April 4, 1950 M. QUERCIA ET AL 2,502,533

IGNITION DEVICE FOR LIGHTERS AND LIKE APPARATUS

Filed June 26, 1947 2 Sheets-Sheet 1

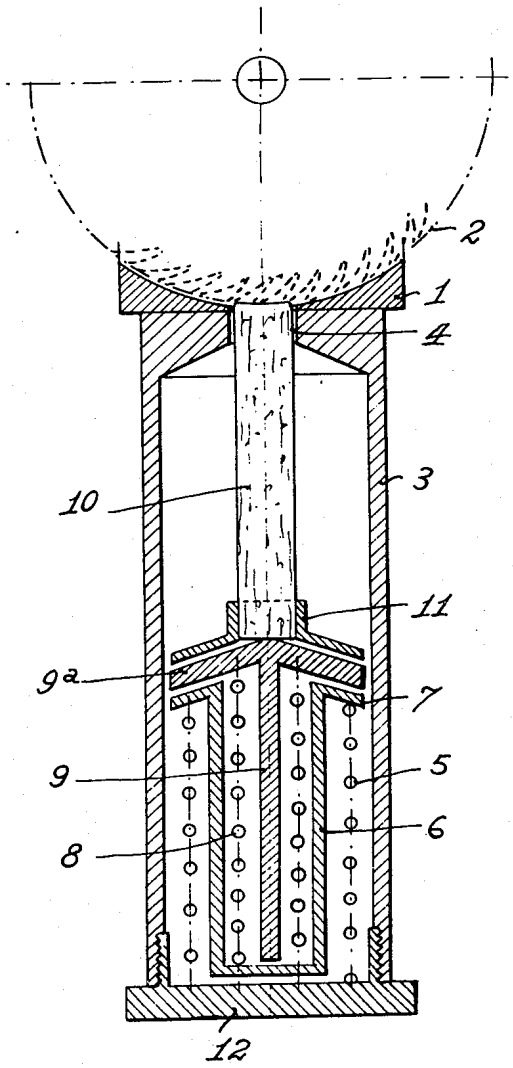

Fig. 1

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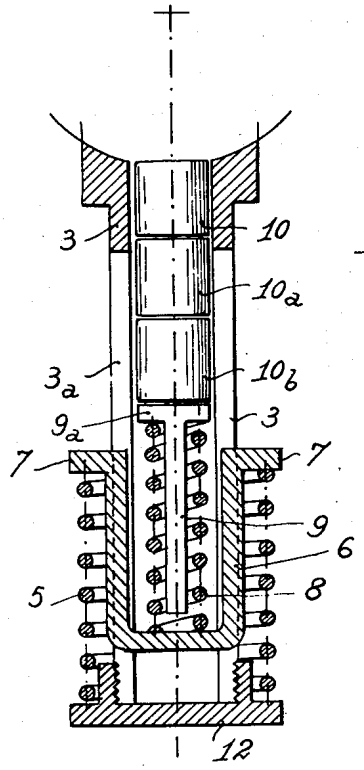

Fig. 2

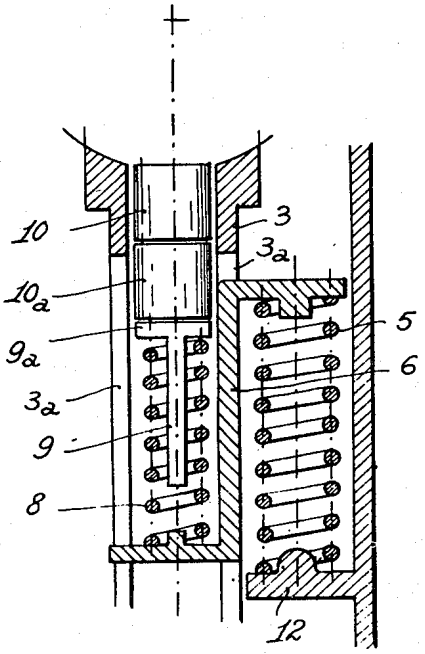

Fig. 3

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IGNITION DEVICE FOR LIGHTERS AND LIKE APPARATUS

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Section 1, Public Law 690, August 8, 1946
Patent expires May 10, 1963

6 Claims. (Cl. 67—6.1)

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The present invention relates to pyrophoric lighters in which a spark is drawn by a striking wheel from a flint of ferro-cerium.

It is an object of the present invention to enable the use of a flint of relatively great length or several superposed flints so that there is no need to exchange the flint except after a long period of use.

It is another object of the present invention to eliminate any regulation of pressure by hand during the use of the flint.

The invention comprises a casing, a striking wheel arranged outside the casing at one end thereof, a flint of great length movably arranged in the casing and protruding beyond the end of the casing against the striking wheel, means for guiding the flint in the casing, a first spring acting with one end thereof on the flint, a second spring arranged in parallel relationship to the first spring and bearing with one end thereof on the casing, and a sliding member arranged in the casing between the springs and having a bottom and a top, the first spring bearing against the bottom and the second spring bearing with its other end against the top.

The novel features which we consider as characteristic for our invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawings, in which:

Fig. 1 is a sectional elevation of a first embodiment of our invention;

Fig. 2 is a sectional elevation of a second embodiment of the invention; and

Fig. 3 is a sectional elevation of a third embodiment of this invention.

As is seen from the Fig. 1, a fork-shaped member 1, which carries the wheel 2 of the lighter, is mounted upon a tubular member 3, which is hollow to provide a passage for the housing of the flint 10 of ferro-cerium. The latter is of a relatively great length, for example double, triple, quadruple, or more of the usual length, so that it lasts correspondingly longer and has to be replaced at less frequent intervals of time.

The diameter of the opening 4 of the neck of the member 3 is very slightly larger than the diameter of the flint 10 and its height is also reduced as much as possible as is consistent with mechanical strength.

In the member 3 is introduced, for example by the base, a compression spring 5, inside which a socket 6 is arranged which is provided with a flange 7 against which the spring 5 abuts.

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Inside the socket 6 is housed a spring 8 surrounding a rod 9, the length of which is at most equal to the height of the socket 6. This rod is provided at its upper end with a conical head 9a, the diameter of which is a little smaller than that of the member 3.

The flint 10, of ferro-cerium, is provided at its foot with a flanged collar 11, of small height, preferably having a conical or disc-like profile the diameter of which is a little smaller than that of the member 3.

At its end opposite to the wheel 2, the member 3 is closed by any suitable means, for example by a threaded stopper 12, a pin, or a similar member, or as the tubular member 3 is housed in a cover closing the opening of the member so as to maintain in position the whole assembly of the pieces housed therein.

The outer spring 5 rests upon the stopper 12, while the spring 8 rests upon the bottom of the socket 6, which is itself acted upon at its flange 7 by the thrust of the spring 5.

The upper end of the flint of ferro-cerium engages the neck 4 and comes in contact with the wheel 2, while the flint is maintained centrally with respect to the vertical axis of the member 3 owing to the collar 11 which slides freely in the member.

The inner spring 8, pushing the rod 9—9a, urges upwards the collar 11 with the flint 10, so as to press the latter against the wheel 2. The outer spring 5 adds its thrust to that of the spring 8 through the intermediary of the socket 6, the bottom of the latter acting upon the spring 8 so as to increase and extend its action. It follows that whatever the shortening of the length of the flint 10 is owing to wear, an appreciably constant pressure is always exerted upon it, sufficient to obtain suitable ignition sparks.

The parts 7, 9a and 11 and the inner face of the upper bottom of the member 3 are advantageously of conical shape, as shown in the drawing, so as to permit a practically total wear of the flint, of which the small portions only which are contained in the neck 4 of the member 3 and in the collar 11 are wasted, this loss being however negligible in consideration of the greater length of flint which can be utilised.

In the alternative construction shown in Fig. 2, the tubular member 3 is slotted at 3a along a great portion of its length; in this slot 3a slides a stirrup 6 on the outer flange 7 of which acts the outer spring 5. On the bottom of this stirrup rests the inner spring 8 which pushes the head 9a of the central rod 8 against either the single flint or against the bottom flint of a series of superposed flints 10, 10a, 10b. A stopper 12 closes

the tubular member 3 and serves as a seating for the outer spring 5.

In the alternative construction of the Fig. 3 the outer spring 5 is arranged laterally and acts upon the axial spring 8 by means of a zig-zag 6 sliding in the slot 3a of the tubular member 3. This spring 5 rests upon a fixed stop member 12.

In all these arrangements, the inner and outer springs add reciprocally their action to obtain the regularity of the thrust upon the flint or flints, whatever may be the degree of wear of the latter.

It will be noticed that the adjustment of the pressure on the flint is obtained automatically because of the gradual manner in which the springs are brought into action.

It goes without saying that the system could comprise a number of springs greater than two, for example three or four springs, disposed concentrically or laterally, and the effects of which would act in superposition or in compensation to ensure an appreciably constant thrust upon the flint for the whole life of the latter.

What we claim is:

1. In a pyrophoric lighter, in combination, a casing; an interior conical recess formed at one end of said casing; an opening provided around the apex of said recess; a flint extending with its forward end through said opening; a striking wheel disposed exteriorly of said casing so as to be in contact with said forward end of the flint; a collar arranged on the interior end of said flint; a conical flange formed on said collar, the said flange having a shape corresponding to said conical recess; an elongated thrust member disposed in said casing; a conical abutment provided at one end of said thrust member; a slide member having a base, the said slide member being disposed in said casing; a conical flanged top provided on said slide member; and two spring elements, the said spring elements being disposed concentrically and on opposite sides of said slide member and having different physical characteristics, one of said spring elements acting with one end against said base of the slide member and with its other end against said abutment of the thrust member, and the other spring element acting with one end against the interior wall of said casing and with the other end against said flanged top of the slide member whereby said conical flange of the collar, said abutment and said flanged top are urged against each other and whereby said flint is urged against said striking wheel.

2. In a pyrophoric lighter in combination, a casing; a striking wheel arranged outside said casing at one end thereof; a flint of great length movably arranged in said casing and protruding beyond the end of said casing against said striking wheel; means for guiding said flint in said casing; a first spring acting with one end thereof on said flint; a second spring arranged in parallel relationship to said first spring and bearing with one end thereof on said casing; and a sliding member arranged in said casing between said springs and having a bottom and a top, said first spring bearing against said bottom and said second spring bearing with its other end against said top.

3. In a pyrophoric lighter in combination, a casing; a striking wheel arranged outside said casing at one end thereof; a flint of great length movably arranged in said casing and protruding beyond the end of said casing against said striking wheel; means for guiding said flint in said

casing; a first spring acting with one end thereof on said flint; a second spring arranged concentrically to and surrounding said first spring and bearing with one end thereof on said casing; and a sliding member arranged in said casing between said springs and having a bottom and a top, said first spring bearing against said bottom and said second spring bearing with its other end against said top.

4. In a pyrophoric lighter in combination, a casing; a striking wheel arranged outside said casing at one end thereof; a flint of great length movably arranged in said casing and protruding beyond the end of said casing against said striking wheel; means for guiding said flint in said casing; a first spring acting with one end thereof on said flint; a second spring arranged concentrically to said first spring and bearing with one end thereof on said casing, said springs having different physical characteristics; and a sliding member arranged in said casing between said springs and having a bottom and a top, said first spring bearing against said bottom and said second spring bearing with its other end against said top.

5. In a pyrophoric lighter comprising in combination, a casing; a striking wheel arranged outside said casing at one end thereof; a flint of great length movably arranged in said casing and protruding beyond the end of said casing against said striking wheel; means for guiding said flint in said casing; a conical collar slidably arranged in said casing at the base of said flint; a conical member slidably arranged in said casing adjoining said conical collar; a first spring acting with one end thereof on said conical member; a second spring arranged in parallel relationship to said first spring and bearing with one end thereof on said casing; and a sliding member arranged in said casing between said springs and having a bottom and a top, said first spring bearing against said bottom and said second spring bearing with its other end against said top.

6. In a pyrophoric lighter in combination, a casing; a striking wheel arranged outside said casing at one end thereof; a flint of great length movably arranged in said casing and protruding beyond the end of said casing against said striking wheel; means for guiding said flint in said casing; a conical collar slidably arranged in said casing at the base of said flint; a conical member slidably arranged in said casing adjoining said conical collar; a first spring acting with one end thereof on said conical member; a second spring arranged concentrically to and surrounding said first spring and bearing with one end thereof on said casing; and a sliding member arranged in said casing between said springs and having a bottom and a top, said first spring bearing against said bottom and said second spring bearing with its other end against said top.

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