Oct. 29, 1940. A. RACEK 2,219,531

PYROPHORIC LIGHTER

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Fig.1

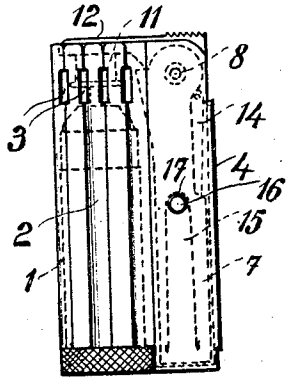


Fig.2

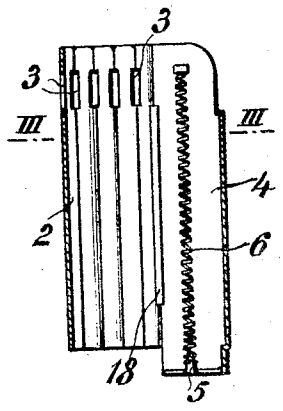


Fig.4

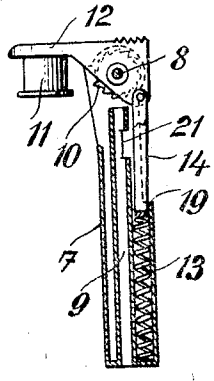


Fig.3

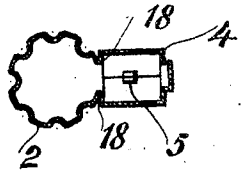


Fig.5

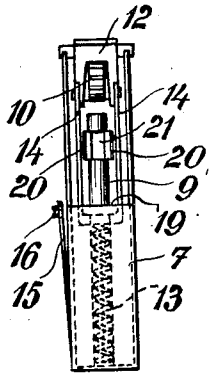
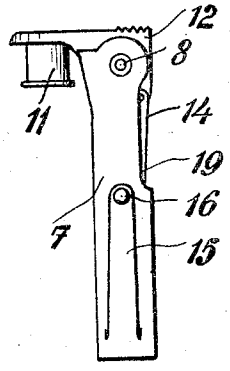


Fig.6



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Fig.7

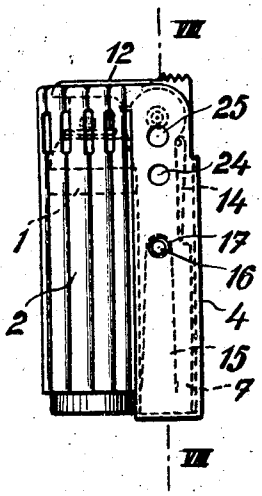


Fig.8

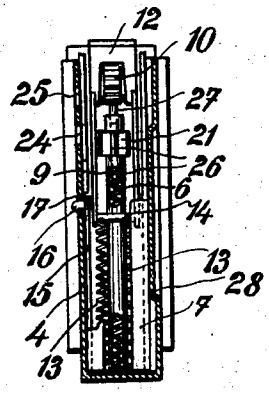


Fig.9

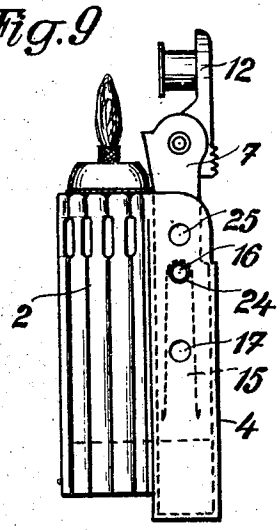


Fig.10

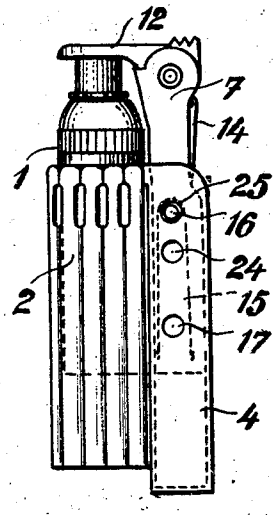


Fig.11

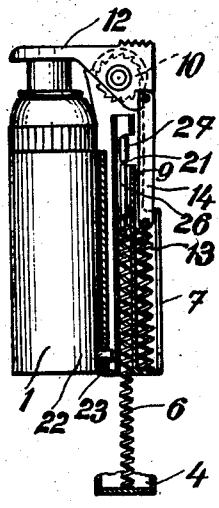
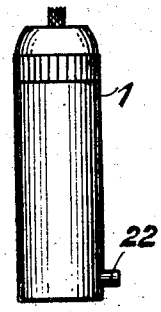


Fig.12



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UNITED STATES PATENT OFFICE

2,219,531

PYROPHORIC LIGHTER

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Application July 20, 1938, Serial No. 220,243
In Austria July 20, 1937

8 Claims. (Cl. 67—7.1)

This invention relates to a friction-wheel pyrophoric lighter in which the spring which presses up the piece of pyrophorous composition ("flint") is mounted in the lighter casing, while the friction-wheel, the keeper or guideway for the "flint," and also the lid of the lighter are arranged on a carrying member detachably connected to the body of the lighter, by means of which the pressing-up spring is tensioned when the lighter is in its operative condition, and may be detensioned for the purpose of inserting a flint. In the known type of lighter this carrying member is adapted to be screwed to the flint spring casing provided in the body of the lighter, which not only makes it necessary to remove the carrying member completely each time a fresh flint is to be inserted, but also takes a considerable time on account of the screw joint. Besides, the changing of the flint offers difficulties, more particularly because the flint easily drops out during the introduction of the flint spring casing into the carrying member which has to be screwed on against the action of the spring, in view of the fact that the flint has to be inserted into its guideway from the lower end thereof.

A further type of lighter is also known in which the carrying member furnished with friction-wheel is locked in its operative position by means of a snap fastener, and for the purpose of inserting a fresh flint is adapted to be pivoted about a hinge joint on the casing of the lighter. Changing flints is only possible, however, provided the pressing-up spring be first suitably relieved of tension by turning the head of the spring casing which is adapted to be screwed apart after the manner of a telescope tube. The reverse procedure must also be carried out once more after the insertion of the fresh flint.

The present invention provides a friction-wheel pyrophoric lighter in which the insertion and replacement of the flint is very considerably simplified by virtue of the fact that the carrying member furnished with the friction-wheel, flint guideway, and lighter lid and loaded by the pressing-up spring takes the form of a sliding element which is longitudinally displaceable relatively to the body of the lighter, and which is adapted to be fixed at least in the operative position requisite for igniting the lighter. In further development of the invention, the fuel holder may also be permanently or detachably connected for movement with the sliding element, even in the case of a lighter having a jacket or shell receiving the fuel holder, e. g. a gasoline container.

Two forms of construction embodying the invention are shown, by way of example, in the accompanying drawings, in which:

Fig. 1 is a side elevation of a friction-wheel lighter according to the invention.

Fig. 2 shows the shell of the lighter in longitudinal section.

Fig. 3 is a transverse section taken on the line III—III of Fig. 2, with the pressing-up spring omitted.

Fig. 4 shows the sliding element for the friction-wheel, lighter lid, and flint guideway, in side elevation and partly in longitudinal section.

Fig. 5 shows the same in rear elevation.

Fig. 6 is a side elevation of the first form of construction of the invention.

Fig. 7 shows a modified form of construction of the friction-wheel lighter in the closed condition, in side elevation.

Fig. 8 shows the same in section taken on the line VIII—VIII of Fig. 7, as seen from the right.

Fig. 9 is a side elevation of the lighter according to the invention in the position which allows of its use as a torch or for lighting a pipe.

Fig. 10 shows the lighter in the position suitable for the insertion of the flint, in side elevation.

Fig. 11 shows the lighter in section without the casing jacket or shell, and

Fig. 12 shows the gasoline container in side elevation.

The friction-wheel or pyrophoric lighter according to the present invention preferably consists of a tubular shell **2** which receives the removable fuel container **1**, the latter being provided near its upper edge with air admission apertures **3**. Shell **2** merges at the side in a guide casing **4** preferably of rectangular cross-section. From the bottom of the guide casing **4**, which is open at the top, two lugs **5** are bent out towards the inside at right angles which together constitute a pin on which the end of the flint spring **6** is fitted. Associated with guide casing **4** is a longitudinal casing **7** (Figs. 4 to 6) adapted to fit its inside cross-section and acting as sliding element, which is traversed beneath the friction-wheel journal **8** by the flint guide **9** extended to form the housing for the flint spring **6**. The friction-wheel journal **8** carries in a known manner, the freely rotatable, friction-wheel **10** coacting with a driving element (not shown in the drawings), and the lighter

lid 12 equipped with a wick cap 11; a pressure spring 13 housed in the gap between the flint guide 9 and the housing 7 of the sliding element is counter supported against the web of a stirrup 14 eccentrically connected to the lid 12 of the lighter, with the result that the lid 12 of the lighter is retained in a position corresponding to its position of closure.

The sliding element 7 thus equipped is so inserted from above into its guide casing 4, that the flint spring 6 projects with its free end in the flint guide 9 lower portion of which constitutes the spring housing, while the bottom of the housing 7 of the sliding element is situated close above that of the guide casing 4. In this manner the flint spring 6, in spite of the displaceability of the sliding element 7, is guided throughout its length in the position appropriate for the delivery of sparks, and prevented from lateral bulging. In order that the sliding element 7 shall not be displaced out of the guide casing 4 under the influence of the flint spring 6 acting upon the friction-wheel 10 there is formed from the one side wall of the casing 7 of the sliding element a spring lug 15 which, when the sliding element 7 is in its lower position, automatically snaps with a stud 16 into a detent 17, e. g. in the form of a hole, in the guide casing 4; since the contiguous side walls of the casing 7 of the sliding element and of the guide casing 4 are thus directly utilized to form the fixing means of the sliding element it becomes unnecessary to provide separate structural elements for this purpose. A longitudinal rib 18, which narrows the transition between the shell 2 and the guide casing 4 on both sides, prevents the casing 7 of the sliding element from becoming obliquely set in its guide casing 4. The flint may be inserted through an aperture 19 in the rear wall of the casing 7 of the sliding element, and between the shanks of the stirrup 14, into a lateral aperture 21 in the flint guide 9 near the upper end thereof and bounded by obliquely jutting out guide lugs 20 (Fig. 5), the shanks 14 of the stirrup serving at the same time as guide walls leading from the aperture 19 to the guide lugs 20.

When the sliding element 7—as shown in Fig. 1—is completely pushed into the guide casing 4 the lighter can be operated in the usual manner by pressure exerted upon the ribbed portion of the lid 12, particularly since owing to the stud 16 engaging in the detent 17 the sliding element 7 is held firmly in position relatively to the guide casing 4 and therefore also relatively to the fuel tank. To insert a flint in the lighter or to change flints it is merely necessary to exert pressure upon the stud 16 so as to force it out of the detent 17, whereupon the sliding element 7 is partly forced out of the guide casing 4 in response to the action of the flint spring 6 which, owing to its initial tension, exerts pressure upon the friction-wheel 10. The flint spring 6 is thereby completely relieved of tension, for which reason this spring is not subjected to any strain at all during the inserting of the flint. After a sufficient clearance has been obtained between the free end of the flint spring 6 and the friction-wheel 10 by further pushing out the sliding element 7 if necessary the flint may be inserted in the known manner.

The above disclosed arrangement of the casing 7 of the sliding element together with the parts pertaining thereto, and its ready and complete detachability from the guide casing 4 and/or the body of the lighter not only simplifies very considerably the manufacture of the lighter, but also allows of an easy replacement of used parts.

The second embodiment of the lighter according to the invention, which is shown in Figs. 7–12, and in which the parts having exact equivalents in the form of construction previously described are denoted by the same reference characters, differs from the first form of construction essentially in this that the fuel container 1, which has no projecting rim at the bottom, is also connected for movement with the sliding element 7, with the result that the fuel tank 1 participates in the longitudinal displacement of the sliding element 7. The connection between the fuel container 1 and the sliding element 7 may in this case be permanent or detachable. The latter type of connection is obtained as shown in Figs. 11 and 12 by providing the fuel tank 1 with a projecting pin 22 or the like capable of engaging in an appropriate hole 23 in the sliding element 7. The stud 16 on the spring tongue 15 has associated therewith, above the detent 17, preferably two further detents 24, 25 with the aid of which the sliding element 7 and therefore also the fuel tank 1 can be fixed at two different levels. The arrangement of the one detent 24 is such that when the stud 16 snaps into engagement the pressure piston 26 connected with the upper end of the flint spring 6 still closes the lateral aperture 21 in the flint guide 9, which serves for replacement of the flint 27, and therefore prevents the falling out of flint 27, whereas the pressing piston 26 completely closes the lateral aperture 21 when the other detent 25 is engaged by stud 16. It is of such a shape that the stud 16 is automatically forced out of the detents 25, 24 when pressure is exerted from above on the lighter lid 12 pertaining to the sliding element 7; in this manner the sliding element 7, together with the fuel tank may be transferred from any position occupied, with simultaneous tensioning of the flint spring 6, in one operation, back into the lower position in which the stud 16 engages detent 17. Since the wall of the guide casing 4, disposed opposite the wall having the detents 17, 24, 25, is provided with an indentation 28 (Fig. 8) the sliding element 7 lies snugly against the wall provided with the detents 17, 24, 25, so that the resilience of the tongue 15 is fully utilized, and the nose 16 snaps with certainty into one of the detents 17, 24, 25.

As long as the sliding element 7 with the fuel tank 1 is in the lowermost position (Figs. 7 and 8), in which the stud 16 of the tongue 15 engages with the detent 17, the lighter can be operated for ignition. If it is then desired to use the burning lighter as a torch or to ignite a difficultly accessible object, e. g. a pipe, it is merely necessary to force the stud 16 by pressure exerted with a finger, out of the detent 17, with the result that the released flint spring 6 jerks the sliding element 7 out of its guide casing to such an extent that the stud 16 automatically snaps into the next following detent 24 (Fig. 9). Since the fuel tank 1 participates, however, in the movement of the sliding element 7 the upper end portion of the fuel tank 1 with the wick then projects out of the shell 2, with the result that the flame is exposed. The pressing piston 26 projecting beyond the lateral aperture 21 prevents the falling out of flint 27 even when the lighter is tilted. In order to change flints the stud 16 must also be removed from the detent 24, and the sliding element 7 be

further lifted by hand, in order that the stud 16 may engage with the uppermost detent 25 (Figs. 10 and 11). In this position the flint may be introduced through the lateral aperture 21 in the flint guide 9 exposed by the pressing piston 26. When, finally, after the ignition of the wick, the sliding element 7 is also lifted with its stud 16 over the detent 25 the sliding element 7 and the fuel tank 1 may be removed upwards out of the guide casing 4 and the shell 2, after which the fuel tank 1 may be used like a candle after disengagement of the connecting means 22, 23 between it and the sliding element 7.

Instead of the tank 1 for liquid fuel, equipped with a wick, the shell 2 may also be fitted with a fuse or tinder holder movable with the sliding element 7; it would also be possible if necessary to replace the fuel container 1 by a tinder holder and vice-versa.

I claim:

1. A pyrophoric lighter comprising a casing, a fuel container in the same, said fuel container being provided with a wick, a flint biasing spring mounted in said casing, a detachable unit carrying a friction wheel, a flint-guide and a lighter cover, said unit being slidable in said casing, means to lock said unit within said casing in at least one of the operating positions of the lighter and to release the same whereby on the one hand the flint supporting spring is set under tension for the purpose of establishing said operating position and on the other hand said unit is ejected by said released spring in order to permit the exchange of the flint.

2. A pyrophoric lighter comprising a casing, a fuel container in the same, said fuel container being provided with a wick, said casing having a lateral extension, a flint biasing spring mounted on the bottom of said extension, a detachable unit carrying a friction wheel, a flint guiding sleeve receiving said flint spring and a lighter cover, said unit being slidable in said extension, means to automatically lock said unit within said extension in at least one of the operating positions of the lighter and to release the same, whereby on the one hand the flint biasing spring is set under tension for the purpose of establishing said operating position and on the other hand said unit is ejected by said released spring in order to permit the exchange of the flint.

3. A pyrophoric lighter comprising a casing, a fuel container in the same, said fuel container being provided with a wick, a flint biasing spring mounted in said casing, a second detachable casing, a spring influenced rotatable friction wheel, an open-end flint guiding sleeve and a lighter cover in said second casing, said casing being slidable in said first casing, means to lock said second casing within said first casing in the position for ignition and to release the same whereby the flint supporting spring is put under tension for establishing the igniting position and said second casing is ejected by said released spring in order to permit the exchange of the flint.

4. A pyrophoric lighter comprising a casing, a fuel container in said casing, said fuel container being provided with a wick, a flint biasing spring mounted in said casing, a detachable unit carrying a friction wheel a flint-guide and a lighter cover, said unit being slidably arranged in said casing, snap fastening means adapted to lock said unit within said casing in at least one of the operating positions of the lighter and to release said unit, said snap fastening means consisting of a resilient tongue formed directly from the casing wall of said detachable unit, said tongue cooperating with at least one detent provided in the guide of said detachable unit, whereby on the one hand the flint supporting spring is tensioned for the purpose of establishing said operating position and on the other hand said unit is ejected by said released spring in order to permit the exchange of the flint.

5. A pyrophoric lighter comprising a casing having a lateral extension, a fuel container in said casing, said fuel container being provided with a wick, a flint biasing spring mounted on the bottom of said extension, a detachable unit carrying a friction wheel a flint guiding sleeve receiving said flint spring and a lighter cover, said flint guiding sleeve having a lateral aperture for inserting the flint, said aperture being accessible through the shanks of the spring-stressed stirrup connected with said lighter cover, said unit being slidable in said extension, means to automatically lock said unit within said extension in at least one of the operating positions of the lighter and to release the same, whereby on the one hand the flint biasing spring is set under tension for the purpose of establishing said operating position and on the other hand said unit is ejected by said released spring in order to permit the exchange of the flint.

6. A pyrophoric lighter comprising a shell having a lateral extension, a fuel container in said shell, said fuel container being provided with a wick, a flint biasing spring mounted on the bottom of said extension, a detachable unit carrying a friction wheel, a flint guiding sleeve receiving said flint spring and a lighter cover, said unit being slidable in said extension, said fuel container being slidably arranged in said shell and disengageably connected with said unit, means to automatically lock said unit within said extension in at least one of the operating positions of the lighter and to release the same, whereby on the one hand the flint biasing spring is tensioned for the purpose of establishing said operating position and on the other hand said unit is ejected by said released spring in order to permit the exchange of the flint.

7. A lighter as claimed in claim 4 wherein a plurality of detents is provided and arranged one above the other.

8. A pyrophoric lighter comprising a shell having a lateral extension, a fuel container in said shell, said fuel container being provided with a wick, a flint biasing spring mounted on the bottom of said extension, a detachable unit carrying a friction wheel a flint guiding sleeve receiving said flint spring and a lighter cover, said unit being slidably arranged in said extension, said fuel container being slidable in said shell and being provided with a pin cooperating with a hole provided in said unit, means to automatically lock said unit within said extension in at least one of the operating positions of the lighter and to release the same, whereby on the one hand the flint biasing spring is set under tension for the purpose of establishing said operating position and on the other hand said unit is ejected by said released spring in order to permit the exchange of the flint.

ALFRED RACEK.