

May 22, 1956

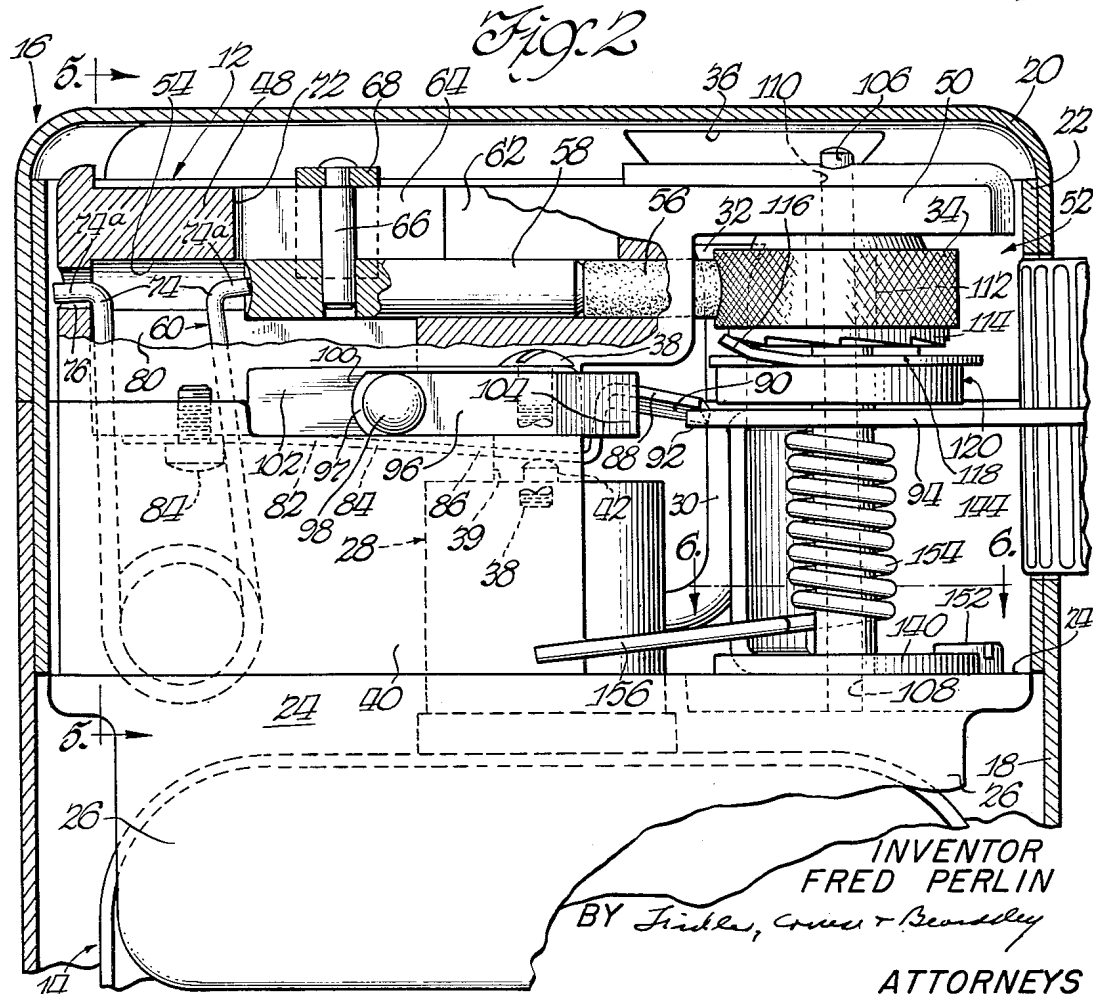
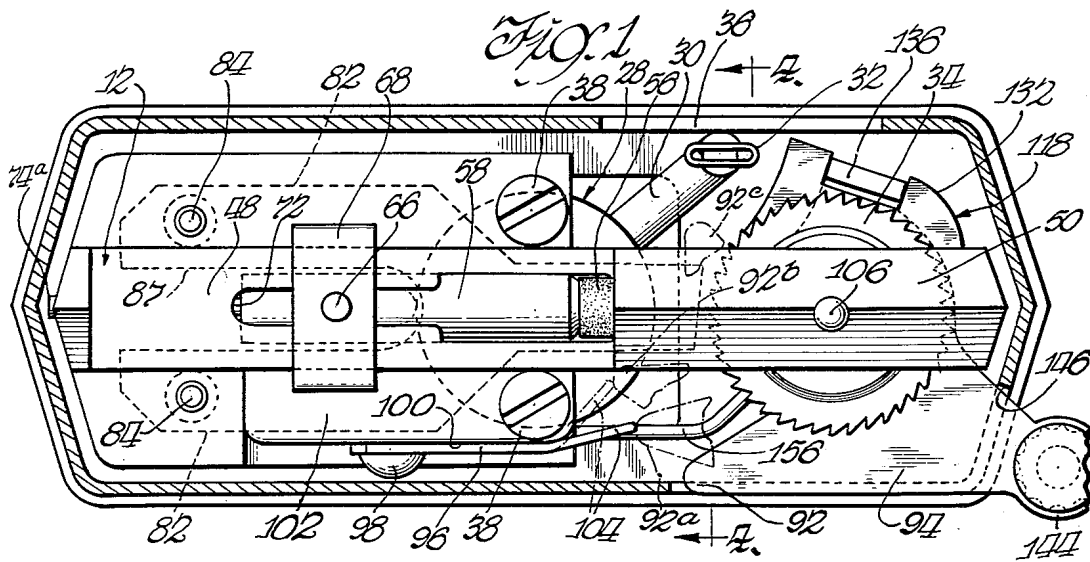
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2,746,277

LIGHTERS

Filed Sept. 8, 1953

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

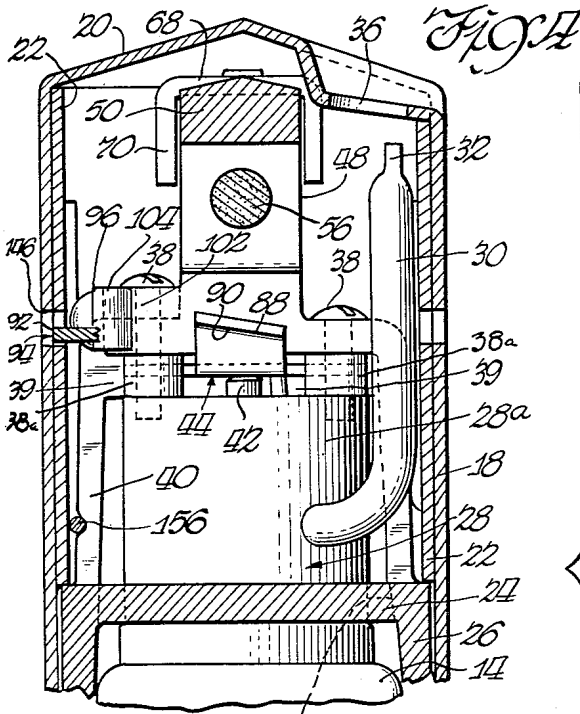


Fig. 1

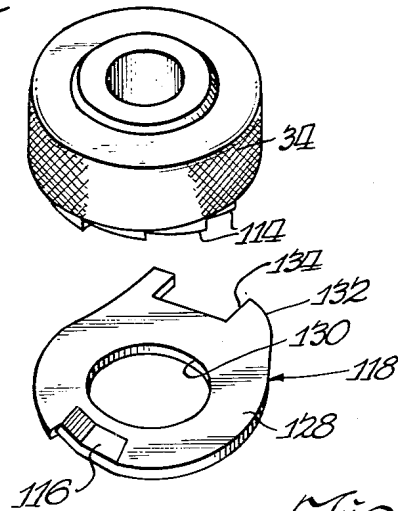


Fig. 2

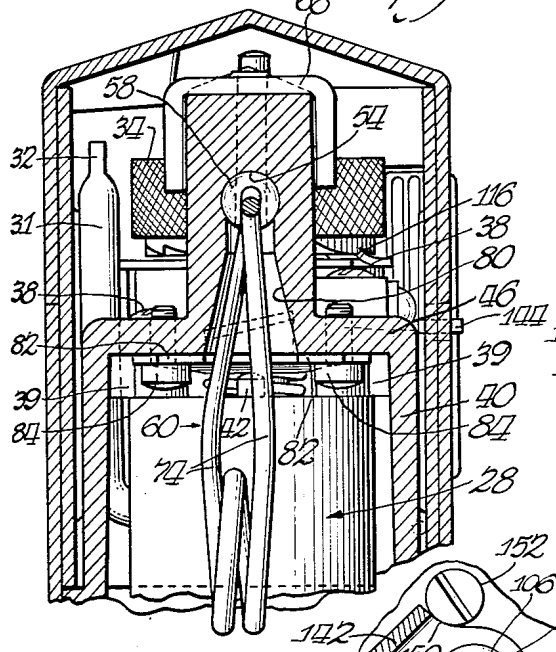
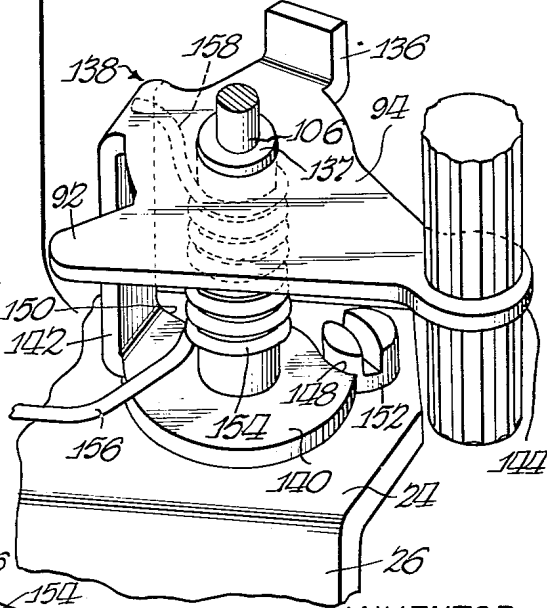
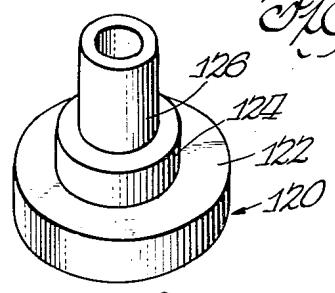


Fig. 6

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2,746,277

LIGHTERS

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Application September 8, 1953, Serial No. 378,764

5 Claims. (Cl. 67—7.1)

This invention relates to lighters of the type commonly employed for lighting cigars and cigarettes and has to do particularly with a lighter adapted to employ as a fuel a normally gaseous material which is stored in the lighter either as a compressed or liquefied gas and burned in gaseous form.

An object of the present invention is to provide a new and improved lighter of the aforementioned type.

Another object is to provide a lighter having an improved mechanism for controlling the flow of fuel from the fuel tank.

Another object is to provide a lighter having an improved mechanism for striking and throwing a spark into fuel issuing from the tank.

Still another object is to provide a lighter having an improved mechanism whereby the operator may readily control the flow of fuel from the tank and at the same time strike and throw a spark into fuel issuing from the tank.

Another object is to provide a lighter having a mechanism for simultaneously controlling the flow of fuel from the tank and igniting the fuel, which mechanism may be operated in a very simple manner by the user and may be maintained under control of the user at all stages of the operation.

Still another object is to provide a lighter having a simple and inexpensive mechanism for controlling the flow of fuel from the tank and simultaneously striking and throwing a spark in the fuel issuing from the tank.

A further object is to provide a lighter having a simple and inexpensive means for guiding and maintaining a flint in engagement with the sparking wheel.

Another object is to provide a lighter having means for imposing an acceleration action on the sparking wheel when it is manually rotated, thereby insuring that a strong, full sparking action takes place.

Still another object is to provide a lighter having means for furnishing a yieldable resistance to the manual movement of the sparking wheel, which resistance is suddenly released, thereby resulting in an acceleration of the sparking wheel and a consequent full spark production even though the user initially applies rotating force to the wheel of such a nature as would rotate the wheel too slowly to produce a strong sparking action.

Other objects and advantages will appear from the following description taken in connection with the appended drawings, wherein:

Figure 1 is a top view of a lighter constructed in accordance with the invention, with the cover of the casing removed and portions of the casing in section;

Fig. 2 is a fragmentary, side elevational view of the lighter showing the casing in section and portions of the lighter broken away and shown in section;

Fig. 3 is an exploded perspective view of the friction wheel and the rotating mechanism therefor;

Fig. 4 is a view taken substantially on line 4—4 of Fig. 1;

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Fig. 5 is a view taken substantially on line 5—5 of Fig. 2; and

Fig. 6 is a fragmentary, detail view showing an alternate position of one of the elements of Fig. 3.

Referring now in detail to the drawings, the lighter includes certain structural elements similar to the lighter disclosed in my copending application, Serial No. 333,415, filed January 27, 1953, and references to that application will be made herein in connection with certain features of construction for the purpose of eliminating as much as possible detail description of certain features of the present lighter in the present application and consequently facilitating consideration of the novel features of the present invention.

The lighter disclosed herein may be considered as having three main parts, namely, a chassis 12, a fuel tank 14 and a casing 16. The chassis 12 supports all of the operating parts of the lighter and also detachably supports the fuel tank 14. Both the chassis and fuel tank are removably contained in the casing 16. The casing 16 preferably includes a bottom portion 18 which takes the form of a relatively deep cup-like member and a cover or cap 20 which takes the form of a cup-shaped member but of lesser height than the bottom portion 18. The cover 20 is detachably retained on the bottom portion 18 by an extension or cuff 22 on the bottom portion which may conveniently take the form of a separate strip suitably secured, as by welding, to the inner surface of the bottom portion and which, when the cover is on the bottom portion, frictionally engages the inner surface of the cover or cap.

The chassis 12 preferably is so dimensioned as to frictionally engage the inner surface of the casing bottom so that the chassis and fuel tank together are retained snugly in position in the casing.

The chassis 12 preferably includes a floor 24 and spaced side skirt portions 26 depending from the side edges of the floor 24. A valve assembly 28, which may be similar to the corresponding assembly of my aforesaid copending application, is provided and includes a body 28a secured in the upper deck 46, a suitable aperture 24a being provided through which the valve body 28a extends.

The fuel tank 14 preferably is connected to the valve body 28a in a manner similar to that described in my aforesaid application. Leading from the valve body 28a is a burner tube 30, which is connected to the fuel tank through a valve (not shown) terminating upwardly in a burner tip 32 for conducting fuel from the fuel tank to a position for ignition by the spark-producing mechanism hereinafter described. The burner tube is disposed below an opening 36 in the cover 20 and so positioned that the flame produced upon ignition of the gas issuing from the burner projects through the opening for lighting a cigar or cigarette. The valve body 28a may be mounted in a suitable manner such as by screws 38 extending downwardly through screw holes 39 in the upper deck 46 and through spacers 38a and into the valve body. The valve assembly 28 includes an upwardly projecting actuating member in the form of a plunger or rod 42 which is normally retained in depressed position by a valve closing element 44 mounted on the chassis in a manner to be described later in detail. The valve closure 44 takes the form of a leaf spring normally self-biased downwardly, which functions to depress the plunger or rod 42 and close the valve (not shown) until it is lifted in the operation of the lighter as will be explained further hereinafter.

The chassis 12 includes spaced side walls 40 upstanding from the floor 24 and merging into an upper transverse deck or roof 46 which supports a flint holder or guide 48, preferably formed integrally with the remainder of the chassis. The flint guide extends longitudinally of the chassis and has an overhanging arm 50 which extends

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beyond the walls 40, deck 46 and flint holder 48 whereby the arm 50 and the portion of the floor 24 form therebetween a cavity or recess 52 in which are disposed a friction wheel 34 and the mechanism for driving the friction wheel and for opening the valve.

The flint guide 43 preferably is formed as an elongated block and has a longitudinal bore 54 in which is disposed a flint 56, the bore terminating adjacent the friction wheel 34 for enabling the flint 56 to project through the end of the bore and into engagement with the friction wheel 34. Preferably the bore 54 is of generally cylindrical shape and of such diameter as to accommodate and guide flints of conventional size and shape. A flint follower 58 is disposed in the bore for engagement with a flint 56 and the flint is yieldingly urged into engagement with the friction wheel 34 by a feeding spring 60 acting through the flint follower 58. The flint holder 48 preferably is provided with an upwardly opening slot or groove 62 opening into the bore 54 and through the top of the flint holder for facilitating insertion of a new flint after expenditure of a previous flint, upon retraction of the flint follower 58. The slot or groove 62 is of course of sufficient width to enable insertion of the flint. The flint holder is also provided with a second and narrower upwardly opening slot or groove 64 for reception of a pin 66 secured in the flint follower by any suitable means such as by pressfitting it in an aperture in the flint follower. Secured on the upper end of the pin 66 is a transverse piece or yoke 68 of suitable shape and which may include lateral legs 70 (Figs. 4 and 5). The transverse piece or yoke 68 serves as a convenient element for engagement of the thumb of the user for retracting the flint follower and it preferably engages or rides on the top surface of the flint holder. The end wall 72 of the slot 64 serves as an abutment or stop means for the pin 66 for limiting the retracting movement of the flint follower.

The feeding spring 60 is in the form of a coil having its ends extended to provide normally divergent arms 74, each having a bent-out portion 74a, one of which is inserted in an aperture 76 at and communicating with the end of the bore 54 for anchoring and supporting the spring in place. The other end 74a engages the rearward or trailing end of the flint follower 58, which preferably is formed with a concave surface 78 for receiving the end of the spring. The spring 60 is suitably positioned in the chassis as by extending it downwardly through a slot 80 of the flint holder and between the side walls 40 of the chassis. The spring 60 is formed so that the arms 74 thereof normally are self-biased outwardly and when in position in the lighter are closed together so as to tension the spring. Thus the arms serve to yieldingly urge the flint follower 58, and thus the flint, toward the friction wheel 34, and thus maintain the flint in engagement with the wheel.

The valve closing element 44 referred to above includes rearwardly extending leg portions 82 (see Fig. 1) which are secured to the undersurface of the roof 46 by suitable means such as screws 84. The legs 82 define therebetween a slot 87 for permitting the spring 60 to pass therethrough. The legs 82 merge into a single central arm 86 which is disposed to extend across the end of plunger or rod 42 and to normally engage the latter. The free end of the central portion 86 is preferably of angular form having a raised terminal portion 88 which has a transversely inclined under-surface 90 forming a camming surface for engagement by the projection 92 of an actuating member 94 which will be described in detail later, upon rotation of the latter in rotating the friction wheel and otherwise operating the lighter. In the operation of the lighter the terminal portion 88 is lifted, enabling the valve (not shown) to open and permit the flow of fuel therethrough in a manner described in detail in my aforesaid copending application.

Also mounted on the chassis 12 is a retarding element or "snubber" 96 which serves to produce a temporary

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retarding action on the rotation of the friction wheel during the initial portion thereof with a subsequent abrupt release of the retarding force, thus enabling the latter portion of the rotation a rapid rotation of the friction wheel. The manner in which the retarding member or snubber functions will be described in detail hereinafter. The snubber 96 takes the form of a leaf spring anchored at one end 97 by suitable means such as a drive screw 98 and extending along and in engagement with a vertical side surface 100 formed on a suitable portion of the chassis such as on a ledge or projection 102. The other end 104 of the snubber extends beyond the adjacent portion of the chassis and into the cavity or recess 52 in a position in which it lies in the path of movement of the projecting portion or nose 92 on the actuating lever 94 for engagement thereby in the initial portion of the rotation of the latter. The projecting end 104 of the snubber is preferably bent inwardly (Fig. 1) for conveniently positioning it for engagement by the nose 92, as will be explained more in detail hereinafter.

The friction wheel 34 and the mechanism for driving it are mounted on a shaft 106 suitably secured in the chassis 12 for mounting the elements thereon in the cavity or recess 52 and has its lower end fitted in an aperture 108 in the lower base element or portion 24 and its upper end in an aperture 110 in the overhanging arm 50. The friction wheel 34 has a knurled peripheral surface for producing sparks from the flint as is usual in such friction wheels. The lower face of the friction wheel 34 is provided with a plurality of teeth 114 of suitable shape for engagement by a clutch finger 116 provided on a clutch member 118. The teeth 114 are arranged for rotating the friction wheel in one direction and as is usual in this kind of teeth, each is provided with an axially extending surface for engagement by the clutch finger, when rotated in one direction and an inclined surface enabling the clutch finger to ride over the teeth when it is rotated in the other direction. The friction wheel 34 and clutch member 118 are preferably mounted on a bushing member 120 having a lower, relatively large flange portion 122, a reduced bushing portion 124 thereabove and a further reduced top bushing portion 126.

The clutch member 118 is generally in the form of a washer having a flat body portion 128 formed with a central aperture 130 for receiving the bushing portion 124 when the clutch member is assembled thereon. A clutch finger 116 is cut and bent up from the body portion 128 with its free end raised up out of the plane of the body for engagement with the teeth of the friction wheel 34. The clutch member is made of spring metal and the clutch finger is enabled to yield upon application of force, tending to move it into the plane of the body, and when the force is released the clutch finger resumes its normal inclined position shown in Figs. 2 and 3. At one side of the body is a laterally projecting portion having a notch 134 for receiving an upturned projection 136 formed on the actuating lever 94 referred to above.

The friction wheel and clutch member are assembled on the bushing member 120 with the bushing portion 124 inserted in the aperture 130 in the clutch member 118 and a bore 112 in the friction wheel 34 receiving the top bushing portion 126. Preferably the teeth 114 are disposed adjacent the periphery of the wheel leaving a central portion of such diameter as to enable the friction wheel 34 to engage the upper surface of the bushing portion 124. The assembly including the bushing member, clutch member and friction wheel are mounted on the shaft 106 and this assembly is maintained in position axially of the shaft by an elongate sleeve bushing 137 on which a yoke member 138 is mounted. The yoke member 138 includes as an element thereof the actuating or driving lever 94 referred to above. The sleeve bushing 137 and yoke member rest on the base element 24 and the bushing member 120 rests on

the sleeve bushing and thus the assembly including the friction wheel and clutch member are maintained in the proper position axially of the shaft.

The yoke member 138 includes, in addition to the actuating or driving lever 94, a bottom platelike member 140 and a connecting vertical strap 142. The lever 94 and bottom portion 140 are provided with aligned openings for receiving the sleeve bushing 137. The lever 94 includes a handle 144 extending through a suitable slot 146 in the casing, which slot may conveniently be located at the parting line between the bottom portion and cover of the casing. The projection 136 may be formed integrally with the lever 94 and is of appropriate vertical height to project into the notch 134 for rotation of the clutch 118 with the lever. The parts are restrained against axial displacement so that the projection 136 remains in the slot 134. The bottom portion 140 of the yoke at one side is provided with an indentation including shoulders 148 and 150 adapted to alternately engage a screw 152 secured in the base portion 24 of the chassis for limiting the extent of rotational movement of the yoke in both directions.

The yoke 138, as will be pointed out in detail presently, is adapted to be moved between limit positions for rotating the friction wheel 34. It is normally retained in the first of the positions by a suitably yieldable and resilient means which preferably takes the form of a coil spring 154 surrounding the sleeve bushing 137 and having laterally extending arms 156 and 158. One of the arms 156 engages a fixed portion of the chassis such as one of the side walls 40 and the other arm 158 engages the yoke at a convenient location, such as the strap 142. The spring 154 urges the yoke 138 in a counterclockwise direction (Figs. 1 and 3) toward its initial position wherein the shoulder 148 engages the stop screw 152. In the actuation or operation of the lighter the user applies his thumb to the handle 144 and rotates the yoke in clockwise direction against the action of the spring 154. The rotational movement of the yoke 138 in the latter direction is limited by engagement of the shoulder 150 with the stop screw 152. Preferably the extent of rotation of the yoke is of the order of 90 degrees. It will be understood, however, that the mechanism may be arranged for permitting rotation of the yoke to any suitable extent.

During movement of the yoke 138 in advancing direction (clockwise) the nose 92 of the lever 94 engages the inclined surface 90 on the valve closing member 44 and lifts the closing member. This action permits the valve (not shown) to open as explained above. The valve (not shown) is opened before the lever 94 reaches its limit of movement, in order that gaseous fuel can flow or pass up through the burner tube 30 and out of the burner tip 32 prior to the time the sparks are produced for igniting the fuel, so that gas is issuing from the burner prior to the striking of the spark.

During rotation of the lever 94 in advancing direction, the clutch member 118 is rotated therewith by reason of the engagement of the projection 136 with the walls of the notch 134 in the clutch. Rotation of the clutch member causes the clutch finger 116 to engage one of the teeth 114 on the friction wheel 34, and rotate the friction wheel 34 in the direction explained, namely, clockwise (Figs. 1 and 3). The friction wheel 34 rubs on the flint and produces sparks in a normal manner and the relative positions of the friction wheel, flint and burner tip (Fig. 1) cause the sparks to be thrown into the gas issuing from the burner tip, thus igniting the fuel. The flame produced extends upwardly through the top opening 36 in the casing cover. Upon release of the handle 144 by the user, the spring 154 rotates the yoke 138 in a retracting direction, which carries the clutch 118 also in a retracting direction. The friction wheel 34 is normally restrained against rotation in retracting direction by friction engagement therewith by

the flint 56, and the clutching finger 116 rides over the teeth on the friction wheel.

In the actuation of the lever 94 by the hand or thumb the movement of the hand is more or less uniform in speed. Also the rate of movement of the hand and thumb is normally not great. The present invention includes means in the form of the snubber 96 for retarding the rotational movement of the lever 94 in the initial portion of the rotation thereof and thereafter releasing the retarding force suddenly, so that the friction wheel is accelerated and rotated rapidly in the latter portion of hand movement. The result is that the friction wheel, due to its relatively rapid rotation, produces appreciably more spark than if the friction wheel were rotated relatively slowly throughout its range of movement as by the normal and uniform movement of the thumb.

The spring 96 which forms the "snubber" projects into the cavity 52 to a position (Fig. 1) where it lies in that path of movement of the nose 92 for engagement thereby in the intermediate portion of the rotational movement of the lever 94. The spring 96 is engaged by the lever as the latter is rotated from its initial position and produces a yielding resistance to the movement of the lever. The position wherein the nose 92 first engages the snubber or spring is shown at 92a. Upon further rotational movement of the lever 94 the end portion 104 of the snubber yields and moves toward its broken line position (Fig. 1) and at about that position wherein the nose 92 is approximately at the position 92b, the nose rides past the "snubber." The "snubber" thus produces a yielding, retarding action and the normal reaction on the part of the user, when the hand meets with resistance, is to apply additional force. Thus, when the nose rides past the "snubber" and the retarding force is released, the sudden and relatively great force or pressure applied by the hand results in rapid rotation of the friction wheel, which action produces a substantially greater spark than would be produced if the friction wheel were rotated relatively slowly and more or less uniformly in speed by the movement of the hand.

As the nose 92 engages the "snubber" the latter bears against the surface 100 and the end portion 104 flexes about the end of the surface as a fulcrum. After the nose passes the "snubber," the end portion 104 flexes back into its initial and normal position shown in full lines in Fig. 1. In the return or retracting movement of the nose 92 after operation of the lighter, the nose again engages the "snubber" and the latter is enabled to flex about the screw 98 as a fulcrum, and after the nose passes the "snubber" in retracting direction, the "snubber" again flexes back into engagement with the surface 100 to its normal and initial position.

After the nose 92 passes the "snubber" in its forward movement it engages the inclined surface 90 of the valve closing member 44 and raises it to permit the valve to open in the manner referred to above. The valve thus opens before the lever 94 reaches its ultimate position in advancing direction to enable gaseous fuel to issue from the burner tip before the sparks are produced. The nose 92 reaches an ultimate position in advancing direction approximately as shown at 92c and at all times between the time that the nose engages the inclined surface 90 and the time it reaches its ultimate position, a portion of the lever is in engagement with the surface 90 and retains the valve closure member raised (with the valve open) until the lever 94 is again permitted to retract under the action of the return spring 154.

I claim:

1. A lighter comprising a fuel tank, means forming a fuel passage from the tank terminating in a burner tip, a rotatable sparking wheel, a flint cooperating with the sparking wheel, a drive member rotatable between a retracted position and an advanced position, means connecting the drive member and sparking wheel in advancing direction, and spring means having a portion disposed

in the path of the drive member and engaged thereby in both directions of movement through only a portion of the movement in each direction and positioned for displacement out of the path by predetermined movement of the drive member, the spring means exerting a yielding retarding force in each direction but substantially greater in advancing direction than in retracting direction.

2. A lighter comprising a fuel tank, means forming a fuel passage from the tank terminating in a burner tip, a rotatable sparking wheel, a flint cooperating with the sparking wheel, a drive member rotatable between a retracted position and an advanced position, means connecting the drive member and sparking wheel in advancing direction, said drive member having a radial projection, and a leaf spring having an end portion extending into the path of said projection operative for yieldingly retarding the drive member in a portion of its movement in advancing direction and releasing it before it reaches full advanced position.

3. A lighter comprising a fuel tank, means forming a fuel passage from the tank terminating in a burner tip, a rotatable sparking wheel, a flint cooperating with the sparking wheel, a drive member rotatable between a retracted position and an advanced position, means connecting the drive member and sparking wheel in advancing direction, said drive member having a radial projection, and a leaf spring having a first end portion extending into the path of said projection, said leaf spring being fastened at a second end portion to a frame element and fulcrumed by a portion of said element at a point between said first and second end portions such that said first end portion acts as a relatively short lever arm about the fulcruming frame portion against advancing movement and the leaf spring as a whole acts as a relatively long lever arm about the second end portion against retracting movement.

4. A lighter comprising a chassis, a fuel tank, means forming a fuel passage from the tank terminating in a burner tip, a valve in the fuel passage and having an outwardly extending operating element, a valve closer engaging said operating element and biasing it to closed position, a rotatable sparking wheel, a flint cooperable with the sparking wheel, a drive member on the chassis generally in the form of a plate mounted on a vertical axis and rotatable between a retracted position and an advanced position, and means connecting the drive mem-

ber and sparking wheel in advancing direction, said drive member having a radial projection and said valve closer having a portion disposed in the path of said projection and an inclined surface engaged by said projection in advancing direction whereby the valve closer is lifted for opening the valve, said projection having such circumferential extent and consequent engagement with the valve closer that the latter is maintained in lifted position with the valve remaining open through the terminative portion of the movement of the drive member in advancing direction.

5. A lighter comprising a chassis, a fuel tank, means forming a fuel passage from the tank terminating in a burner tip, a valve in the fuel passage with an outwardly exposed operating element adjacent the top of the chassis, a valve closer urging the operating element to closed position, a rotatable sparking wheel and a flint cooperable therewith, a drive member on the chassis generally in the form of a plate mounted for rotation on a vertical axis, the drive member having a radial projection with a substantial planar extent, a leaf spring mounted on the chassis with a flexible end in the path of said projection effective for yieldingly retarding the drive member and positioned for releasing it before it reaches full advanced position, said valve closer having an extended end portion in the path of said projection and having an inclined surface engageable thereby for lifting the closer and opening the valve, said valve closer and planar portion being so relatively dimensioned and positioned that the valve is opened in advancing movement of the drive member and retained open to the full advanced position thereof.

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