March 22, 1932. J. ROSENTHAL 1,850,142

LIGHTER

Filed May 29, 1929

Fig. 1.

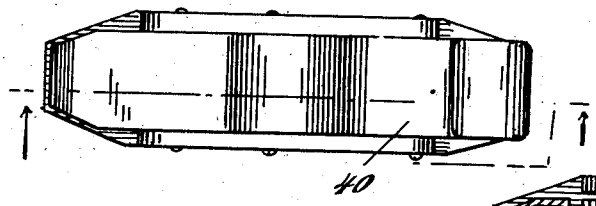


Fig. 3.

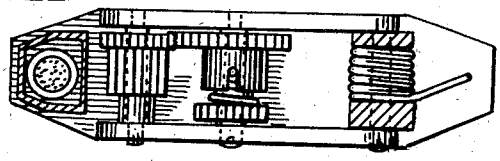


Fig. 2.

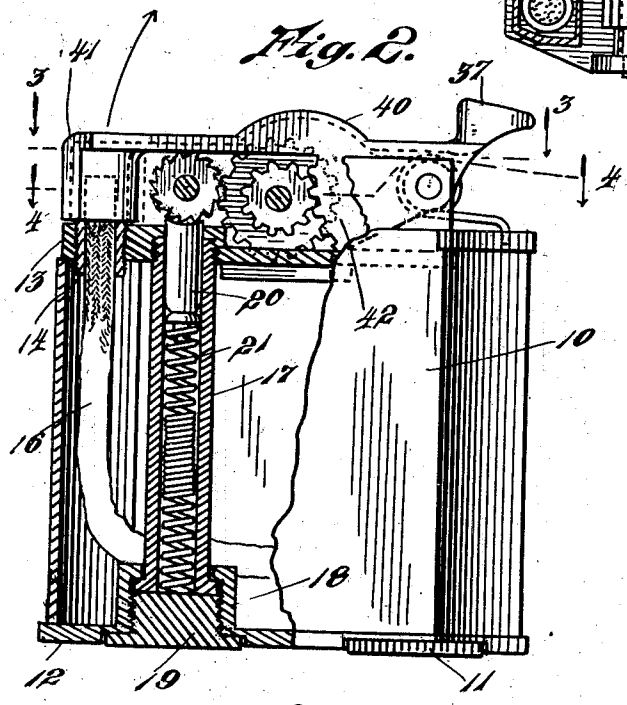
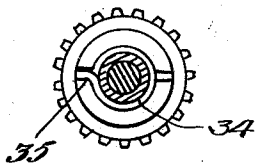


Fig. 6.



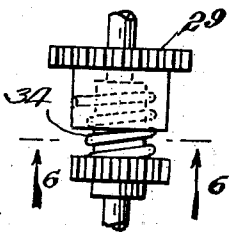


Fig. 5.

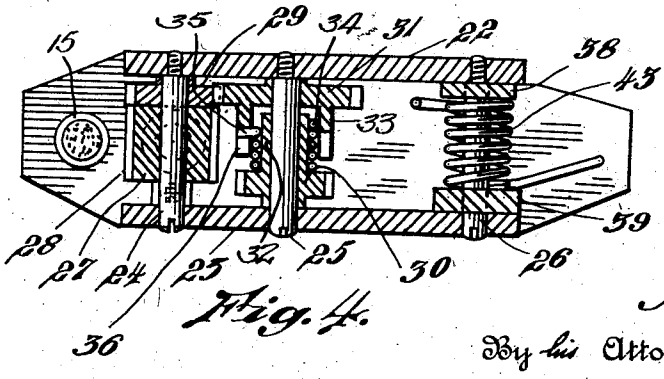


Fig. 4.

Inventor

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By his Attorneys

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Patented Mar. 22, 1932 1,850,142

UNITED STATES PATENT OFFICE

JACK ROSENTHAL, OF BROOKLYN, NEW YORK, ASSIGNOR TO HENRY LEDERER & BRO., INC., OF PROVIDENCE, RHODE ISLAND, A CORPORATION OF RHODE ISLAND

LIGHTER

Application filed May 29, 1929. Serial No. 366,957.

My present invention relates to lighters, and more particularly to pocket lighters of the mechanical type.

One object of my invention is to provide a mechanical lighter having improved spark producing facilities.

Another object is to utilize a train of gears for operating the friction wheel and increasing its speed of rotation.

A third object of my invention is to simplify and reduce the number of operating parts.

A further object is to utilize an improved form of clutch for operating the friction wheel.

Other objects and advantageous features will be readily apparent from the detailed description following, in conjunction with the accompanying drawings, and will be particularly pointed out in the appended claims.

In the drawings:

Figure 1 is a top plan view of the improved lighter;

Figure 2 is an elevation, partly in section, showing the operating mechanism;

Figures 3 and 4 are respectively sections on the lines 3—3 and 4—4 of Figure 2;

Figure 5 is an enlarged detail of the spring clutch members; and,

Figure 6 is a section on the line 6—6 of Figure 5.

Lighters of the mechanical type have heretofore used a pawl and ratchet arrangement for operating the friction or abrading wheel. This arrangement requires a comparatively large operating space, and is expensive to manufacture on account of the positioning and setting of the pawls and the formation of the ratchet teeth; moreover, the securing of the pawls on their base and the assembly of the pawls and ratchet requires careful, expert workmanship, and the number of elements and their operating stresses increase the liability of breakage when the lighter is subjected to hard usage. I obviate these difficulties by using a coil spring clutch in place of the usual pawl and ratchet.

Another disadvantage of lighters of this type has been the failure to obtain sufficient spark production in the short operating period to insure ignition of the wick. I overcome this disadvantage by using a train of gears to provide an increased rapidity of rotation of the friction wheel. The combination of a coil spring clutch and a gear train thus increases both the effectiveness and the reliability of the improved lighter; and the following is a detailed description of a preferred structural embodiment which carries out the principles of my invention.

Referring to the drawings, the lighter comprises a fuel compartment 10 of generally octagonal cross section, having the usual screw closure 11 for admitting fuel to the interior thereof, housed in a recess in the bottom wall 12. The top wall 13 serves as a support for the operating mechanism and has an opening 14 adjacent one end in which a wick retainer 15 is screw-threadedly mounted, the wick 16 extending upwardly from the wick retainer and having its lower portion within the fuel compartment.

Positioned adjacent the wick is a pyrophoric alloy container tube 17, preferably having the upper end screw-threadedly engaging the top wall 13 and the lower end flanged to seat within the apertured base of a cup 18 which extends into the fuel compartment. A closure member 19 has a thumb wheel housed in a recess concentrically positioned with respect to the cup 18, and screw-threadedly engages the side walls thereof.

Within the tube 17, I position a pyrophoric alloy 20, spring pressed upwardly by a double compression spring 21, the closure member 19 being advanced or retracted to regulate the engagement of the two spring sections and thus change the pressure of the spring 21 on the alloy 20.

The two parallel sides of the fuel compartment 10 are upwardly extended to form bearing walls or standards 22, 23, within which pivot pins 24, 25 and 26, are mounted as shown in Figure 4, each pin being kerfed at the end adjacent the standard 23 and having a reduced portion at the other end which screw-threadedly engages the standard 22.

Rotatably mounted on the pin 24 is a friction wheel 27 having abrading teeth 28 on the periphery thereof, which teeth contact

with the upwardly pressed pyrophoric alloy 20; secured to the friction wheel 27 is a pinion 29 for imparting rotation to the friction wheel in a manner hereinafter described. Both the friction wheel and the pinion have spaced hubs to prevent lateral shifting on the pivot pin, although washers may be used if desired.

Two gears 30, 31 are rotatably mounted on pivot pin 25, the gear 30 having a hub 32 and the gear 31 a hub 33 of greater diameter than the hub 32 and positioned concentric therewith. A coil spring 34 positioned between the hubs frictionally engages the hub 32 and has an outwardly bent end 35 which is secured in a slot 36 in the hub 33. The gear 31 meshes with the pinion 29.

An operating lever 37 has two depending ears 38, 39 rotatably mounted on the pivot pin 26, the lever being extended to provide a cover 40 for the operating mechanism which terminates in a snuffer cap 41 normally resting over the wick 16. One side of the cover 40 depends downwardly and is formed as a rack 42, which meshes with the gear 30; a coil spring 43 positioned about the pivot pin 26 serves to normally press the operating lever upwardly and to retain the cover 40 and the snuffer cap 41 in closed position. The operation of my improved lighter is as follows:

Manual pressure of the thumb or finger on the end of operating lever 37 turns this lever and lifts the snuffer cap away from the wick; the rack 42 moves and rotates gear 30, which tends to wind the spring 34, thus binding the spring on the hub 32 and causing the gear 31 to be clutched to, and rotate in unison with, the gear 30. The gear 31 therefore imparts rotation to the pinion 29 which meshes therewith, this pinion rotating the friction wheel 27 and causing violent spark production which ignites the now exposed wick. Due to the use of a train of gears, the motion of the operating lever is multiplied to cause a very rapid rotation of the friction wheel. When the pressure on the end of the operating lever is relieved, the spring 43 returns the lever, the cover, and the snuffer cap to their normal positions, the hub 32 now tending to unwind the spring, and thus turning freely therein, without reverse rotation of the friction wheel.

While I have described a specific embodiment of my invention it is obvious that such structural changes and variations as appear desirable may be made, within the scope of the invention as defined by the appended claims.

I claim:

1. In a lighter, a casing, a wick extending therefrom, a pyrophoric material tube in said casing, having an opening adjacent said wick, pyrophoric material therein, a friction wheel engaging said pyrophoric material, a spring comprising two interengaging compression coil sections urging said pyrophoric material into contact with said friction wheel, and means for changing the extent of interengagement of said sections.

2. In a lighter, a casing, a wick extending therefrom, pyrophoric material adjacent said wick, a friction wheel engaging said pyrophoric material, a rotatable element operatively connected to said friction wheel and having a bore, a rotatable pinion, a hub on said pinion extending into said bore, and clutch means operatively connecting said element and said pinion.

3. In a lighter, a casing, a wick extending therefrom, pyrophoric material adjacent said wick, a friction wheel engaging said pyrophoric material, a rotatable element operatively connected to said friction wheel and having a bore, a rotatable pinion, a hub on said pinion extending into said bore, and a coil spring frictionally engaging said hub and secured to said element.

4. In a lighter, a casing, a wick extending therefrom, pyrophoric material adjacent said wick, a friction wheel having teeth engaging said pyrophoric material and a gear for rotating said friction wheel, means for mounting the said wheel and gear on said casing, a pinion engaging said gear, a rotatable member, mounted in said casing, and a clutch between said pinion and said rotatable member, and manually operable means for rotating said member.

5. In a lighter, a casing, a wick extending therefrom, pyrophoric material adjacent said wick, a friction wheel having teeth engaging said pyrophoric material and a gear for rotating said friction wheel, means mounting the said friction wheel and gear on said casing, a pinion engaging said gear, a second pinion mounted on said casing, and a clutch between said pinions, and manually operable means for rotating said second pinion.

6. In a lighter, a casing, a wick extending therefrom, pyrophoric material adjacent said wick, a friction wheel rotatably mounted on said casing and having teeth engaging said pyrophoric material, a pinion operatively connected to the friction wheel, a manually movable device, and means including a clutch operatively connecting said manually movable device and said pinion.

7. In a lighter, a casing, a wick extending therefrom, pyrophoric material adjacent said wick, a friction wheel rotatably mounted on said casing and having teeth engaging said pyrophoric material, a pinion operatively connected to the friction wheel, a second pinion geared to said first pinion, a rotatable member, a clutch connecting said rotatable member and said second pinion, and manually movable means for rotating said rotatable member.

8. In a lighter, a casing, a wick extending therefrom, pyrophoric material adjacent said

wick, a friction wheel rotatably mounted on said casing and having teeth engaging said pyrophoric material, a pinion operatively connected to the friction wheel, a second pinion geared to said first pinion, a third pinion, a clutch connecting said third pinion and said second pinion, and manually movable means for rotating said third pinion.

9. In a lighter, a casing, three parallel pivot pins mounted on the upper part thereof, a rotatable friction wheel and a pinion secured thereto mounted on the first pin, a second pinion geared to the first pinion, and a third pinion and clutch means connecting the same to said second pinion mounted on the second pin, and a geared segment geared to said third pinion mounted on the third pin.

10. In a lighter, the combination of a fuel casing having a wick end projecting therefrom, a friction wheel mounted adjacent said wick end and having a pinion, a pair of gear wheels loosely journalled on a bearing adjacent said friction wheel and having coacting clutch members, one of said gear wheels having driving connection with said friction wheel pinion and having a diameter substantially greater than the same and an operating lever fulcrumed on said casing and having a gear member meshing with the other of said gear wheels.

11. In a lighter, the combination of a fuel casing having a wick end projecting therefrom, a friction wheel journalled on an axis adjacent said wick end and having a fixed pinion, a pair of gear members loosely mounted on a bearing adjacent said friction wheel with one of the same meshing with said pinion, complementary clutch members carried by said gear wheels, and an operating lever fulcrumed on said casing and having a gear segment in mesh with the other of said gear members, said gear member, gear wheels and pinion providing a speed-increasing gear train whereby said friction wheel is rotated at a substantially greater speed than the operating lever.

In testimony whereof I affix my signature.

JACK ROSENTHAL.