing. The plate 28 and casing cover 16 are provided with registering apertures or slots 31 below the top opening 20, for supplying air for combustion for the flame at the burner tip which is disposed below the top opening 20, as will be brought out in detail hereinafter.

The mounting member 30 is mounted on the plate 28 in any suitable manner such as by means of screws 34, and includes a flint holder 32 integral therewith or separate therefrom and secured thereto, as desired. The mounting member 30 at one end is spaced a short distance from the actuating member 26 to allow movement of the latter toward and from the former, and at its other end extends adjacent to or into engagement with the extension or alignment strip 18 where it is bifurcated and provided with a slot 36 opening through the end of the member to receive the stem 46 of a fuel tank 38 to facilitate removal and replacement of the fuel tank which is also supported by the mounting plate 28 in a convenient manner. Suitable means for mounting the fuel tank is provided which may include a bracket 40 adjacent the bottom of the plate on which the tank rests, and a spring clip 42 secured to the plate and arranged for gripping the tank when the tank is inserted in the position as shown in Figs. 1 and 4. When the plate 28 is removed from the casing the tank may be removed from its position shown by movement in the appropriate direction (to the right), in which movement the stem 46 on the tank is withdrawn through the open end of the slot 36. The fuel tank is restrained against movement on the plate 28 by the spring clip 42 in one direction and when the chassis carrying the tank is inserted in the casing the tank is restrained against movement in the opposite direction by suitable means such as an abutment 44 formed on the casing and against which the tank snugly engages so that the tank will be maintained in appropriate position and against displacement from the desired position.

The fuel contained in the tank 38 and utilized in the lighter is liquified or compressed gas, normally in gaseous state, but liquified when contained in the tank and passing out of the tank in gaseous form. The fuel tank includes a suitable filling valve 45, and suitable control valve means and an outlet conduit for controlling the flow of fuel from the tank to a position under the top opening 20, the flame therefrom projecting through the opening for purposes of lighting a cigar or a cigarette. The valve means may take any suitable form and may for example take the form shown in section in Fig. 4 having a stem 46 terminating in a burner tip 48. The stem is positioned immediately below the top opening 20 and extends through the slot 36 in the mounting member 30. The stem 46 serves as a control member for opening and closing the valve, being arranged so that upon upward movement of the stem the valve is opened and upon downward movement the valve is closed. This arrangement is utilized for control and actuation of the

valve by means of a longitudinal driving member 70 in the mounting member 30. The valve structure includes a cup-shaped member 50 positioned and sealed in an opening in the wall 52 of the tank 38 and having an aperture 54 in the bottom wall thereof. The stem 46 extends slidably through an aperture 56 in a nut-like cap 58 screw threaded in the cup 50. Mounted on the lower end of the stem 46 is a valve closure element 60 yieldingly urged into engagement with a resilient gasket or washer 62 by means of a compression spring 64 surrounding the stem and compressed between the valve closure element 60 and the cap 58. When the stem 46 is raised fuel, in gaseous form, flows through the aperture 54, between the gasket 62 and closure element 60, through a radial bore or aperture 66, and into bore 68 and through the burner tip 48. When the lifting force is removed the compression spring depresses the stem whereupon the valve closure element 60 engages gasket 62 and closes the valve. The burner tip 48 is preferably of larger external diameter than the stem 46, providing a downwardly facing shoulder for engagement by the driving member 70 slidably mounted in the mounting member 30.

The mounting member 30 is provided with a downwardly opening longitudinal groove 72 (Figs. 4 and 6) extending throughout the length thereof and which at its upper portion is enlarged transversely at 74 forming a channel in which the driving member 70 is slidably mounted. The driving member 70 is slidably moved to advanced position (to the right as viewed in Figs. 1 to 4) by means of the actuating member 26. If desired, a headed screw 76 may be mounted in the end of the driving member for engagement by the driving member. The driving member is yieldingly urged in the opposite direction to retracted position by means of a tension spring 78 connected at one end to a pin 80 mounted in the driving member and extending downwardly through the groove 72, and at the other end to a cross piece 82 suitably secured to the under surface of the mounting member 30. The cross piece 82 is preferably formed separately from the mounting member, thus facilitating formation of the groove 72 by a machining operation, after which the cross piece is secured thereto.

The driving member 70 is limited in movement in both directions by suitable means such as a stud 84 secured therein and extending upwardly through a slot 86 in the mounting member. The stud 84 also serves as a means for securement of one end of a yieldable and resilient element 88 in the form of a leaf spring member for actuating the sparking member as will be described more fully hereinafter. The driving member 70 carries an upstanding pin 151 which projects through a slot 150 in the mounting member 30 for a purpose hereinafter explained.

A second cross piece 90 is secured to the under surface of the mounting member 30 adjacent the slot 36, and preferably extends to the end of the mounting member, being provided with an open-end slot registering with the slot 36. The cross piece 90, similarly to the cross piece 82, is preferably formed separately from the mounting member and secured thereto after formation of the groove 72. The cross piece 90 serves as a stop means for engagement by the cap or head 58 of the valve means in the tank for positioning the tank and limiting upward movement thereof, this feature having particular importance in positioning the burner tip 48 vertically relative to the driving member 70. The driving member 70 at its end adjacent the slot 36 is bifurcated to form a slot 92, the side portions 93 formed thereby straddling the valve stem 46 and each having an inclined upper surface 94 forming a camming means for engagement with the burner tip 48. Upon movement of the driving member 70 in advancing direction (to the right, as viewed in Figs. 1 to 4) the camming surface 94 engages the shoulder on the burner tip 48, raises the valve stem and opens the

valve (Fig. 4), allowing fuel to flow up through the burner tip to be ignited by sparks from the friction wheel or sparking wheel **96** which is positioned for delivering or projecting sparks into the stream or column of fuel issuing from the burner tip.

The flint holder **32** is preferably of minor transverse dimension relative to the mounting member **30**, and is provided with a longitudinal bore **98** in which is slidably mounted a flint **100**. One end of the bore **98** is adjacent the friction wheel **96** and the flint is yieldingly urged through the end of the bore into engagement with the friction wheel by suitable means such as a coil spring **102** compressed between the flint and a screw plug **104** threaded in the opposite end of the bore. Upon removal of the chassis from the casing and swinging the actuating member **26** downwardly out of its upright position, the screw plug **104** and spring **102** can be removed from the bore for insertion of a new flint therein, after which the spring and screw plug are replaced in position. The flint and friction wheel are appropriately positioned so that upon rotation of the friction wheel (clockwise as viewed in Figs. 2 and 3) sparks are thrown by the wheel into the stream of fuel issuing upwardly from the burner tip **48**.

The friction wheel or sparking wheel **96** and certain associated elements are mounted on the mounting member **30** and retained in proper position by a horizontal overhanging arm portion **106** formed on the flint holder **32** and overlying the adjacent end of the mounting member. The friction wheel **96** is provided with a knurled peripheral surface for producing the sparks as is usual in friction wheels. Formed on the under surface of the friction wheel are a plurality of teeth **108** adapted for cooperation with a one-way clutch member **110** and each having an inclined surface for enabling the latter to ride over the teeth in retracting direction.

The clutch member **110** takes the general form of a split ring having a body portion **112** lying substantially in a plane, and a clutching finger **114** bent upwardly from the plane. The clutch member is formed of spring metal whereby the clutching finger **114** is yieldable and flexible, and capable of being flexed downwardly toward the plane of the body. Upon release of the force it flexes upwardly into substantially the position shown in Figs. 1 and 7 for engagement with the teeth of the sparking wheel. A notch **116** is formed in the body of the clutch member for reception of an axially extending pin **118** on a pinion **120** utilized for driving the clutch member and thereby the friction wheel. The friction wheel, clutch member and pinion are assembled together on a bolt **122** forming a fixed shaft inserted through a bearing opening in the overhanging arm **106** and threaded into a tapped hole in the mounting member **30**. Preferably the shaft **122** has a lower reduced threaded portion **124** forming a shoulder **126** engageable with the mounting member when the bolt is threaded into place in the manner mentioned for limiting the extent to which the bolt is threaded into the mounting member. The friction wheel, clutch member and pinion are so dimensioned in axial direction that when they are stacked and assembled the space between the overhanging arm and mounting member allows slight relief or play for enabling the clutching finger **114** to ride over the teeth on the friction wheel without being entirely depressed into the plane of the body of the clutch member, the normal resiliency of the clutching finger **114** serving to retain the assembled elements in proper positions axially of the bolt or shaft. If desired, a semicircular or crescent piece **128** may be secured on the mounting member for at least partially surrounding the pinion **120**.

The friction wheel **96**, as noted, is rotated by the clutching member **110** which in turn is rotated by the pinion **120**. The pinion **120** is rotated by an arcuate rack **130** formed on an arm **132** pivotally mounted as at **134** on the mounting member **30** adjacent the side of the latter opposite the axis of the sparking wheel. A slot **135** may be provided in the flint holder for accommodating the swinging movements of the rack. The resilient leaf spring member **88** referred to above is pivotally secured at **136** to the arm **132** and is operative for swinging the arm and rack about their mutual pivot axis in response to longitudinal movement of the leaf spring **88** which in turn is moved by the driving member **70** upon advancing movement of the latter (to the right, as viewed in Figs. 1 to 4. Fig. 3 shows the driving member in advanced position). Upon movement of the leaf spring member **88** in advancing direction, the rack arm **132** is swung in a counterclockwise direction, and the pinion **120** rotated in a clockwise direction. The pinion **120**, through engagement of the pin **118** in the notch **116**, rotates the clutch member **110**. Upon rotation of the clutch member the clutching finger **114** engages one of the teeth **108** on the friction wheel and rotates the latter. Thus sparks are produced and thrown or directed toward the fuel from the burner tip as mentioned above. Upon release of the force moving the driving member in advancing direction, the driving member and leaf spring member are retracted by the spring **78** (Fig. 4) whereupon the rack **130** is retracted in clockwise direction to its initial position (Fig. 2). The latter action rotates the pinion **120** in counterclockwise direction, and the spring clutch finger **114** rides over the teeth **108** on the friction wheel, the latter normally being retained against reverse rotation by the friction engagement between itself and the flint. The clutch member is thereby rotated relative to the friction wheel whereupon the clutching finger **114** moves into a position for engagement with a successive tooth on the friction wheel for rotating the latter upon a subsequent rotation of the pinion and clutch member in advancing direction.

The actuating member **26**, which may be made of plastic, may take any suitable form and construction. Preferably it is in the form of a lever mounted for swinging movement on a pivot axis adjacent its lower end, as by a lug **138** provided with an aperture receiving a pin or stem **140** suitably mounted on the plate **28**. Preferably the arrangement is such that the actuating member may be slid off the pin when the plate is removed from the casing. Adjacent the upper end and on the inner surface of the actuating member **26** is a stop member **142** of suitable shape engageable with the casing at the marginal edge of the opening **24** for limiting outward movement of the actuating member. Preferably and as herein shown the actuating member does not have positive connection with the driving member **70** but loosely engages the latter to facilitate movement of the actuating member to a position for replacing an expended flint, as mentioned above, and to facilitate removal of the actuating member from the pin **140**.

It will be recalled that the valve of the fuel tank is opened and the friction wheel rotated both in response to advancing movement of the driving member **70**. However, the valve element and the friction wheel assume different kinds of movement through the range of movement of the driving member. During the same advancing movement of the driving member in any given operation of the lighter the valve is opened before the friction wheel is rotated. This relationship is of importance in connection with two features of the invention, one of which is that since the valve is opened before the friction wheel is rotated fuel will have had an opportunity to flow upwardly from the burner tip so that it can be ignited when the friction wheel is rotated, and the other is that rotation of the friction wheel is momentarily frictionally retarded during an operation of the lighter whereby it is later rotated rapidly when the retarding force is overcome. The driving member **70** is rigid and hence raising movement of the valve stem begins substantially immediately upon the first increment of movement of the driving member and hence the valve begins to open immediately to allow a stream of fuel to flow upwardly out of the burner tip to be ignited when the friction wheel is later rotated.

The friction between the flint and friction wheel tends to prevent rotation of the wheel, and the effect is transmitted or propagated through the means for rotating the wheel including the rack arm **132**, and the provision of the yieldable spring member **88** enables the friction wheel to be held against rotation by the friction in the fore portion of the movement of the driving member **70**. During such movement of the driving member, the spring member **88** is bowed upwardly as shown in Fig. 4 and tensioned, to thereby store energy which is later utilized to move the rack as hereinafter explained. Just before the driving member moves into its forward limit position (Fig. 4), the pin **151** strikes against the adjacent edge of the rack arm **132**, and exerts a rotational force thereon sufficient to overcome the frictional resistance between the flint and the friction wheel and initiate rotation of the rack arm **132**. The spring member then resumes its former shape and actuates the rack **130** with consequent continued rotation of the friction wheel. When the static friction is thus overcome, the sudden release of energy stored in the spring member causes rapid rotation of the friction wheel independently of the movement of the driving member **70**. The speed of rotation of the rack is greater than if the spring member **88** were not used and the rotation was that produced by the movement of the member **26**, as moved by the hand of the user. The speed of rotation of the friction wheel is substantially independent of the speed of movement of the member **26** so long as the latter is held against retracting movement. In the operation of the lighter the user may thus impress a usual force on the actuating member **26** without regard to any necessity for rapidly rotating the friction wheel, and in response to a usual and substantially uniform movement of the actuating member **26** by the hand or thumb, the rapid rotation of the friction wheel, after the initial retarding effect, is produced.

I claim:

1. In a lighter, a fuel tank, means for conducting fuel from the tank, a flint, a friction element in contact with said flint and movable in an advancing direction to produce sparks and direct them toward fuel issuing from said tank, means yieldingly urging said flint into engagement with said friction element and establishing a static friction therebetwen constituting the principal restraint against movement of said friction element, a resilient element drivingly connected to said friction element, and manually movable actuating means operatively connected to said resilient element and resiliently acting therethrough during the fore portion of advancing movement of said actuating means to urge advancing movement of said friction element against the restraining force of the static friction between said friction element and said flint, said actuating means having a portion drivingly engaging said friction element upon completion of the fore portion of advancing movement of said actuating means to positively move said friction element in advancing direction.

2. In a lighter, a fuel tank, means for conducting fuel from the tank, a flint, a friction wheel in contact with said flint and rotatable in an advancing direction to produce sparks and direct them toward fuel issuing from said tank, means yieldingly urging said flint into engagement with said friction element and establishing a static friction therebetween constituting the principal restraint against rotation of said friction wheel, a pinion, one-way clutch means interconnecting said pinion and said friction wheel, a movable rack cooperable with said pinion, a resilient leaf spring drivingly connected to said friction wheel through said rack, pinion, and clutch, and a manually movable actuating element operatively connected to said resilient element and resiliently acting therethrough during the fore portion of advancing movement of said actuating element to urge advancing movement of said friction wheel against the restraining force of the static friction between said friction wheel and said flint, said actuating means having a portion drivingly acting against said friction wheel through said rack, pinion and clutch upon completion of the fore portion of advancing movement of said actuating element to positively rotate said friction wheel in advancing direction.

3. A flint wheel actuating mechanism for a lighter of the type having a flint, a flint wheel in contact with the flint and rotatable in an advancing direction to produce sparks, and means yieldingly urging the flint toward the flint wheel and establishing a static friction therebetween constituting the principal restraint against rotation of the flint wheel, said mechanism comprising a driving element drivingly connected to the flint wheel for advancing rotation of the latter, a resilient element drivingly connected to said driving element, a manually movable actuating element operatively connected to said resilient element and resiliently acting therethrough during the fore portion of advancing movement of said actuating element to urge advancing movement of said driving element and advancing rotation of the flint wheel against the restraining force of the static friction between the flint wheel and the flint, and an abutment on the actuating element engageable with said driving element upon completion of the fore portion of advancing movement of said actuating element to positively rotate the flint wheel in advancing direction.

4. A flint wheel actuating mechanism for a lighter of the type having a fuel tank, a flint, a friction element in contact with the flint and movable in an advancing direction to produce sparks, and means yieldingly urging the flint into engagement with the friction element and establishing a static friction therebetween constituting the principal restraint against movement of the friction element, said mechanism comprising a movable rack, a pinion meshing with said rack, a one-way clutch drivingly connected between said pinion and the friction element for movement of the latter in advancing direction relative to the flint upon a corresponding advancing movement of said rack, a resilient element drivingly connected to said rack, and a manually movable actuating element operatively connected to said resilient element and resiliently acting therethrough during the fore portion of advancing movement of said actuating element to urge advancing movement of said rack, pinion, and friction element against the restraining force of the static friction between the friction element and the flint, said actuating element having a portion drivingly engaging the friction element upon completion of the fore portion of advancing movement of said actuating element to positively move the friction element in advancing direction.

5. A flint wheel actuating mechanism for a lighter of the type having a rotatable sparking wheel, a flint, and means for urging said flint into engagement with said sparking wheel whereby the latter is frictionally restrained against rotation, said mechanism comprising a pivotally mounted rack, a rotatably mounted pinion meshing with said rack, a one-way clutch connected between said pinion and said sparking wheel, to rotate the latter relatively to said flint upon pivotal movement of said rack in one direction, a fixed guide, an actuating element manually slidable in said guide, a leaf spring connected at one end to said actuating element and at the other end to said rack for pivotally moving the latter in said one direction upon sliding movement of said actuating element through a predetermined distance in a direction toward said rack to flex and store energy in said spring element, the actuating element being restrained from moving the sparking wheel principally by friction established between the sparking wheel and flint, and an abutment on said actuating element engageable with said rack to initiate pivotal movement thereof prior to but only shortly before completion of said movement of said actuating element, and overcome the static friction between the friction element and flint whereupon the resilient element continues movement of the driving element at a more rapid rate than that of the actuating element.

6. In a lighter, a fuel tank, means for conducting fuel from the tank, normally closed valve means in the fuel conducting means, a flint, a friction element in contact with said flint and movable in an advancing direction to produce sparks and direct them toward fuel issuing from said tank, means yieldingly urging said flint into engagement with said friction element and establishing a static friction therebetween constituting the principal restraint against movement of said friction element, a movable driving element drivingly connected to said friction element for advancing movement thereof, a resilient element drivingly connected to said driving element, a manually movable actuating member operatively connected to said resilient element and resiliently acting therethrough during the fore portion of advancing movement of said actuating member to urge advancing movement of said friction element against the principal restraining force of the static friction between said friction element and said flint, said actuating member having a first portion engaging said valve means to open the latter in the initial portion of movement of the actuating member and a second portion drivingly acting against said friction element upon completion of the fore portion of advancing movement of said actuating member to positively move said friction element in advancing direction, and means yieldingly urging said actuating member to a retracted position.

7. A lighter comprising a fuel tank, means for conducting fuel from the tank, a flint, a friction element in contact with said flint and movable in an advancing direction to produce sparks and direct them toward fuel issuing from said tank, means yieldingly urging said flint into engagement with said friction element and establishing a static friction therebetween constituting the principal restraint against movement of said friction element, a resilient element drivingly connected to said friction element, a manually movable actuating member operatively connected to said resilient element and resiliently acting therethrough during the fore portion of advancing movement of said actuating member to urge advancing movement of said friction element against the restraining force of the static friction between said friction element and said flint, and rigid means on said actuating member positioned to drivingly engage said friction element upon completion of the fore portion of advancing movement of said actuating member to positively move said friction element in advancing direction.

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