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PYROPHORIC ELEMENT FEEDING MECHANISM FOR LIGHTERS

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1 Claim. (Cl. 67-7.1)

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This invention relates to a mechanism for feeding the pyrophoric element in lighters.

In the lighters, as heretofore proposed, the upper edge of the metal follower, whenever substitution of a new pyrophoric element is necessary, contacts the abradant-surfaced wheel. This contact of the metal follower with the abradant surface of the wheel causes gradual impairment of such surface, and in a comparatively short period of time complete destruction thereof, thereby necessitating replacement of the abradant-surfaced wheel.

An object of the present invention is to provide a lighter wherein the feed mechanism is capable of positively advancing the pyrophoric element toward the abradant-surfaced wheel, but when substitution of a new pyrophoric element is necessary, cannot be moved into contacting engagement with said wheel.

Another object of the present invention is to provide a lighter wherein the feed mechanism for the pyrophoric element includes a movable follower actuable by rotative movement of a convolute member.

A further object of the present invention is to provide a lighter in which the follower supporting a pyrophoric element is urged relative to an abradant-surfaced wheel by rotative movement of a resilient convolute member.

A still further object of the present invention is to provide a feed mechanism for a pyrophoric element in a lighter which is extremely efficient in action and simple in structure.

Other objects and advantages will become apparent from the following description.

An embodiment of the invention is illustrated by way of example in the accompanying drawings, wherein:

Figure 1 is a side elevational view, with parts in section and parts broken away, showing the pyrophoric element feeding mechanism of the present invention.

Figure 2 is a sectional view taken on the line 2-2 of Figure 1.

Figure 3 is an enlarged exploded view of the pyrophoric element, follower, and rotatable resilient convolute member.

Referring to the drawings, the numeral 10 designates the receptacle containing fuel and having a wick 11 suitably mounted therein, said wick having an end projecting through the top wall 12 of said receptacle. Rotatably mounted on a shaft 13 carried by the side walls of the receptacle is an abradant-surfaced wheel 14. Arranged in cooperative association with the wheel 14 is a pyrophoric element 15.

Interposed within the receptacle 10 and supported between the top wall 12 and the bottom wall 16 of said receptacle is an upstanding hollow housing or tube-shaped member 17. The

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tube-shaped member 17 is provided with a boss 18 projecting from a side thereof, said boss having a groove 19 extending longitudinally therealong.

Arranged within the tube-shaped member 17 and mounted for rotative movement is a feeding mechanism for feeding the pyrophoric element 15 relative to the abradant-surfaced wheel 14. Such feeding mechanism includes a resilient convolute member 26 and a follower 31 mounted in cooperative association with said member and actuable thereby. The resilient convolute member 26 comprises a head 27 provided with a kerf 28 and a shank 29. Arranged upon the shank 29 and suitably spaced from each other are collars 24 and 25, the collar 24 abutting the inner face of the head 27. Surrounding the end of the shank 29 and having an end supported on and secured to the upper surface of the collar 25 is an upstanding resilient convolute element or spiral spring 30. As shown in Figure 1, the boss 18 terminates at a point just below the top wall of the tube-shaped member 17 to thereby form a seat 35 within which the upper end of the convolute element or spiral element 30 is received or bears against.

The follower 31 carries a transversely disposed pin 32 extending obliquely therethrough and mounted off-center so that one of the projecting ends of the pin is longer than the other projecting end. As shown in Figures 1 and 2, the follower 31 rests upon the end of the shank 29 and is supported thereby, and the transversely disposed pin 32 is interposed in a space intermediate a pair of convolutions of the resilient convolute element or spiral spring 30 with the longer projecting end of the pin 32 interengaging the groove 19 in the boss 18 of the tube-shaped member 17 and the shorter projecting end of the pin 32 engaging the inner wall of said tube-shaped member 17 opposite said groove. Concentrically mounted within the convolutions of the upstanding resilient convolute element or spiral element 30 and having an end resting upon and supported by the end of shank 29 is the pyrophoric element 15. This mounting of the pyrophoric element 15 enables the convolutions of the spiral element 30 to act as a guiding means therefor.

Extending transversely through the end wall 20 of the receptacle 10 and through the side portion of the bottom wall 16 is a releasable headless threaded bolt 21. The bolt 21 is provided at its headless end with a kerf 22 for the reception of a screw driver or like element therein, and has a portion 23 of less cross-sectional area than the threaded portion thereof, which portion 23 is adapted to be received within the space defined by the pair of spaced collars 24 and 25 of the resilient convolute member 26. It is to be noted that the bolt 21 may be withdrawn by inserting a

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screw driver in the kerf 22 and rotating the screw driver in the proper direction, and may be mounted in engaging position by inserting the bolt 21 in the complementary openings in the side wall 20 and the bottom wall 16 of the receptacle 10 and rotating the screw driver in the opposite direction.

The bottom wall 16 of the receptacle 10 is provided with an opening 33 for the insertion of the pyrophoric element 15, the follower 31, and resilient convolute member 26 therethrough, said opening 33 having a notched portion 34 forming a seat for the head 27 of the convolute member. Likewise, the convolute member 26 and follower 31 may be withdrawn through the opening 33 when substitution of a new pyrophoric element 15 is desired. When the pyrophoric element 15 and resilient convolute member 26 are initially positioned within the tube-shaped member 17 and locked in position through the medium of the end of the headless-threaded bolt 21 being advanced to the point such as to be received within the space defined by the pair of spaced collars 24 and 25, the convolutions of the resilient convolute element or spiral spring 30 are placed under a slight tension.

With reference to the follower 31, it is to be noted that the transversely disposed pin 32 engages the inclined shoulder 37, Figure 1, contiguous to the groove 19 in the boss 18 when the follower has been advanced to its upper limit of travel through the tube-shaped member 17, such shoulder acting as a stop for the pin 32. When the pin 32 is in abutting engagement with the shoulder 37, the upper edge of the follower 31 will be just flush with the upper edge of the top wall 12, thereby preventing contact of the follower with the abradant surface of the wheel 14.

In operation of the mechanism with the parts as shown in Figure 1, the operator inserts his finger nail in the kerf 28 of the head 27, and rotates the head in the direction to cause advancement of the pyrophoric element 15 relative to the peripheral surface of the abradant-surfaced wheel 14. The rotation of the head 27 causes the shank 29 to impart rotative movement to the spring 30, and travel of the follower 31 along a longitudinal linear path through the intermediary of the projecting pin 32 moving upwardly between the convolutions of the coil spring 30 in engagement with the groove 19, resulting in the pyrophoric element 15 carried by the following 31 to travel upwardly through the tube-shaped member 17. As the pin 32 moves upwardly through the spaces intermediate the convolutions of the spring 30, the convolutions underneath the pin 32 are placed under tension, which tension acts to give a positive effective upward movement of the pyrophoric element 15 and maintain the upper edge of the pyrophoric element in engaging contact with the abradant surfaced wheel 14. This periodic rotation of the head 27 is continued until all the pyrophoric element 15 has been used up. This is apparent when the top of the follower 31 is just flush with the upper surface of the top wall 12 of the receptacle 10.

When substitution of a new pyrophoric element 15 is necessary, the operator inserts a screw driver in the kerf 22 of the headless bolt 21 and turns same in the proper direction to cause

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withdrawal of such bolt. With the bolt 21 withdrawn, the operator withdraws the resilient convolute member 26 and the follower 31 from the tube-shaped member 17. The operator then positions the follower 31 upon the shank 29 of the convolute member 26 so that the pin 32 extends transversely through a space between a pair of the convolutions of the spiral spring 30 with the longer projecting end arranged on the side corresponding to the groove 19 of the tube-shaped member 17, whereupon a new pyrophoric element 15 is inserted through the top of the spiral spring 30 and allowed to drop until the lower end thereof rests upon the upper edge of the follower 31. With the follower 31, and pyrophoric element 15 thus assembled upon the convolute member 26, the operator inserts same in the tube-shaped member 17 through the opening 33, and while holding same in assembled position, re-inserts the threaded bolt 21 until the projecting end 23 engages the space intermediate the collars 24 and 25.

I claim:

In a lighter including a fuel-containing receptacle, the combination with a rotatable abradant surfaced wheel and a pyrophoric element, of a mechanism for feeding said element relative to said wheel, said mechanism including a hollow, cylindrical tube, there being a longitudinally-extending groove along the inner face of said tube, a pyrophoric feeding means arranged within said tube and mounted for rotative movement, said means including a head, a shank projecting from the inner face of said head, and a spring having a plurality of convolutions therealong carried by said shank, a follower supporting said pyrophoric element arranged concentrically within the convolutions of said spring and resting upon said shank, said follower having a transversely-projecting means embodying a pin in co-acting engagement with the space intermediate a pair of said convolutions and having an end thereof extending into said groove, means on said head for applying rotative movement thereto to thereby impart rotative movement to the spring and travel of the follower along a longitudinal, linear path through said tube, means embodying a shoulder on said groove, co-acting with said transversely-projecting pin for limiting the travel of said follower, and means embodying a bolt carried by said receptacle and inter-engaging said tube and said head for holding the tube and pyrophoric feeding means in assembled relation within said receptacle.

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