July 30, 1963 J. SPECK 3,099,402

FLASHLIGHT

Filed March 14, 1961

Fig. 1

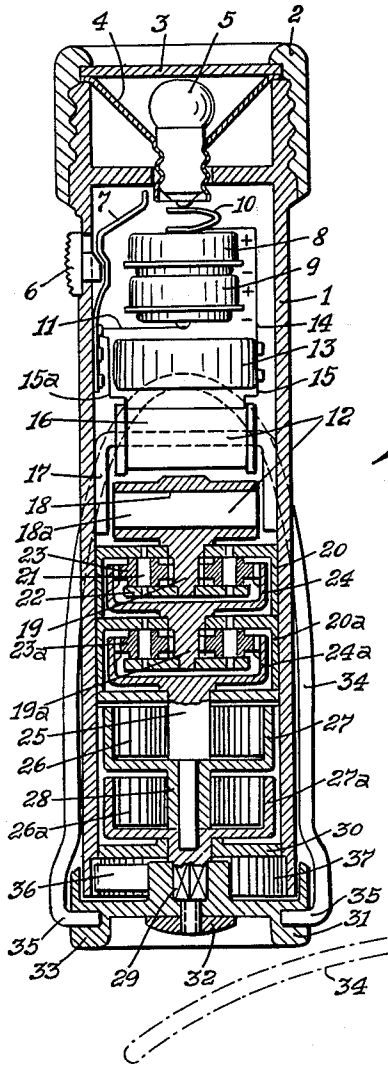
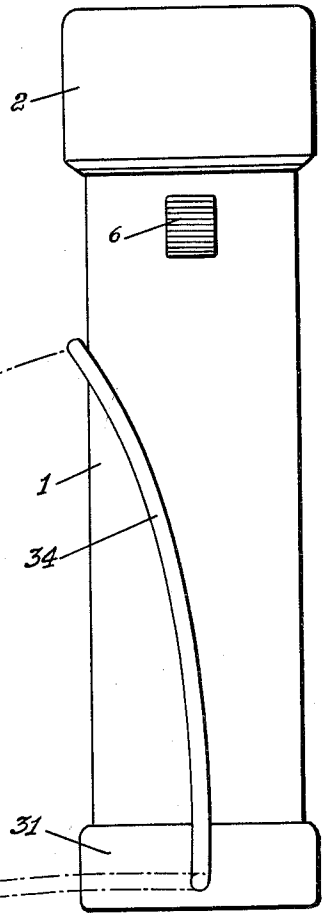


Fig. 2



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United States Patent Office

3,099,402
Patented July 30, 1963

3,099,402

FLASHLIGHT

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Filed Mar. 14, 1961, Ser. No. 112,137
Claims priority, application Switzerland Mar. 16, 1960
2 Claims. (Cl. 240—10.66)

Existing flashlights comprising a built-in dynamo and a transmission gearing and which are operable by hand through a driving element, have the disadvantage that the bulb is lighted only as long as the dynamo is being operated. They have the further disadvantage that the operator's hand is much tired when the light is used for any extended period of time, and that the flashlight hardly can be held steady during actuation of the dynamo drive.

The flashlight disclosed in my present invention, comprising a built-in dynamo, substantially differs from known pocket lights of this type in that the dynamo current serves not only for feeding the bulb directly but also for charging at least one storage battery which in turn also is connected to the bulb for feeding same, and that the dynamo is driven by a wind-up spring motor via a transmission gearing, which motor is characterized by a relatively short wind-up period and a long run-off time.

The flashlight disclosed herein is used, in contrast to known pocket lights of this type, after having been wound up and has the advantage that during operation of the dynamo the storage battery is charged, and that after the spring motor has run off, operation of the bulb will still be maintained for an additional period of time by the battery.

One form of my invention is shown, by way of example, in the drawing, in which—

FIG. 1 shows a longitudinal section through the flashlight, and

FIG. 2 is a view of the light in which the wind-up lever is illustrated in two positions.

The flashlight shown comprises a plastic case **1** to the front portion of which are detachably secured the glass **3** and the reflector **4** with the replaceable bulb **5** by means of an end-cap **2**.

Through the switch button **6** is actuated the contact spring **7** for turning the light on and off. Of two series-connected storage battery cells **8**, **9** the upper one with its positive pole is connected to the central bulb pole through a contact spring **10**, while the lower cell through its negative pole is connected to the switch contact spring **7** via a wire **11**. Between the dynamo **12** and the two batteries **8**, **9** is disposed a rectifier **13** which in turn is connected to the positive pole of battery **8** through a wire **14** and to one of the wire ends of coil **16** of dynamo **12** through a wire **15**. The other wire end of coil **16** is connected to switch contact spring **7** through a wire **15***a*. **17** is a U-shaped soft-iron core, and **18** is the dynamo rotor which carries a permanent magnet **18***a*. The rotor axle **19** is mounted in the housing **20** of a gearing unit and in a rear disc **22** rigidly secured to housing **20** by two axle pins **21**, and said axle **19** is formed as pinion. The pins **21** are disposed diametrically opposite each other with respect to axle **19** and carry gears **23** which mesh with pinion **19**. The gears **23** also mesh with the internal teeth of a cuplike gear **24** of which the axle **19***a* also is formed as pinion to mesh with gears **23***a* which in turn mesh with

the internal teeth on a gear **24***a* of a second gearing unit **20***a* which is similar to gearing unit **20**.

To the axle **25** of rim gear **24***a* is anchored the inner end of a spiral spring **26** of which the outer end is engaged to a drumlike driving wheel **27**, and the hollow axle **28** of the latter is mounted on a shouldered portion of axle **25**. To axle **28** is secured the inner end of a second spiral spring **26***a* of which the outer end is fixed to a second drumlike driving wheel **27***a*. The axle **29** of the latter is mounted in a partition **30** inserted in the light case and on a square portion the axle **29** carries a wind-up disc **31** which is formed as rear end-cap of case **1** and is secured by a nut **32** screwed on to a shouldered threaded portion of axle **29**.

The ends **35** of an elongate wind-up hoop lever **34**, inwardly bent at right angles, are engaged in two diametrically opposite bores **33** of disc or end-cap **31**. Lever **34** in its position of non-use hugs light case **1** and may be swung down to a position at right angles to the flashlight axis for the purpose of winding-up the spring motor. To the hub of wind-up disc **31** is secured a leaf spring **36** which serves as pawl or detent and of which the free end is engaged in ratchet means **37** provided as internal teeth at the end of case **1**, for the purpose of preventing the wind-up axle from turning back.

The spring motor in relation to its run-off period, requires only little time for winding up. To such end, lever **34** is swung out and down into the position shown by dash-and-dot lines in FIG. 2. The operator with one of his hands holds the flashlight, engages the forefinger of his other hand in the lever hoop and turns same until the spring motor is tensed. The pawl-and-ratchet means **36**, **37** prevent the wind-up means from turning back. The spring motor now drives the dynamo **12** which delivers its current on one hand to bulb **5** and, on the other hand, charges the storage battery. After the spring motor has run off or the dynamo has come to rest, the current of the storage battery still lights the bulb until the battery is exhausted.

What I claim as new and desire to secure by Letters Patent, is:

1. An electric flashlight, having a tubular housing and an electric circuit including a dynamo member and a bulb, comprising in combination, two storage means operable independently of each other for storing energy, one of said storage means including a spring motor in driving connection with said dynamo member, and comprising at least two springs for long-time operation of the spring motor, two series-connected casings each housing one of said springs, winding means connected to said spring motor and including a rotor forming a rear cover for said housing and an elongated loop element pivoted to said rotor and having a width at least as large as the width of said housing and being tiltable between a winding position wherein it extends substantially radially of the axis of the housing for manual rotation of said rotor about said axis to wind said spring motor rapidly and, respectively, an inactive position wherein it engages throughout a portion of the loop the tubular surface of the housing, a gear train disposed axially symmetrically of the housing and arranged between said spring motor and said dynamo member, the other storage means including a battery member interconnected in said electric circuit in parallel with said

dynamo member and with said bulb, whereby said bulb may be fed from either member.

2. In an electric flashlight, as claimed in claim 1, said gear train comprising two axles each including a gear having internal teeth, and two diametrically oppositely disposed planetary pinions meshing with each gear and being driven thereby.

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