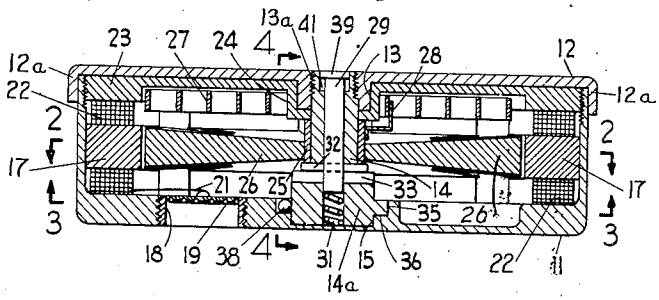
April 26, 1949. R. A. VISSING 2,468,146

CIGARETTE LIGHTER

Filed Nov. 28, 1944

FIG. 1



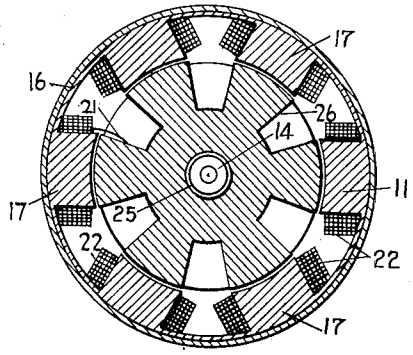


FIG. 2

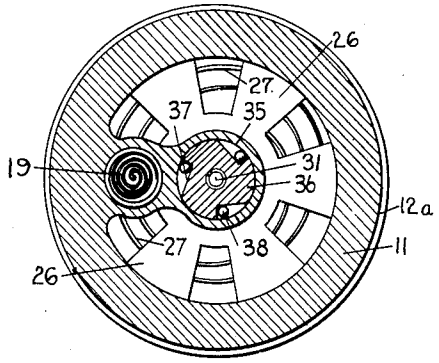


FIG. 3

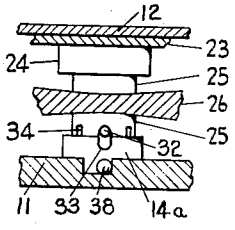


FIG. 4A

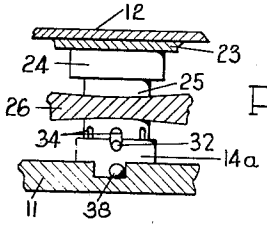


FIG. 4B

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CIGARETTE LIGHTER

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13 Claims. (Cl. 219—32)

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This invention relates in general to cigarette lighters and more specifically to a pocket cigarette lighter including an electric heating element, a generator for energizing the heating element and a spring motor for driving the generator.

Although some development work has been done in the past with reference to this type of lighter, such work has not resulted in a device sufficiently practical to be placed on the market and made available to the public.

In general the object of this invention is the provision of a compact electric lighter in which the heating element, generator and spring motor are incorporated in a two part casing and in which the rotation of one part of the casing with respect to the other serves to wind the spring motor.

Another object of this invention is the provision of a cigarette lighter having a heating element energized by an electric generator and wherein the armature of the generator is directly driven by a coil spring so as to subject the heating element to an instantaneous high current.

Another object is to provide a cigarette lighter which may be conveniently held in one hand and wound with the other hand and which will not automatically unwind when released by the winding hand.

Another object is to provide a cigarette lighter which stores up energy to drive a generator, which in turn energizes the heating or resistance element at any future time as determined by operation of a control member movable by the user.

A more specific object is the provision of a cigarette lighter which requires no operation other than the pressing of a button or like control member, provided its spring motor has been previously wound.

The device of this invention has certain inherent advantages such as the fact that it requires no fuel, no flints or other sparking means, no seals for highly volatile fuels, and is usable in most weather conditions and at all altitudes if the ambient temperature is not too low. However, along with these features, the invention provides a lighter or igniter which is unque in that the generator is driven by the stored-up energy of a coil spring, permitting a much higher torque and higher speed of generator rotation than is possible with finger-actuated generators of prior art flashlights. This higher speed results in a higher temperature of the heating element and insures lighting of the cigarette, etc., under practically all conditions.

Another object of my invention is to provide a

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pocket cigarette lighter whose current output cannot exceed a given safe level necessary for maximum heating element life.

Another object is to provide a cigarette lighter including a casing enclosing a generator, wherein the casing is but little larger than the generator.

Another object is to provide a cigarette lighter so constructed that it will be notably quiet in operation.

The invention possesses other advantageous features, some of which with the foregoing will be set forth at length in the following description where that form of the invention, which has been selected for illustration in the drawings accompanying and forming a part of the present specification, is outlined in full. In said drawings, one embodiment of the invention is shown, but it is to be understood that it is not limited to such form, since the invention as set forth in the claims may be embodied in a plurality of forms.

Referring to the drawings:

Fig. 1 is a diametric section of a cigarette lighter embodying my invention.

Fig. 2 is a section taken on the line 2—2 of Fig. 1.

Fig. 3 is a section taken on the line 3—3 of Fig. 1.

Fig. 4A is an enlarged section taken on the line 4—4 of Fig. 1 showing the clutch mechanism for controlling the operation of spring motor and generator armature.

Fig. 4B is a section similar to that shown in Fig. 4A but with the clutch mechanism in its released position.

Referring particularly to the drawings, the preferred cigarette lighter has a housing or casing which is preferably cylindrical and is sufficiently small to be held conveniently in one's hand or carried in a pocket or purse. Casing 11 is really a two-part casing as it is provided with a flanged cover 12 which is adapted to be rotated manually relative to the casing, the cover flange 12a having a sufficient clearance with the casing, which it embraces, to permit free rotation. A hub 13 is integral with the cover at the center thereof and projects inwardly and is provided with internal screw threads 13a to permit securing an axially drilled shaft 14 thereto, said drilled shaft being thus held rigidly at right angles to the general plane of the cover, with its opposite and enlarged end 14a journaled in a bearing 15 formed centrally in the interior wall or base of casing 11.

Accommodated within the casing 11 is a field coil ring or stator 16 formed integrally with a plu-

rality of spaced radially extending cores 17. Threaded through the base of the casing 11 off center thereof is a ring 18 within which is recessed an electric heating element 19 in the usual form of a resistance wire coil adapted to be heated sufficiently to ignite tobacco, etc. One end of the heating element 19 is grounded to the ring 18 and its other end communicates through a lead 21 with one of the field coils 22 wound around the cores 17. The field coils are in series circuit with each other, the last coil in the series being grounded to the ring 16. It will therefore be observed that the heating element is in closed series circuit with the field coils 22 and that any current generated in the field coils will of necessity pass through and energize the heating element.

Threaded to the open end of the casing 11 is a plate 23 serving to clamp or secure the field coil ring 16 to the interior wall or base of the casing and formed centrally of the clamping plate 23 is a boss 24, in which the hub 13 snugly fits, but with sufficient clearance for free rotation. Journaled on the shaft 14 centrally thereof is an armature sleeve 25 on which is fastened a radially indented (permanent magnet) armature or rotor 26. Accommodated between the clamping plate 23 and one side of the armature 26 and surrounding the boss 24 is a spirally coiled spring 27 having its outer end fastened to the clamping plate and its inner end anchored to the armature sleeve 25 through a clip 28. The spirally coiled spring is an elastic windable means capable of storing potential energy and capable of rapidly rotating the armature or rotor when it unwinds.

Slidably disposed within the hollow shaft 14 is a clutch release pin 29 urged outwardly by a compression spring 31 also within the bore of the shaft and bearing against the base or inner wall of the casing 11. Extending through and fixed to the clutch release pin 29 is a transverse pin 32, the ends of which pass through a transverse slot 33 formed in the shaft 14, and are arranged to be received in radially extending notches 34 formed about the end of the sleeve 25 which carries the rotor. In this connection it is to be noted that the spring 31 normally holds the transverse pin 32 engaged in the notches 34 so as to prevent relative rotation between the armature 26 and the shaft 14 under the influence of the motor spring 27. However, by depressing the clutch release pin 29 against the action of the spring 31, the transverse pin 32 is disengaged from the notches 34 and the armature 26 is then free to rotate about the shaft 14 to thereby energize the heating element 19.

Operatively associated with the base of the shaft 14 and the base of the casing 11 is an overrunning or unidirectional clutch consisting of a recess 35 provided in the casing 11 in which is accommodated a flange 36, formed on the shaft 14 and provided with wedge-shaped notches 37. Accommodated within each of the notches 37 is a ball 38, which may be a ball bearing. By means of this clutch the shaft 14 as viewed in Fig. 3 can be rotated only in a counter-clockwise direction with respect to the casing 11. Any attempt to produce a relative reverse rotation of these members will simply cause the balls 38 to become jammed within the wedge-shaped notches 37. Since the cover 12 is secured to the shaft 14 any relative rotation between the casing 11 and its cover 12 permitted by the clutch just described will effect a winding of the motor spring 27, while reverse rotation is prevented by the unidirectional clutch just described.

Preferably the upper end of the clutch release pin 29 is provided with a finger button 39 receivable in a counterbore 41 in the threaded end of shaft 14.

From the above description it will be seen that I have provided a compact pocket size electric cigarette lighter powered by a spring motor which can be wound by applying leverage thereto through the lighter casing and cover. Once the spring is wound, it will remain wound for any desired period, and thereafter the lighter may be used without manipulating any part except the button 39. When the armature starts to rotate because of the spring motor and the release of the clutch, the cover (which is the equivalent of a crank, providing the necessary leverage) cannot unwind. If there were any external parts which unwound, the lighter might be thrown out of the user's hands.

It should be emphasized that by the term "exposed" as used in the claims I mean a naked heating (cigarette lighting) element, as contrasted with the shielded or bulb-enclosed resistance elements of electric lamps. I do not intend to disclaim a construction wherein the cigarette lighting element, though exposed when actively igniting a cigarette, is at times covered by some element.

I claim:

1. A cigarette lighter comprising, in combination, a casing adapted to be held in the user's hands, said casing consisting of two relatively rotatable parts; a coil spring within the casing and adapted to be wound up when the parts of the casing are properly held and moved; means interposed between the coil spring and the casing part which is moved during said winding, to prevent backward rotation of said casing part when released; an electric generator within the casing; operator-controlled means connecting the generator and the coil spring so that the generator is rotated under energy derived from the wound spring; and a resistance element carried by the casing so as to be exposed and electrically connected with the generator and adapted to be heated sufficiently to ignite tobacco whenever the generator is rotated for a sufficient period.

2. A device of the character described comprising in combination, a casing; an electric heating element associated with said casing; an electric generator enclosed within said casing and in circuit with said heating element; a coil spring within said casing and constructed and arranged to drive said generator; means mounted on the casing and serving as a crank to wind said coil spring to store potential energy; automatically acting means to prevent said spring from unwinding during the progressive stages of winding; and manually controlled clutch means to release said spring to effect driving of the generator to energize said heating element; the heating element being exposed and being adapted when so energized to ignite tobacco.

3. A device of the character described comprising, in combination, a casing; a generator having field coils fixed in the casing, and an armature rotatable in the casing; an exposed electric resistance element electrically connected in series with the field coils so as to be heated to tobacco-igniting temperature when the armature is rotated; a motor consisting of a coil spring one end of which is secured to the armature; a clamping plate secured to the casing; the other end of the coil spring being anchored to the clamping plate and hence being stationary rela-

tive to the casing; a cover plate outside of the clamping plate and mounted to rotate relative to the casing and clamping plate; a hollow shaft secured at one end to the cover plate and extending axially of the casing and journaled at its other end upon the casing; an overrunning clutch interposed between the shaft and the casing and permitting said shaft and hence the cover plate to turn in only one direction relative to the casing; a clutch release pin slidably disposed in the hollow shaft; a coil spring interposed between the casing and the inner end of the clutch release pin; the outer end of the clutch release pin being normally substantially flush with the outer face of the cover plate and providing a button which may be depressed by the user; a pin fixed transversely to the clutch release pin to provide two oppositely projecting ends; the armature having a sleeve journaled on the shaft and the end of the sleeve having a plurality of pairs of radial notches for receiving the ends of said transverse pin, thereby preventing relative rotation between the armature and the shaft under the influence of the spring motor; said shaft having a transverse slot for movement of said transverse pin out of said notches upon depression of said button, the spring motor then rotating the armature.

4. A cigarette lighter comprising, in combination, a casing adapted to be held in one hand by the user and having walls; a heating element adapted to light cigarettes mounted on the casing and exposed to the exterior thereof; a generator located in the casing and consisting of a rotor and a stator; the heating element being electrically connected with the stator; a spring motor within the casing and mechanically connected with the rotor; means on the exterior of the casing and affording mechanical advantage such as will permit the user to wind the spring motor readily; an overrunning clutch within the casing so constructed and arranged that winding of the spring motor is permitted but unwinding with concomitant movement of said means is prevented; a button located in the casing and a spring pressing said button outwardly; a pin moved by said button; a transverse pin fixed to the first named pin; a sleeve having a plurality of notches on one end for receiving the ends of said transverse pin, said sleeve being secured to the center of said rotor; the last named spring normally holding said transverse pin in said notches to prevent rotation of said rotor, but yielding to inward pressure on said button to move the transverse pin out of the notches to permit such rotation responsive to the potential energy of the spring motor.

5. A pocket cigarette lighter comprising, in combination, a hollow relatively flat casing adapted to be held in one hand by the user and having flat opposed walls; a resistance-type cigarette lighting element mounted on one wall of the casing and exposed to the exterior thereof; a generator located in the casing and consisting of a rotor and a stator; a flanged cover arranged for manual rotation relative to the casing, said cover closely embracing the opposite side of the casing from the heating element; a spring motor within the casing and having means constructed and arranged to wind it upon manual rotation of said flanged cover in one direction; means connecting said spring motor with the casing and rotor; releasable means to hold said rotor against rotation, said releasable means including a button which is exposed on the cover side of the casing

and which is depressed by a finger to release the rotor; and overrunning clutch means interposed between the casing and the spring motor winding means to permit winding of the spring motor but to prevent backward or unwinding motion of the winding means.

6. A unitary, fuelless pocket lighter for cigarettes and the like consisting of a casing which may be held in one hand with one face exposed; an electric generator in the casing; a resistance element located on said exposed casing face and being electrically connected with the output side of said generator and being adapted to be heated to a temperature sufficient to ignite tobacco; an elastic windable means capable of storing energy and located within the casing; means connecting said elastic means with the generator so that the latter is driven at high speed when the former is wound up; manually operable winding means on the exterior of the casing and connected to said elastic means and affording mechanical advantage during winding; means to lock the generator; a release button centrally positioned of the casing on a side opposite to said exposed face and adapted to be pressed inwardly to release the generator-locking means to permit the rotation thereof by said elastic means; and a unidirectional clutch acting automatically to prevent retrograde movement of said winding means.

7. A hand operated electric cigarette lighter of a size to be conveniently carried in the operator's pocket, said lighter comprising a casing having a substantially greater diameter than thickness, an electric generator including rotor and stator enclosed within said casing, a coil spring within said casing and connected thereto and constructed and arranged to directly drive the rotor of said generator, a winding plate rotatably mounted at one end of said casing and serving as a crank to wind said coil spring to store potential energy, unidirectional clutch means interposed between the casing and winding plate to prevent said spring from unwinding during the progressive stages of winding; a resistance element carried by the casing and electrically connected with the stator; and manually controlled clutch means to release said spring to effect driving of rotor of said generator at a high angular velocity to energize the resistance element sufficiently for igniting a cigarette or the like.

8. A hand operated cigarette lighter adapted to be carried in the pocket of the user comprising a shallow generator casing of substantially greater diameter than thickness, a winding plate rotatable in one direction only with reference to the casing, a central hub connected to the winding plate and extending axially through the casing, a generator within the casing including a stator fixed with reference to the casing and a spring-actuated rotor mounted upon said hub for free rotation with reference thereto, a resistance element providing a cigarette-lighting unit connected to the stator so as to be energized thereby, a coil spring reacting directly between said casing and said rotor and adapted to be placed under tension on relative rotation of the winding plate and casing in one direction, unidirectional clutch means interposed between the casing and winding plate to prevent reverse rotation, a releasable retaining clutch mechanism normally adapted to positively retain the rotor in fixed relation to the casing, and manual means for releasing said retaining clutch means to permit the rotor to turn freely on the hub under the

influence of said coil spring and thereby generate a high wattage for a short period of time to energize the cigarette-lighting unit sufficiently to ignite a cigarette or the like.

9. A hand operated cigarette lighter adapted to be carried in the pocket of the user comprising a shallow casing of substantially greater diameter than thickness, a winding device rotatable in one direction with reference thereto, a generator within the casing, said generator including a stator fixed with reference to the casing and a spring actuated rotor mounted for rotation with reference to both the winding device and casing, a resistance element providing a cigarette-lighting unit connected to the stator so as to be energized thereby, a coil spring interposed between the casing portion and rotor for actuating said rotor and adapted to be placed under tension on relative rotation of the winding device and casing in one direction to store potential energy for actuating said generator, a unidirectional clutch interposed between the casing and winding device to prevent reverse rotation, a releasable retaining clutch adapted to normally and positively retain the rotor in fixed relation to the winding device, and means for releasing said retaining clutch to permit the rotor to turn freely under the influence of said coil spring and thereby generate a relatively high wattage for a short period of time to energize the cigarette-lighting unit for igniting a cigarette or the like.

10. A hand operated cigarette lighter of a size and shape permitting the same to be carried in an operator's pocket, comprising a casing, an electric generator located within the casing, a heating element connected to and adapted to be energized by the generator, generator driving means housed within the casing and comprising a coil spring having one end fixed with reference to the casing and the other end connected to directly drive the generator, thereby utilizing the entire torque output of the spring for generator rotation, spring winding means including a rotatable crank member external to said casing for winding said spring, automatically acting means for preventing unwinding of said spring during the progressive stages of winding and until manually released, and manually controlled clutch means to release said spring, whereby a relatively high power input to the generator is provided for a short period on release of said spring, with a resulting relatively high wattage electrical current output from the generator to energize the heating element sufficiently for igniting a cigarette or the like.

11. A device of the character described comprising, in combination, a casing; a generator having field coils fixed in the casing and an armature rotatable in the casing; a resistance element connected to the field coils and mounted on the casing so as to provide a cigarette-lighting unit; a motor consisting of a windable spring one end of which is secured to the armature; a clamping plate secured to the casing; the other end of the windable spring being anchored to the clamping plate and hence being stationary relative to the casing; a winding plate outside of the clamping plate and mounted to rotate relative to the casing and clamping plate; a hollow shaft secured at one end to the winding plate and extending axially of the casing and journaled at its other end upon the casing; an overrunning clutch interposed between the shaft and the casing and permitting said shaft and hence the winding plate to turn in only one direction relative to the casing; a clutch release pin slidably disposed in the hollow shaft; a coil spring interposed between the casing and the inner end of the clutch release pin; the outer end of the clutch release pin being normally substantially flush with the outer face of the winding plate and providing a button which may be depressed by the user; a pin fixed transversely to the clutch release pin to provide two oppositely projecting ends; the armature having a sleeve journaled on the shaft and the end of the sleeve having a plurality of pairs of radial notches for receiving the ends of said transverse pin, thereby preventing relative rotation between the armature and the shaft under the influence of the spring motor; said shaft having a transverse slot for movement of said transverse pin out of said notches upon depression of said button, the spring motor then rotating the armature to energize the cigarette-lighting unit sufficiently to permit igniting a cigarette.

12. A cigarette lighter comprising a casing; a resistance member supported on the casing so as to be exposed to the exterior thereof; an electric generator within the casing and including field coils in circuit with said resistance member and an armature; an elastic windable potential-energy-storing member in the casing and connected directly to the armature; manually operable means for winding said member; means for holding said member in wound-up condition so that its potential energy is instantly available; and means permitting the user to release the held member; the parts being so constructed and arranged that the stored energy is released with sufficient rapidity to generate a current which will raise the resistance member to tobacco-igniting temperature.

13. A device for lighting cigarettes and the like comprising a casing; a potential-energy-storing motor within the casing; manual-power-taxing means connected to said motor for producing the energy stored in said motor; a generator within the casing driven by said motor; a cigarette-lighting resistance element in circuit with the output side of the generator and supported by the casing so as to be readily contacted by the end of a cigarette; the motor, generator and cigarette-lighting element being so constructed and arranged that the element will be raised to a cigarette-igniting temperature when the motor is permitted to drive the generator; the wattage output of the generator during a single cycle of operation being well in excess of that developable by human hand power if permitted to act on the generator during the same period of time.

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