

Aug. 30, 1932.

W. J. BUTLER ET AL

1,874,892

LIGHTER

Filed May 10, 1929

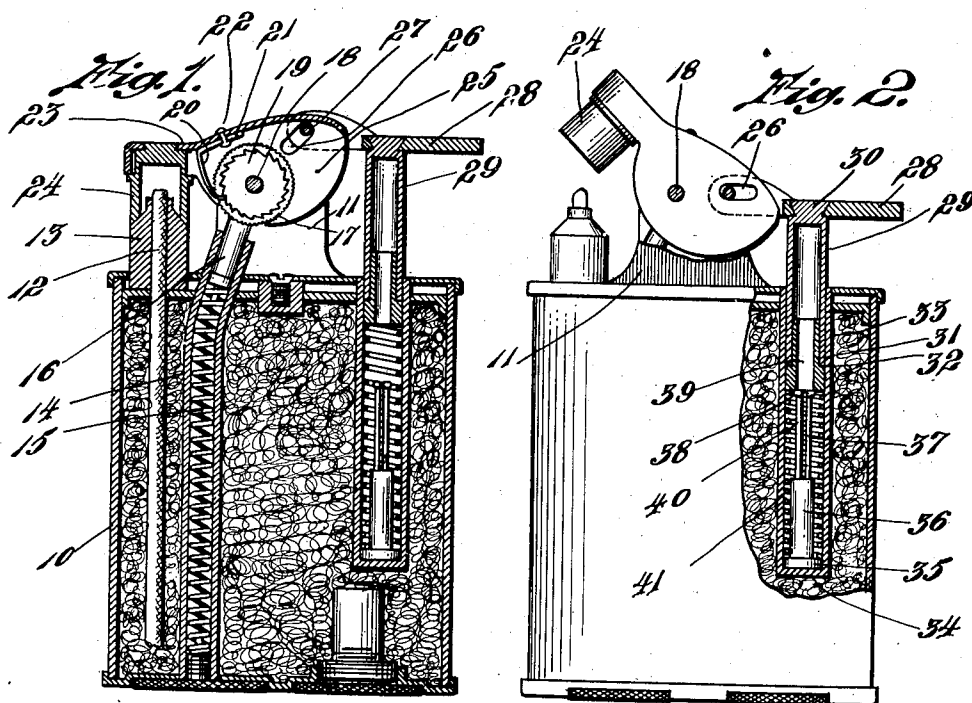
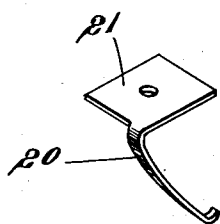


Fig. 6.

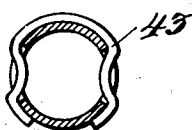


Fig. 4.

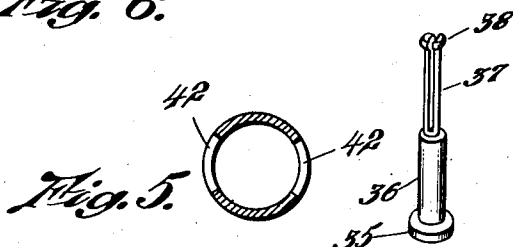


Fig. 5.

Fig. 7

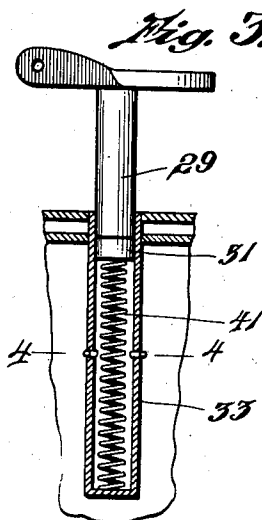


Fig. 3.

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## UNITED STATES PATENT OFFICE

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## LIGHTER

Application filed May 10, 1929. Serial No. 361,916.

This invention relates to a pocket lighter of the pyrophoric type and has for its object to provide a momentary resistance in the path of movement of the operative parts of a friction wheel which upon the application of additional pressure will yield and cause a sudden release of this resistance to provide a snap or increased speed of the friction wheel to positively throw the sparks into engagement with the wick.

A further object of the invention is to provide a yielding means to interrupt the stroke to operate upon the manually operable plunger to operate the friction wheel.

A still further object of the invention is to provide this interrupting mechanism so that the same will be concealed from view and not detract from the appearance of the lighter when finished.

This invention further consists in the provision of a pawl which will have sufficient inherent resiliency to eliminate the need of a separate spring on the pawl and provide a means of attachment of the pawl to the snuffer arm.

With these and other objects in view, the invention consists of certain novel features of construction, as will be more fully described, and particularly pointed out in the appended claims.

In the accompanying drawing:

Fig. 1 is a sectional view thru the lighter, illustrating the improved means of accomplishing the interrupted stroke.

Fig. 2 is a side elevation partly in section illustrating the snuffer as partially raised and the flange in position to engage the yielding means for interrupting its stroke.

Fig. 3 is a fragmental section of a modified construction for interrupting the stroke of the plunger.

Fig. 4 is a section on line 4—4 of Fig. 3.

Fig. 5 is a view similar to Fig. 4 with the resilient spring omitted.

Fig. 6 is a detailed view of the pawl for operating the ratchet wheel.

Fig. 7 is a perspective view of the resilient means placed in the path of the plunger.

It has been found in the operation of lighters that where pressure is applied against

resistance which is suddenly released or which is overcome by the amount of pressure applied with a following decrease of the resistance, the friction wheel is given an additional impetus of rotation to speed up its action and positively throw the ignited particles of the pyrophoric material against the wick to ignite the same, and we have interposed a resilient element which after receiving a certain increased amount of pressure will be moved or collapsed to permit relatively free movement of the plunger, and we have also found that a resilient pawl may be secured to the snuffer cap to engage the ratchet wheel without the necessity of providing a pivot for the pawl and an additional or separate spring for moving the same into engagement with the ratchet wheel; and the following is a detailed description of the present embodiment of the improvements illustrating the preferred means by which these advantageous results may be accomplished:

With reference to the drawing, 10 designates the casing of fuel reservoir with bearing standards 11 extending upwardly therefrom. A wick 12 extends from the casing thru a suitable support 13 and a pyrophoric guide tube 14 extends thru the casing with a spring 15 forcing the pyrophoric material 16 into engagement with the friction wheel 17 rotated about shaft 18 by means of a ratchet wheel 19 and pawl 20 formed of resilient material with a base 21 secured by means of a rivet 22 to the snuffer 23 which has a cap portion 24 to cover the wick.

Snuffer ears 25 are pivotally mounted to swing about the pin 18 in any suitable manner, and each ear is provided with a slot 26 through which it is connected to a fingerpiece 28 whereby it is moved upon depression of the fingerpiece 28 and downward movement of the plunger 29. This plunger 29 is of hollow construction and secured to the fingerpiece 28 in any suitable manner such as riveting 30. The plunger is often made of nickel silver and a bushing of a harder material such as steel 31 is fitted into its inner or lower end to greater resist the wear on the plunger and is shouldered as at 32 to limit its movement into the hollow plunger.

It is of course understood that, if the plunger is itself made of sufficiently hard material to withstand the wear to which it is subjected in operation upon the yielding interrupting resistance that it will be unnecessary to provide the steel bushing 31.

The plunger is guided in the tube 33 having a bottom 34 upon which rests the base 35 of the tubular member 36 having a yielding means 37 in the form of a bifurcated spring with enlarged end portions 38 so that in their normal position under no strain or force they will be of a size larger than the internal bore 39 of the end of the plunger or its bushing 31 so that as the plunger is depressed by means of the fingerpiece 28 it will engage these enlarged ends 38 and be interrupted in its movement but upon the application of additional pressure these ends 38 being round will be forced together to permit the cylinder 31 to slide thereover and the increased pressure will cause the friction wheel to be given a snap or increased impetus to positively throw the ignited particles or sparks against the wick, the portion of the fingers 40 below the head 38 are of much narrower construction so as to eliminate friction after the end of the plunger has passed beyond the head portions 38 of these fingers. A helical spring 41 is provided in the guide surrounding this interrupting member to resist the movement of the plunger and return it to starting position.

The foregoing description is directed solely towards the construction illustrated, but we desire it to be understood that we reserve the privilege of resorting to all the mechanical changes to which the device is susceptible, the invention being defined and limited only by the terms of the appended claims.

We claim:

1. In a lighter, a casing, a wick extending therefrom, pyrophoric material positioned adjacent said wick, a friction wheel rotatably mounted in engaging relation with said pyrophoric material, a plunger, means effecting rotation of said friction wheel on movement of said plunger, a spring yieldingly resisting movement of said plunger, and means interposing an additional resistance in the path of movement of said plunger.

2. In a lighter, a casing, a wick extending therefrom, pyrophoric material positioned adjacent said wick, a friction wheel rotatably mounted in engaging relation with said pyrophoric material, a plunger, a plunger casing, means effecting rotation of said friction wheel on movement of said plunger, a spring in said casing yieldingly resisting movement of said plunger, and an additional spring in said casing increasing the yielding resistance during a portion of the movement of said plunger.

3. In a lighter, a casing, a wick extending therefrom, pyrophoric material positioned

adjacent said wick, a friction wheel rotatably mounted in engaging relation with said pyrophoric material, a hollow plunger, a plunger casing, means effecting rotation of said friction wheel on movement of said plunger a spring in said casing engaging the plunger base for yieldingly resisting movement of said plunger, and an additional spring in said casing initially engaging the plunger base and displaceable into the bore of said plunger for increasing the yielding resistance during a portion of the movement of said plunger.

4. In a lighter, a casing, a wick extending therefrom, pyrophoric material positioned adjacent said wick, a friction wheel rotatably mounted in engaging relation with said pyrophoric material, a hollow plunger, a plunger casing, means effecting rotation of said friction wheel on movement of said plunger, a spring in said casing engaging the plunger base for yieldingly resisting movement of said plunger, and a plurality of spring fingers in said casing initially engaging the plunger base and displaceable into the bore of said plunger for increasing the yielding resistance during a portion of the movement of said plunger.

5. In a lighter, a casing, a wick extending therefrom, pyrophoric material positioned adjacent said wick, a friction wheel rotatably mounted in engaging relation with said pyrophoric material, a plunger, a plunger casing, means effecting rotation of said friction wheel on movement of said plunger, a spring in said casing yieldingly resisting movement of said plunger, and an additional spring mounted in said casing in the path of movement of said plunger and displaceable transversely to the direction of movement of said plunger, for increasing the yielding resistance during a portion of the movement of said plunger.

6. In a lighter, a casing, a wick extending therefrom, pyrophoric material positioned adjacent said wick, a friction wheel rotatably mounted in engaging relation with said pyrophoric material, a plunger, a plunger casing, means effecting rotation of said friction wheel on movement of said plunger, a spring in said casing yieldingly resisting movement of said plunger, and an additional spring mounted in slots in the wall of said casing and extending in the path of movement of said plunger and displaceable transversely to the direction of movement of said plunger, for increasing the yielding resistance during a portion of the movement of said plunger.

In testimony whereof we affix our signatures.

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