Sept. 8, 1936. F. A. WHITTAKER 2,053,455

LIGHTER

Filed Oct. 5, 1935

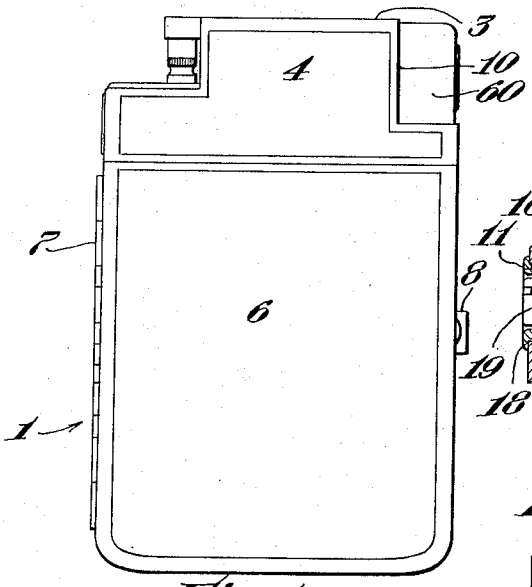


Fig. 1

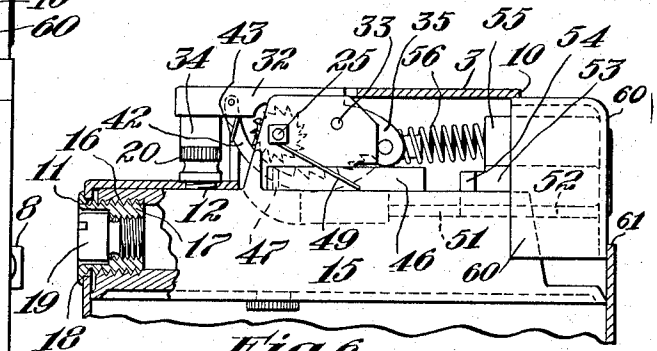


Fig. 6

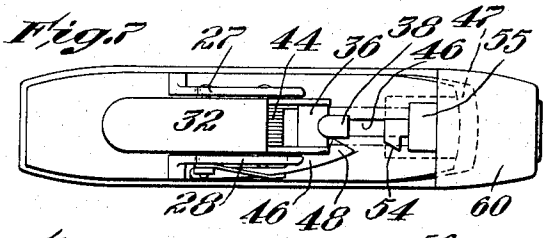


Fig. 7

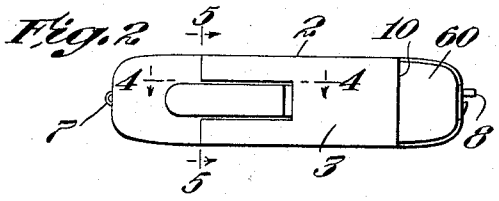


Fig. 2

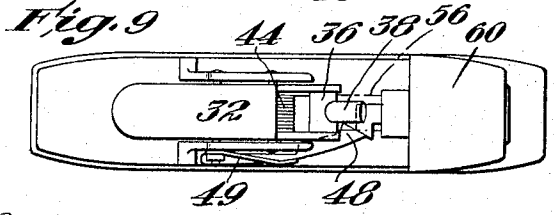


Fig. 9

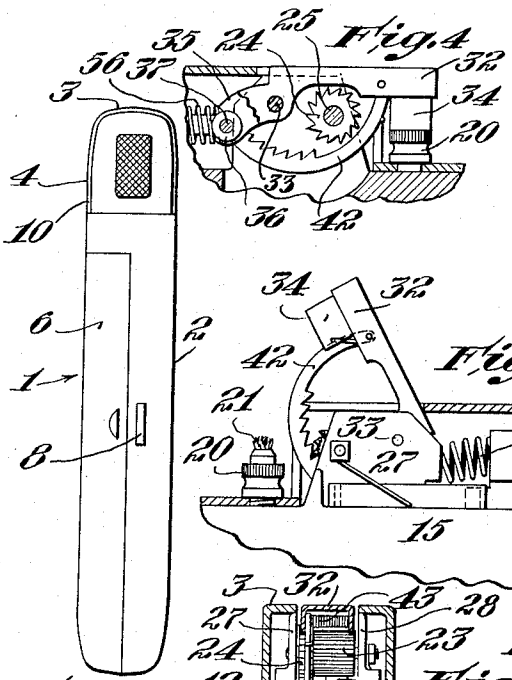


Fig. 3

Fig. 4

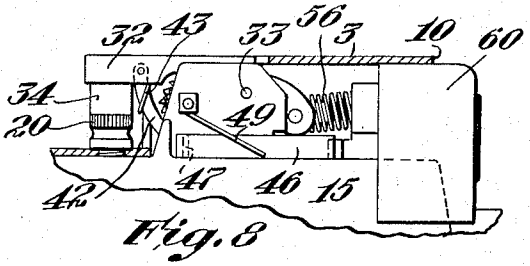


Fig. 8

Fig. 10

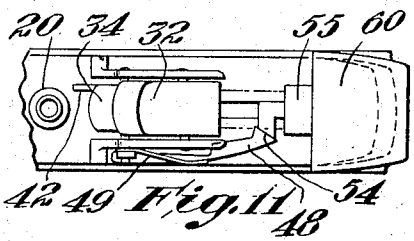


Fig. 11

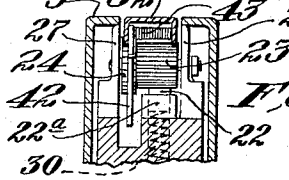


Fig. 5

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Attys.

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UNITED STATES PATENT OFFICE

2,053,455

LIGHTER

Frederick A. Whittaker, deceased, late of Attleboro, Mass., by Sarah Jane Whittaker, administratrix, Attleboro, Mass., assignor to Marathon Company, Attleboro, Mass., a corporation of Massachusetts

Application October 5, 1935, Serial No. 43,720

1 Claim. (Cl. 67—7.1)

This invention relates to a pyrophoric lighter and more particularly to a lighter of the type wherein the friction member is spring-actuated, in contradistinction to the manually operated type wherein the rate of movement of the friction member and snuffer are dependent upon the rate at which the finger piece is depressed.

The principal objects of the invention are to provide a lighter mechanism of the spring-actuated type, which is of simple design, having but few parts, which is quick acting, reliable and efficient in operation, and which may be economically manufactured and easily assembled; and to provide a lighter-actuating mechanism of the type having pyrophoric and friction members and a snuffer operatively associated with a burner, the parts being so designed that the snuffer arm or operating mechanism is permitted a free and unrestrained start before acting to operate the friction member, thereby eliminating any tendency of these parts becoming frictionally locked and thus insuring a smooth and quick acting operation.

Other objects are to provide a combination pyrophoric lighter and cigarette case which is of simple design and pleasing and attractive in appearance; and to provide a combination lighter and case wherein the fuel reservoir is so constructed that it may be filled without danger of the fuel leaking into the interior of the case and wherein the entrance or mouth of the fuel receptacle provides a reliable means for securing the receptacle and actuating mechanism to the case.

Further objects will be apparent from a consideration of the following description and the accompanying drawing wherein

Fig. 1 is a front elevation of a combination lighter and case constructed in accordance with the present invention;

Fig. 2 is a top plan view of the lighter and case;

Fig. 3 is a side elevation viewed from the right of Fig. 1;

Figs. 4 and 5 are fragmentary sections on the lines 4—4 and 5—5, respectively, of Fig. 2;

Fig. 6 is an elevation, with parts broken away and shown in section, of the actuating mechanism and associated parts, the snuffer arm, finger piece, etc. being shown in normal or retracted position;

Fig. 7 is a top plan view of the actuating mechanism with its parts in the position shown in Fig. 6 and with the actuating spring removed;

Fig. 8 is a fragmentary side elevation similar to Fig. 6 but showing the actuating member or finger piece in its advanced position prior to the release of the snuffer arm;

Fig. 9 is a view similar to Fig. 7, but showing the parts in the position shown in Fig. 8;

Fig. 10 is a view similar to Fig. 8, but showing the parts after the release of the snuffer arm; and

Fig. 11 is a view similar to Fig. 9, but showing the parts in the position shown in Fig. 10.

The embodiment chosen for the purpose of illustration comprises a casing 1 having a continuous back wall 2 which extends across the top, as shown at 3 (Figs. 1 to 3), and down the front side to provide the front wall 4 of the upper compartment which encloses the lighter mechanism or "movement". Below the upper compartment or housing is a lower or main compartment designed to hold cigarettes or the like, this latter compartment being provided with a lid or cover 6 which is hinged to the casing at 7 and held latched by a spring catch 8 of conventional construction. The upper right-hand corner of the casing is cut off, as shown at 10, to provide a corner aperture or opening and the side and top walls adjacent to the left-hand corner are provided with circular openings 11 and 12, respectively, as shown in Fig. 6.

The lighter proper comprises an elongate fuel receptacle 15 (Fig. 6) having at one end a screw-threaded opening 16 which registers with the opening 11 in the side wall of the casing when assembled therewith. An interiorly and exteriorly screw-threaded sleeve or bushing 17 extends through the opening 11 into the opening 16 and constitutes a mouth through which the reservoir may be filled. The sleeve 17 tightly fits within the opening 11 and its outer end is provided with a peripheral flange 18 which closely fits against the outer surface of the marginal portion surrounding the opening 11 and provides a seal for preventing fuel from leaking into the interior of the case. A screw cap 19, adapted to fit the bore of the sleeve 17, provides a removable closure for the fuel receptacle.

Mounted on the top of the receptacle is a burner 20 which projects through the opening 12 in the top wall of the casing, the burner 20 being provided with the usual wick 21 which extends into the interior of a fuel receptacle. A pyrophoric member 22 (Fig. 5) is held in a tube 22a which is integral with the reservoir and which extends upwardly with its outer end adjacent to the burner 20, and a serrated friction wheel 23 and a ratchet wheel 24 (Fig. 5) are pinned or otherwise secured to a shaft 25 journaled in a pair of spaced uprights 27 and 28 integrally joined to the top of the fuel receptacle. A spring 30 (Fig. 5) disposed in a tube 22a

yieldingly urges the pyrophoric member 22 into engagement with the friction wheel 23.

An arm 32 (Figs. 4 and 6) is pivotally mounted between its ends to a shaft 33 supported by the uprights 27 and 28 and the outer end of the arm supports a snuffer 34, here shown as a cup which fits over the burner 20. The opposite or inner end of the arm 32 is provided with a depending portion, here shown as a bifurcate member 35 adapted to swing downwardly toward the receptacle as shown in Fig. 10. A collar 36 is journaled on a wrist pin 37 (Fig. 4) secured to the wings of the bifurcate member 35 and integral with and projecting radially from the collar 36 is a pin 38 (Fig. 7) which has a pressed fit within the end of a coil compression spring 56, as shown in Figs. 6 and 8.

A curved rack or ratchet bar 42 is pivotally connected to the arm 32 adjacent to its outer end and extends downwardly between the pyrophoric member 22 and adjacent upright 27 (Figs. 4 and 5) and beyond the ratchet wheel 24. The ratchet 42 is yieldingly held in a position to engage the ratchet wheel 24 by a light spring member 43 (Fig. 6) and the ratchet is so designed that when the arm is in snuffing position and the ratchet retracted, as shown in Figs. 4 to 8, its teeth are spaced from those of the ratchet wheel a distance sufficient to prevent engagement of the ratchet and wheel until the arm 32 has swung upwardly through an angle preferably of the order of 30°. With this construction and arrangement both the arm 32 and ratchet 42 are permitted a "free or unrestrained start which not only adds in overcoming the frictional locking action exerted on the friction wheel by the action of the spring 30 on the pyrophoric member, but also insures a quicker action than would otherwise be possible, that is, a "snap action". During the initial outward movement of the arm 32 the ratchet teeth are clear of the ratchet wheel and after the arm has swung through an angle of the order of 30° the ratchet teeth then engage those of the ratchet wheel to effect rotation of the friction wheel in response to further upward movement of the arm, thus causing a shower of sparks to be emitted from the pyrophoric member toward the wick 21 after the snuffer has been raised a distance sufficient to clear the burner wick.

A coil spring 44 (Figs. 7 and 8) circumposed about the shaft 33 effects the return movement of the arm from its elevated or extended position (Figs. 10 and 11) and normally holds it in snuffing position. Between the upright 28 and adjacent wall of the case, one end of a catch 46 (Fig. 6) is pivotally mounted at 47 to the top of the receptacle and its free end is provided with an inwardly extending nose 48 (Figs. 7 and 9) which is normally retained in locking position between the top of the receptacle and the depending end 35 of the arm 32 (Figs. 6 to 9) by a small spring 49 secured to the shaft 25. The nose 48, when in locking or retracted position, prevents the arm 32 from swinging upwardly and hence provides a positive lock which prevents the actuation of the pyrophoric and friction members. The outer end of the nose is provided with a cam surface by means of which the catch may be swung to released position in the manner hereinafter described. When the catch is swung from locking position to released position (Figs. 10 and 11) the nose 48 is then free of the depending portion 35 and hence the arm 32 may then be swung upwardly to operate the pyrophoric and friction members.

The top of the fuel receptacle at the end opposite the burner 20 is provided with a longitudinally extending recess which defines a slideway 51 (Fig. 6) which receives a slide 52. The slide 52 is provided with an upstanding wing 53 and a cam or latch release 54 is formed on the inner end of the wing and is positioned so as to engage the cam surface on the nose 48 when the slide is pushed inwardly to retracted position, as shown in Figs. 10 and 11.

A tubular holder 55 (Figs. 6 and 7) is secured to the top of the wing 53 and these parts are so positioned that the horizontal axis of the tubular holder 55 is in substantial vertical alignment with the axis of the pin 38 on the collar 36, and is disposed in a horizontal plane above that passing through the axis of the pin 38. The opposite end of the compression spring 56 is disposed in the tubular holder 55, this spring being heavy enough, when compressed, to overcome the frictional resistance offered by the pyrophoric and friction members and to swing the arm 32 upwardly against the action of the spring 44.

An actuating member or slidable finger piece 60 is rigidly secured to the outer end of the slide 52 and wing 53 and this finger piece is preferably in the form of a hollow shell which conforms to the shape of the cut-off corner of a casing so as to fill out this corner and provide, in effect, a corner piece whose outer surfaces have the appearance of substantial continuity with the surface of the case. The finger piece is so designed that its lower end is disposed below the upper edge 61 (Fig. 6) of the casing which provides a stop that limits the outward or reverse movement of the finger piece. The spring 56 normally holds the finger piece against the stop 61 and, as previously noted, the spring 44 normally holds the arm 32 in snuffing position (Fig. 6), so that all movable parts are normally held in the position shown in Figs. 4 to 7.

In assembling the mechanism with the case, the sleeve 17 and burner 20 are removed from the receptacle and with the finger piece 60 partially depressed the mechanism is then inserted into the upper compartment. The sleeve 17 may then be screwed into the opening 16 and the burner 20 in the opening 12 so that its annular shoulder engages the top surface of the case (Figs. 4 and 6). The sleeve 17, supplemented by the burner 20 thus holds the entire mechanism within the casing without the aid of the usual fastening elements or the like.

To fill the reservoir the cap 19 may be unscrewed and the proper amount of fuel then run in. As the flange 18 tightly fits about the marginal portion surrounding the opening 11 in the casing, there is no danger of fuel leaking into the interior of either compartment and for the same reason there is no danger of fuel seeping into the main compartment in event the cap 19 has not been screwed up tightly after filling the reservoir.

In operating the device, the finger piece 60 is pushed inwardly in the usual manner and the major part of its travel is effective merely to compress the spring 56 as will be apparent by a comparison of Figs. 6 and 7 with Figs. 8 and 9, thus storing up energy in the spring 56 without regard to the rate of movement of the finger piece 60. When the parts are in the position shown in Figs. 8 and 9 the catch 46 is still in locking position and the release 54 has only been brought to a position contiguous to the nose 48. A further movement of the finger piece is op-

erative to cause the release **54** to engage the nose **48** and throw the latch outwardly against the action of the spring **49** so that the spring **56** is free to act and swing the arm **32** outwardly with a sudden sharp movement, thus effecting the actuation of the pyrophoric and friction members.

In the particular embodiment herein shown, the arm **32** is permitted a free start so that the instant the catch is thrown from locking position it is swung upwardly by the spring **56** and by the time the teeth of the ratchet **42** engage those of the wheel **24**, the arm **32** has sufficient momentum to overcome the frictional engagement or locking action between the pyrophoric and friction members. Moreover, as the depending portion **35** swings downwardly the leverage of the spring on the collar **36** increases so that by the time the ratchet engages the ratchet wheel the spring **56** acts on the collar at an angle of the order of 45° and hence is more effective to overcome the resistance offered by the pyrophoric and friction members. As the axis of the collar **36** is disposed below that of the holder **55** the spring **56** at no time acts on "a dead center line".

When the pressure on the finger piece **60** is released the spring **44** acts to swing the arm **32** back to snuffing position and at the same time the spring **56** acts in conjunction with the spring **44** to slide the finger piece **60** back to normal position. In the meantime the release **54** disengages the nose **48** so that the catch **46** is swung to locking position under the influence of the spring **49**.

While there is shown and described one desirable embodiment of the invention it is to be understood that this disclosure is for the purpose of illustration only and that various changes in shape, proportion and arrangement of parts, as well as the substitution of equivalent elements for those herein shown and described, may be made without departing from the spirit and scope of the invention as set forth in the appended claim.

What is claimed:—

A lighter comprising a fuel receptacle, a slideway carried by said receptacle, a burner mounted on said receptacle, ignition means mounted on said receptacle between said burner and slideway, said ignition means including a pyrophoric member and a rotatable friction wheel engaging said pyrophoric member and arranged to direct a shower of sparks toward said burner when rotated, an arm pivotally mounted between said ignition means and slideway, the outer end of said arm being arranged to swing toward and away from said burner and the other end of said arm having a depending portion arranged to swing downwardly toward said receptacle, a snuffer carried by the outer end of said arm, connections between said arm and friction wheel for operating the latter in response to upward movement on the outer end of said arm, a spring operative to move said arm to and normally maintain it in snuffing position, a spring-pressed latch pivotally mounted on said receptacle so as to swing beneath and engage the depending portion of said arm and hold it against downward movement, a thumb piece mounted on said slideway to move inwardly toward said arm, a latch release carried by said thumb piece and operative to engage said latch so as to swing it away from the depending portion of said arm, thereby to effect the release of said latch in response to a predetermined travel of said thumb piece, and a spring having one end secured to said thumb piece and its opposite end secured to said depending portion, said spring being constructed and arranged to be compressed sufficiently to actuate said arm when said thumb piece is pushed inwardly a distance sufficient to effect the release of said latch.

SARAH JANE WHITTAKER,
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