

# PATENT SPECIFICATION



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## PROVISIONAL SPECIFICATION

### Improvements relating to Pyrophoric Lighters

I, BENNO LOWENTHAL, a German Citizen, of 60, Beaufort Park, Beaufort Drive, London, N.W.11, England, do hereby declare the nature of this invention to be as follows:—

This invention relates to pyrophoric lighters and is concerned more especially with a lighter head, that is to say the spark-producing means, which can be attached to any kind of fuel container provided with a wick, so as to form a complete lighter.

According to the invention, the whole of the spark-producing means, including the friction wheel and the flint, are enclosed in a casing which is provided in the vicinity of the flint with an opening for the emission of the sparks. The casing may be provided with any suitable means whereby it may be attached to a fuel container adjacent the wick.

According to a further feature of the invention the flint, instead of being in the form of a rod or cylinder as usual, is in the form of a disc or annulus and the friction wheel co-operates with one of the side surfaces of the disc or annulus. For this purpose the friction wheel may also be in the form of a disc or annulus which is provided on one of its side surfaces, and not as usual on its periphery, with teeth which co-operate with the side surface of the flint. Although a flint of this form is preferred the invention is not limited thereto as flints of the usual cylindrical form may be used.

According to a preferred form of construction, the casing is made in two parts of which one part is provided with means for attachment to a fuel container and the other part is rotatably mounted on the first-mentioned part. Between the friction wheel, and the rotatable part of the casing there is interposed a spring-controlled one-way clutch which is so arranged that, when the rotatable part of the casing is turned in one direction, a coiled spring fitted in the casing is tensioned and the parts of the clutch move relatively the one to the other without rotating the friction wheel, while, when the rotatable part of the casing is released, the spring rotates the rotatable part of the

casing in the opposite direction and, the clutch members engage one another in this direction of rotation, so that the friction wheel is also rotated.

The rotatable part of the casing may be provided on its outer surface with an inclined projecting surface or an inclined groove and a slot, which are adapted to co-operate with a catch on a spring-actuated lid on a lighter body to which the head is fitted. The arrangement may then be such that a slight initial rotation of the rotatable part of the casing releases the lid catch from the slot, so that the lid is opened by its spring, and further rotation in the same direction effects the tensioning of the spring which operates the clutch. After the return of the rotatable part of the casing, the lid is pressed down so that its catch slides along the inclined surface after slightly rotating the rotatable part of the casing and clicks into the slot.

In order that the nature of the invention may be clearly understood, a preferred form of lighter head constructed in accordance with the invention will now be described by way of example.

The lighter head comprises a lower casing part of cylindrical shape and provided with means for attachment to a fuel container adjacent the wick, and an upper casing part also of cylindrical shape and rotatably mounted on the lower part. In the lower casing is fixed a flint of circular disc shape and a friction wheel is mounted above the flint. The friction wheel is provided with teeth on one side surface adjacent the side surface of the flint and a reduced neck portion provided with ratchet teeth extends from the opposite side surface. A second ratchet member in the form of a disc having extending lugs which engage in slots in the upper casing part so as to rotate therewith and a reduced neck portion having ratchet teeth which coact with the ratchet teeth on the flint wheel is fitted in the upper casing part. The reduced neck portions of the two ratchets are enclosed by a sleeve around which is disposed a coiled spring of which one end is anchored to the rotatable casing part and the

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other end is anchored to the fixed casing part. The rotatable casing part is closed by a cover between which and the adjacent ratchet member is interposed a coiled spring, by which the two ratchet members are yieldingly pressed together and the flint wheel is also pressed against the flint. A screw of which the head bears against the cover and the opposite end screws into the end of the fixed casing part passes through central holes in the ratchet members, the flint wheel and the flint and holds the parts in place. The rotatable part of the case is provided with an outwardly extending trigger or lever, operation of which rotates the rotatable part of the casing and thereby tensions the spring, without rotating the flint wheel as the teeth of the two ratchet members slide over one another in this direction of rotation. When the trigger or lever is released the spring rotates the rotatable part of the casing in the opposite direction in which the ratchet teeth engage so that the friction wheel also is rotated and its teeth engage the flint from which the sparks are emitted through an opening provided in the fixed part of the casing adjacent the periphery of the flint.

If desired, a spring which is adjustable by means of a screw or the like may be provided in a part of the casing below the flint, in order to regulate the pressure of the flint or flint wheel against the friction wheel.

The rotatable part of the case may be provided on its external periphery with an inclined surface or slot terminating in a notch or horizontal slot or the like for co-acting with a catch on a lid or cover in the manner previously described.

The flint, instead of being in the form of a disc or annulus as described, may be of the usual rod form in which one or a plurality of flints may be arranged to co-operate with the friction wheel.

The lighter head may be made in an extremely small and compact form, and may be fixed in any suitable position to a fuel container of any kind.

The invention comprises also a lighter fitted with the new lighter head.

Dated this 5th day of February, 1944.

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## COMPLETE SPECIFICATION

### Improvements relating to Pyrophoric Lighters

I, BENNO LOWENTHAL, a German Citizen, of 60, Beaufort Park, Beaufort Drive, London, N.W.11, England, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to pyrophoric lighters and is concerned more especially with a lighter head, that is to say the spark-producing means which can be attached to any kind of fuel container provided with a wick, so as to form a complete lighter.

According to the invention, the lighter head comprises a casing which contains the whole of the spark-producing means including the friction wheel and the flint and is made in two parts, one of which is rotatably mounted upon the other, the arrangement being such that by partially rotating the rotatable part of the casing relatively to the part on which it is mounted a spring is tensioned and, on releasing the rotatable part, the spring rotates the rotatable part in the opposite direction and thereby causes the

friction wheel to be rotated against the flint so as to produce sparks which are emitted through an opening in the casing adjacent the flint. The casing may be provided with any suitable means whereby it may be attached to a fuel container adjacent the wick.

According to a further feature of the invention the flint, instead of being in the form of a rod or cylinder as usual, is in the form of a disc or annulus and the friction wheel co-operates with one of the side surfaces of the disc or annulus. For this purpose the friction wheel may also be in the form of a disc or annulus which is provided on one of its side surfaces, and not as usual on its periphery with teeth which co-operate with the side surface of the flint. Although a flint of this form is preferred the invention is not limited thereto as flints of the usual cylindrical form may be used.

According to a preferred form of construction, there is interposed between the friction wheel and the rotatable part of the casing a spring-controlled one-way clutch which is so arranged that when the rotatable part of the casing is turned in

one direction, a coiled spring fitted in the casing is tensioned and the parts of the clutch move relatively the one to the other without rotating the friction wheel, 5 while, when the rotatable part of the casing is released, the spring rotates the rotatable part of the casing in the opposite direction and the clutch members engage one another in this direction of rotation, 10 so that the friction wheel is also rotated.

The rotatable part of the casing may be provided on its outer surface with an inclined projecting surface or an inclined groove and a slot, which are adapted to 15 co-operate with a catch on a spring-actuated lid on a lighter body to which the head is fitted. The arrangement may then be such that a slight initial rotation of the rotatable part of the casing releases 20 the lid catch from the slot, so that the lid is opened by its spring, and further rotation in the same direction effects the tensioning of the spring which operates the clutch. After the return of the rotatable 25 part of the casing, the lid is pressed down so that its catch slides along the inclined surface after slightly rotating the rotatable part of the casing and clicks into the slot.

In order that the invention may be easily understood and readily carried into effect, a lighter head constructed in accordance with the invention is illustrated by way of example in the accompanying drawing, in which 35

Fig. 1 is a perspective view of the lighter head showing the head fitted to a fuel container;

Fig. 2 is a view mainly in section of the lighter head shown in Fig. 1;

Fig. 3 is a view similar to Fig. 2 showing a slightly modified form of construction; and

Fig. 4 is a view showing how the lighter head co-acts with the lid of a fuel container to which it is fitted.

Referring to the drawing, the lighter head comprises a cylindrical casing part 1 provided around its periphery at its lower end with a number of flanged portions 2 which can be engaged under the retaining lips 3 which are provided on the fuel container 4 to which the lighter head is fitted. The upper end of the casing part 1 is stepped inwardly as will be seen from Fig. 2 so as to provide a bearing surface for the lower end of an upper cylindrical casing part 5 which is rotatably mounted on the lower casing part and for this purpose is provided with an internal step or recessed portion at its lower end. 60

In the case part 1 a flint 7 in the form of a circular disc is secured against rotation by means of a grub screw 8 which engages 65 in a groove in the periphery of the flint,

and a friction wheel 9 having teeth 10 which are in contact with the upper surface of the flint disc is rotatably mounted in the casing part 1 above the flint disc 7, the upper surface of the friction wheel 70 bearing against a shoulder formed by the step at the upper end of the casing part 1. The friction wheel has an upwardly extending reduced neck portion 11 provided at its upper end with ratchet teeth 75 12. In the casing part 5 is fitted a second ratchet member in the form of a disc 13 having a downwardly extending neck 16 provided at its lower end with ratchet teeth 17 which engage the teeth 80 12.

The disc 13 is provided with a pair of radially extending lugs 14 which engage in two diametrically opposite slots 15 in the casing part 5, so that the disc 13 and 85 its ratchet teeth 17 rotate together with the casing part 5.

The neck portions 11 and 16 of the two ratchets are enclosed by a sleeve 18 by which they are held in position and around which is disposed a coiled spring 19. One end 20 of the spring 19 is anchored in one of the slots 15 in the casing part 5 while the other end 21 is anchored in a slot 22 in the casing part 1. 95 The casing 5 is closed by a cover 23 between which and the ratchet member 13 is interposed a coiled spring 24 by which the two ratchet members 11 and 13 are yieldingly pressed together. The spring 24 100 also acts to press the friction wheel 9 against the flint disc 7. A screw 24' which screws into the friction wheel 9 and of which the head bears against the cover 23 holds the parts in position. The 105 rotatable casing part 5 is provided with an outwardly extending lever 25, rotation of which in one direction causes the casing 5 to rotate relative to the casing part 1 and thereby tensions the spring 19 without however rotating the flint wheel, since 110 the teeth of the two ratchet members slide over one another in the one direction of rotation. When the lever 25 is released after being partially rotated, the spring 19 115 rotates the casing part 5 in the opposite direction in which the ratchet teeth engage, so that the friction wheel 9 is also rotated and its teeth 10 engage the flint 7 from which sparks are emitted through an opening 26 provided in the casing part 1. 120

In the form shown in Fig. 2, the casing part 1 is provided with a tubular extension 27 which contains a spring 28 125 which presses against the under surface of the flint wheel 7 or against a disc 29 which is interposed between the end of the spring and the flint wheel. In order to regulate the pressure of the flint against 130

the flint wheel, the compression of the spring 28 may be adjusted in the usual manner by means of a screw which is screwed into the end of the tubular extension 27 and is not illustrated in the drawing.

The rotatable part 5 of the casing may be provided on the outside with a projecting part 30 containing a groove 31 and an inclined surface 32 leading to the groove. The cover or lid 33 of the lighter to which the head is fitted may then be provided with a catch 34 which co-acts with the inclined surface 32 and groove 31. In the form illustrated the arrangement is such that a partial rotation of the lever 25 in a clockwise direction releases the catch 34 from the slot 31, so that the lid is opened by its spring 35, and a further partial rotation in the same direction tensions the spring 19. When the lever 25 is released the spring 19 rotates the casing part 5 in the opposite direction and sparks are emitted through the opening 26. When the lid is closed by hand the catch 34 slides down the inclined surface 32 thereby partially rotating the casing part 5 until it reaches the groove when the spring again rotates the part 5 in the reverse direction to lock the catch 34 in the groove.

In the modified form of construction illustrated in Fig. 3 the arrangement is similar to that shown in Figs. 1 and 2, except that the screw 24<sup>1</sup> passes through the two ratchet members, the friction wheel and the flint disc, which are bored to receive it, and screws into the bottom 36 of the casing part 1.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A lighter head comprising a casing which contains the whole of the spark-producing means including the friction wheel and the flint and is made in two parts, one of which is rotatably mounted upon the other, the arrangement being such that by partially rotating the rotatable part of the casing relatively to the part on which it is mounted a spring is tensioned and, on releasing the rotatable part, the spring rotates the rotatable part in the opposite direction and thereby causes the friction wheel to be rotated against the flint so as to produce sparks which are emitted through an opening in the casing adjacent the flint.

2. A lighter head in accordance with claim 1, in which a spring-controlled one-way clutch is interconnected between the rotatable part of the casing and the friction wheel.

3. A lighter head in accordance with claim 1 or claim 2, in which the flint is in the form of a disc or annulus and the friction wheel co-operates with one of the side surfaces of the disc or annulus. 70

4. A lighter head in accordance with claim 3, in which the friction wheel is also in the form of a disc or annulus which is provided on one of its side surfaces with teeth which co-act with a side surface of the flint. 75

5. A lighter head in accordance with claim 1, 3 and 4, in which one of the parts of the casing is provided with means for attachment to a fuel container and the flint and friction wheel are fitted in the said part. 80

6. A lighter head in accordance with any preceding claim, in which the rotatable part of the casing is provided on its outer surface with an inclined surface terminating in a recess for co-operating with a catch on the lid of the lighter to which the head is fitted. 85

7. A lighter head in accordance with claim 6, in which the arrangement is such that rotation of the rotatable part of the casing first releases the catch and further rotation in the same direction stresses the spring which tends to rotate the rotatable part in the opposite direction. 90 95

8. A lighter head in accordance with any preceding claim comprising a casing part adapted to be secured to a fuel container, a second casing part rotatable on the first, a flint disc fixed in the first-mentioned casing part, a friction wheel rotatable in said first-mentioned casing part and having teeth on one of its side surfaces which co-operate with the side surface of the flint disc and a neck extending from its opposite side into the second casing part and provided with ratchet teeth, a disc rotatable with the second casing part and having a neck extending from one side and provided with ratchet teeth which co-operate with the ratchet teeth on the friction wheel and a coiled spring encircling the neck portions of the friction wheel and disc anchored at one end to the first-mentioned casing part and at the other end to the second casing part. 100 105 110 115

9. A lighter head in accordance with any preceding claim, having a central screw of which the head bears against one end of the rotatable casing part and the opposite end is screwed into the friction wheel. 120

10. A lighter head in accordance with any of the claims 1—8, having a central screw of which the head bears against one end of the rotatable casing part and the opposite end is screwed into the opposite end of the other casing part, the screw passing through the friction wheel, which 125 130

is rotatable about the screw, and through the flint disc.

11. A lighter head substantially as described with reference to Figs. 1 and 2,  
5 or to Fig. 3 of the accompanying drawing.

Dated this 20th day of April, 1944.

For the Applicant,

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[This Drawing is a reproduction of the Original on a reduced scale.]

