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PYROPHORIC LIGHTER

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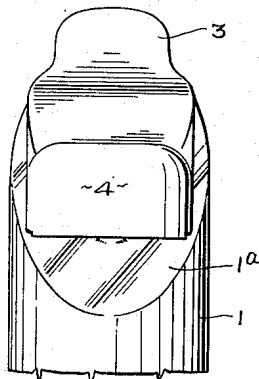


FIG. 3.

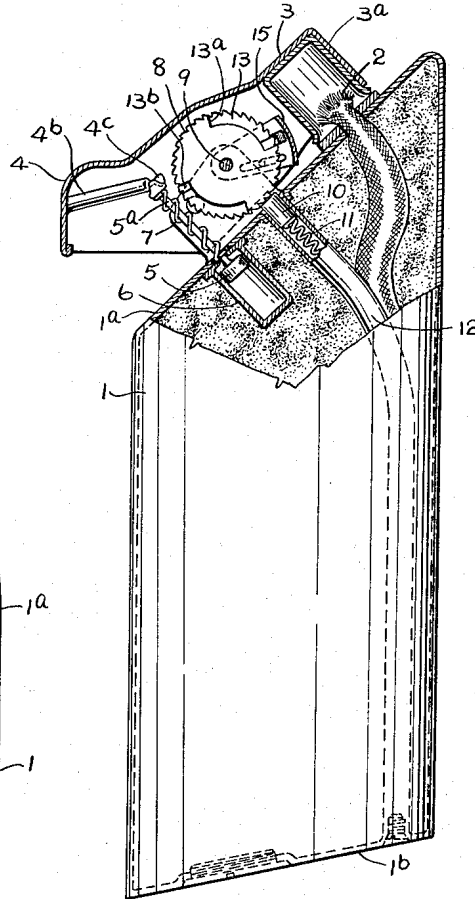


FIG. 1.

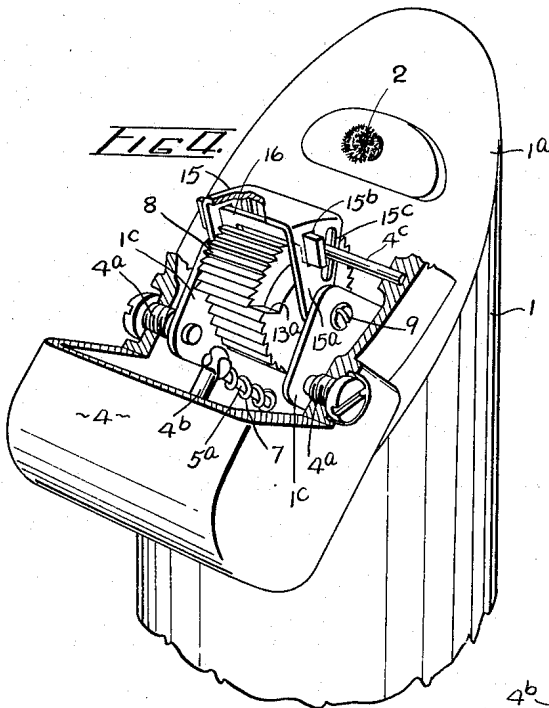


FIG. 4.

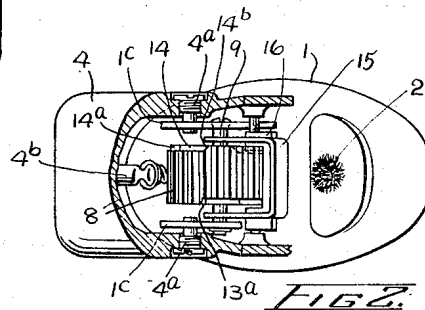


FIG. 2.

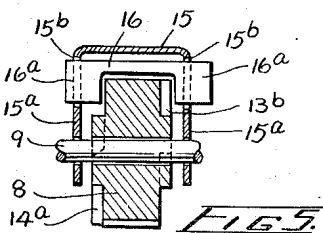


FIG. 5.

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PYROPHORIC LIGHTER

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4 Claims. (Cl. 67-7.1)

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This invention relates to a pyrophoric lighter. An object of the invention is to provide a cigarette lighter having the finger piece and the snuffer in one integral piece enclosing the working mechanism.

Another object is to provide a lighter which is sturdy, neat and reliable.

In the drawings which illustrate the invention, and in which like reference numerals indicate like parts:

Fig. 1 is a side view, partly in section, of a cigarette lighter;

Fig. 2 is a top view of the cigarette lighter shown in Fig. 1 with the snuffer broken away;

Fig. 3 is a rear view of the upper portion of the cigarette lighter shown in Figs. 1 and 2;

Fig. 4 is a perspective view of the upper portion of the cigarette lighter with the snuffer broken away and the finger piece depressed; and

Fig. 5 is a fragmentary sectional view taken through the friction wheel of the lighter.

The lighter illustrated has a fuel-containing casing 1 with upper and lower ends 1a and 1b sloping downwardly from the front of the casing. A wick 2 extends through the upper end 1a of the casing and is normally covered by a cylindrical cap 3a of a snuffer 3, the snuffer forming an integral part of a finger piece 4 which is pivotally mounted on the casing by means of pivot pins 4a journalled on ears 1c on the upper end 1a of the casing. Under the finger piece and rigidly secured to its rear wall is a post 4b having a neck 4c at its free end, and grasping the post 4b at the neck 4c is a bifurcated stem 5a of a plunger 5. The plunger 5 works in a cylindrical cup 6 within the casing 1 at the upper end thereof, and is normally biased to its uppermost position by a spring 7 which is in compression between the upper end of the cup 6 and the bifurcated end of the stem 5a. Thus, the spring 7 normally holds the finger piece 4 in the position shown in Figs. 1, 2 and 3, with the snuffer 3 covering the wick 2.

A friction wheel 8 having an irregular peripheral surface is journalled on the ears 1c by means of a pin 9 located forwardly of the pins 4a. A pyrophoric element 10 is urged into frictional engagement with the peripheral surface of the friction wheel by means of a spring 11 which is in compression within a tube 12 inside the casing 1a, the element 10 projecting from an opening in the end 1a of the casing. The two side surfaces of the friction wheel 8 are provided with ratchet formations. Thus, the side of the frictional wheel that is visible in Fig. 1 has, adja-

cent the periphery of the wheel, two arcuate depressions 13, one end 13a of each depression having an abrupt face forming a ratchet tooth, and the other end of the depression having a face 13b inclined about 45° to the side surface of the friction wheel. The other side surface of the friction wheel has a pair of arcuate depressions 14 similar to the depressions 13 and having abrupt tooth surfaces 14a at one end and inclined surfaces 14b at the other end, the depressions 14 being staggered around the axis of the friction wheel relative to the depressions 13 so that, in the construction illustrated in which there are two depressions 13 and two depressions 14, each tooth 14a is one-quarter of the circumference of the friction wheel away from each tooth 13a.

A yoke member 15 has a pair of arms 15a on either side of the friction wheel 8, the arms 15a being journalled on the pin 9 so that the yoke member 15 is free to oscillate coaxially with the friction wheel 8. The arms 15a have aligned openings 15b in which a pawl bar 16 is slidably mounted, the bar 16 extending between the yoke 15 and the peripheral surface of the friction wheel 8 as best seen in Fig. 5 and being supported in the openings 15b for slidable movement in a direction parallel to the pin 9. The pawl bar 16 has at each end a pawl portion or tooth 16a, the teeth 16a being able to ride over the inclined surfaces 13b and 14b of the ratchet formations on the friction wheel but being adapted to engage the teeth 13a and 14a.

One arm 15a of the yoke has a radial slot 15c into which extends a pin 4c rigidly mounted on the finger piece 4 so that movement of the finger piece 4 causes movement of the yoke 15 through the pin and slot connection 4c, 15c.

When the finger piece 4 is pressed downwardly against the force of the spring 7, the pin 4c causes the yoke 15 to rotate in a counter-clockwise direction as viewed in Fig. 1; with the parts in the position shown in Fig. 1 the pawl tooth 16a on the far side of the friction wheel 8 is in engagement with a tooth 14a of the friction wheel so that when the finger piece is depressed the friction wheel rotates in a counter-clockwise direction against the pyrophoric element 10. The frictional movement of the friction wheel against the element 10 causes sparks which ignite the fuel on the wick 2, the wick being of course uncovered as the finger piece is depressed. The finger piece is shown in Fig. 4 in the fully depressed position. When the finger piece is released, the spring 7 forces it upwardly and the pawl teeth 16a ride over the ratchet forma-

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tions on the friction wheel 8 until the snuffer 3 again covers the wick 2, in which position a pawl tooth 16a is adapted to engage a ratchet tooth 13a the next time the finger piece is depressed.

It will be seen that on successive operations of the lighter the teeth of the pawl bar 16 engage alternately ratchet teeth on opposite sides of the friction wheel 8. The friction wheel is of course prevented from clockwise rotation as viewed in Fig. 1 by the friction between its peripheral surface and the pyrophoric element 10.

On each operation of the lighter, the friction wheel makes approximately one-quarter of a revolution. Since the pivotal axis of the finger piece 4 is not coincident with the axis of the pin 9, it is not necessary to move the finger piece through a very large arc in order to rotate the friction wheel one-quarter of a revolution, and the rotation of the friction wheel is very rapid. It will be seen that with the construction illustrated it is practical to make the finger piece and the snuffer in one integral piece which encloses the working mechanism, protecting the working mechanism and giving the lighter a neat external appearance.

It is to be understood that the form of the invention herewith shown and described, is to be taken as a preferred example of the same, and that various changes in the shape, size and arrangement of the parts may be resorted to without departing from the scope of the claims.

What I claim as my invention is:

1. A pyrophoric lighter comprising a fuel-containing casing, a friction wheel rotatably mounted on the casing and having an irregular peripheral surface, a pyrophoric element urged into frictional engagement with said surface, the friction wheel having opposite side surfaces with ratchet formations thereon, the ratchet formation on each side surface comprising a plurality of ratchet teeth at spaced apart locations around the axis of the wheel, the ratchet teeth on one side surface being in staggered relationship to the ratchet teeth on the other side surface, a yoke member rotatably mounted on the casing coaxially with the friction wheel and adapted to oscillate coaxially therewith without interfering with the frictional engagement of the friction wheel and the pyrophoric element, a pawl bar slidable in the yoke member parallel to the axis of the friction wheel and adjacent the peripheral surface of the friction wheel, the pawl bar having a first tooth adapted to engage the ratchet teeth on said one side surface of the friction wheel and a second tooth adapted to engage the ratchet teeth on said other side surface of the friction wheel, a finger piece movably mounted on the casing, a spring biasing the finger piece to one position, the finger piece being movable against the force of the spring to another position, and means coupling the yoke member to the finger piece whereby movement of the finger piece from said one position to said other position causes rotation of the yoke member in one sense, the first tooth on the pawl bar engaging a ratchet tooth on said one side surface of the friction wheel causing the friction wheel to rotate in said sense against the pyrophoric element, movement of the finger piece from said other position to said one position causing rotation of the yoke member in the opposite

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sense, the pawl bar riding over the ratchet formations until the second tooth is adapted to engage a ratchet tooth on said other side surface of the friction wheel on a subsequent movement of the finger piece from said one position to said other position.

2. A pyrophoric lighter as claimed in claim 1, in which the finger piece is pivotally mounted on the casing on an axis parallel to but distinct from the axis of the friction wheel and the yoke member, the means coupling the yoke member to the finger piece being a pin and slot connection between the yoke member and the finger piece.

3. A pyrophoric lighter as claimed in claim 2, in which a wick is provided on the casing and a snuffer for the wick is an integral part of the finger piece.

4. A pyrophoric lighter comprising a fuel-containing casing, a wick on the casing, a finger piece pivotally mounted on the casing and having an integral snuffer for the wick, a spring biasing the finger piece to one position in which the snuffer covers the wick, the finger piece being movable against the force of the spring to another position in which the snuffer uncovers the wick, a friction wheel rotatably mounted on the casing on an axis parallel to but distinct from the axis of the finger piece, the friction wheel having an irregular peripheral surface, a pyrophoric element urged into frictional engagement with said surface, the friction wheel having opposite side surfaces with ratchet formations thereon, the ratchet formation on each side surface comprising a plurality of ratchet teeth at spaced apart locations around the axis of the wheel, the ratchet teeth on one side surface being in staggered relationship to the ratchet teeth on the other side surface, a yoke member rotatably mounted on the casing coaxially with the friction wheel and adapted to oscillate coaxially therewith without interfering with the frictional engagement of the friction wheel and the pyrophoric element, the yoke member providing a first pawl portion adapted to engage the ratchet teeth on said one side surface of the friction wheel and a second pawl portion adapted to engage the ratchet teeth on said other side surface of the friction wheel, and a pin and slot connection between the yoke member and the finger piece whereby movement of the finger piece from said one position to said other position causes rotation of the yoke member in one sense, the first pawl portion engaging a ratchet tooth on said one side surface of the friction wheel causing the friction wheel to rotate in said sense against the pyrophoric element, movement of the finger piece from said other position to said one position causing rotation of the yoke member in the opposite sense, the pawl portions riding over the ratchet formations until the second pawl portion is adapted to engage a ratchet tooth on said other side surface of the friction wheel on a subsequent movement of the finger piece from said one position to said other position.

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