Dec. 20, 1949 A. H. ORMESHER 2,492,061

PYROPHORIC LIGHTER

Filed May 15, 1948

Fig.1.

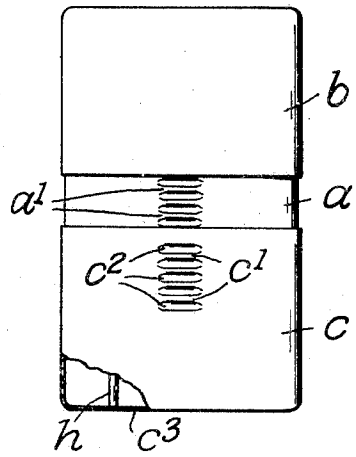


Fig.2.

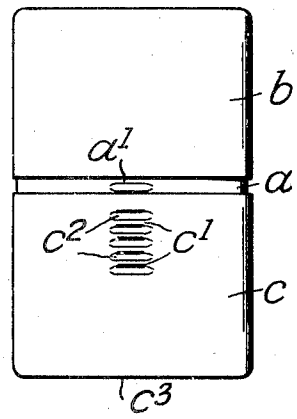


Fig.3.

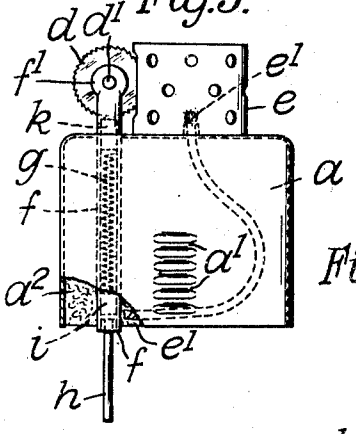


Fig.4.

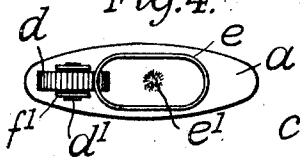


Fig.6. Fig.7. Fig.8.

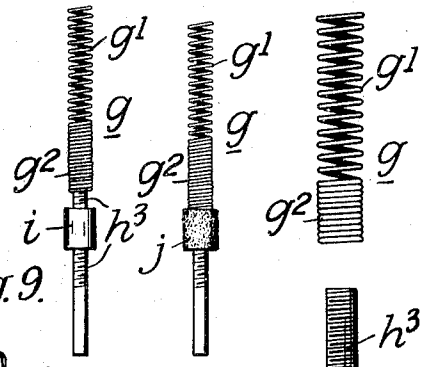


Fig.9.

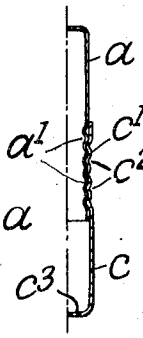
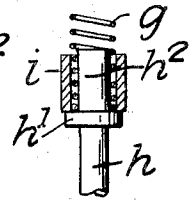
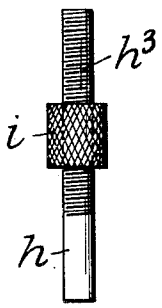


Fig.5.





INVENTOR

Arthur Harrison Ormesher

By: John W. Graham

His Agent

Patented Dec. 20, 1949

2,492,061

UNITED STATES PATENT OFFICE

2,492,061

PYROPHORIC LIGHTER

Arthur Harrison Ormesher, Chesterfield, England

Application May 15, 1948, Serial No. 27,311
In Great Britain May 23, 1947

4 Claims. (Cl. 67—7.1)

1

This invention has reference to pyrophoric lighters or frictional pocket igniters of the kind in which the flint is pressed into operative contact with the friction-wheel by means of a coiled spring, the casing being provided with a guide for the said spring. Usually a screw member has been fitted which can be advanced to compress the spring as the flint wears. That screw member is, however, often difficult to adjust satisfactorily and when withdrawn, prior of the insertion of a new flint, the spring member is liable to fly out of the casing and perhaps be lost.

The invention has for object to avoid those disadvantages and to provide a simplified adjustment device for the spring member in a pyrophoric lighter and to lessen or prevent the liability of the spring member to become ejected from the casing. A further object is to provide pressure-applying means to the spring by means of a cap having a sliding movement on the casing. Still further objects are to provide the spring with a tail-piece or stem whereby the sliding cap can apply pressure to the spring, and to furnish said stem and spring assembly with an adjustable connection so that pressure upon the spring can be further varied, and also to provide means for making the assembly a close fit in the guide tube.

In a pyrophoric lighter according to my invention, the compression or coiled wire spring is provided at its end opposite to that which presses upon the flint, with a tailpiece or stem, the free end of which protrudes from the guide tube which in the other direction extends into the main casing and towards the friction wheel; this tailpiece at its outer extremity bears against the cross piece of a cap-member adjustably secured upon said main casing. The cap member is slidably and frictionally secured upon the main casing. By sliding the cap member upon that casing, the cross piece of the cap member will force the tailpiece into the guide tube and thereby compress the coiled spring.

The invention is hereafter described with reference to the annexed drawings in which—

Fig. 1 is an elevation of the lighter or igniter in its partly closed-up position. Fig. 2 is a similar view showing the igniter almost closed. Fig. 3 is an elevation of the main casing detached and showing a first form of connection between the spring and its tailpiece. Fig. 4 is a plan view of Fig. 3. Fig. 5 is a view on a larger scale of another form of connection between spring and tailpiece and illustrating the retaining means around the spring. Figs. 6 and 7 are elevations

2

of stem-fitted coiled springs fitted with retaining means and adjustable connections between spring and stem. Fig. 8 is an enlarged view of the disconnected parts of the adjustable stem and spring assembly. Fig. 9 is a diagram explaining the method of advancing and frictionally holding the sliding cap upon the main casing.

The casing *a* is shown fitted at opposite ends with sheath-like cap-members *b* and *c*, the cap-member *b* protecting the friction wheel *d* and flame-guard *e* which are mounted upon the top of the casing and the cap-member *c* closing in the open lower end of the casing *a* and being slidable upon said casing. The casing *a* contains fuel-charged wadding a^2 in the known manner and the cap-member *c* is a tight fit upon casing *a* to conserve the igniter fuel and minimise evaporation. An ignitible wick e^1 of the usual kind projects into the flame-guard and is in contact with the supply of fuel inside the casing *g*. These cap-members *b* and *c* are slidable upon the main casing (see Fig. 1) and can be brought together with their inner ends abutting, or almost so as shown in Fig. 2.

The friction wheel *d* is mounted on axle d^1 held between parallel bracket arms f^1f^1 at the top of a guide tube *f* which extends upwardly through the main casing *a* from the lower open end towards the friction wheel *d*. This tube houses a flint *k*, e. g. of cylindrical shape, at top of the tube, and this flint is shown in Fig. 3 held pressed against the friction wheel *d* by an ordinary compression spring *g*. This coiled spring is of wire and shown in both Figures 3 and 5, fitted with a stout rectilinear tailpiece or stem *h* and it is housed in the tube *f*, with the stem *h* protruding from the lower end of the tube. By pressing upwardly upon the free end of the stem *h* the coiled spring *g* will be forced up the guide tube *f* and will keep the flint bearing operatively against wheel *d*. Longitudinal pressure is imparted to the free end of the tailpiece or stem *h* for this purpose by causing the base c^3 of the cap-member *c* to bear against the extremity of the tailpiece. This base c^3 is a squared end to the sheath-like cap *c* and bears constantly against the end of the rectilinear tailpiece *h*. Then, as the sliding cap-member *c* is moved by hand up the main casing *a*, it maintains or even increases the pressure on the tailpiece and spring *g*, thereby providing a first adjustment to the spring pressure on the flint *k*.

As seen in Figure 5, the tailpiece *h* is fitted with a head h^1 bearing against spring *g* and a

sleeve washer i and with a steady pin h^2 which enters into the end of the spring g.

The sleeve washer i or textile packing j (Fig. 7) will be fitted upon the stem and spring assembly, at or where these components meet, so as to encompass a portion of the assembly and make said portion a close fit in the tube f. The coiled spring and tailpiece are connected together and the position of the retaining means is such that normally it is in the bore of the tube f.

The sleeve-washer i or packing piece j will restrict the free movement of the coiled spring g in its guide tube f. The arrangement is such that when it becomes necessary, for example, to insert a new flint and the cap member c has to be removed, the spring g remains in the guide tube by reason of the retaining means i or j secured upon the spring and its tailpiece, until the tailpiece has been withdrawn. This tailpiece is stouter than the wire of the spring g and may be of metal rod to take the end thrust.

In Figures 6, 7 and 8 I show another form of connection between the tailpiece and the spring and this form allows relative adjustment of those two parts. In this arrangement, the spring g (see particularly Fig. 8) is shown formed at the upper end with "open" coils or coils of coarse pitch g^1g^1, whilst the coils g^2g^2 at the lower end are "closed together" to resemble an internally screw-threaded sleeve portion. The coils g^1g^1 are compressible whilst the coils g^2g^2 are substantially incompressible. The tailpiece or stem h is provided externally with means for adjustably engaging internally the close-coiled end g^2g^2 of the spring. For example, it may be screw-threaded externally for part of its length, the threads h^3 being of a pitch to correspond with that of the closed together coils g^2g^2. The stem h can thus be securely connected with the spring but the position of the coils g^2g^2 upon the stem h can be varied by rotating one part of the assembly in relation to the other and thus the overall length of stem and spring can be varied to compensate for wear and shortening of the flint k due to the abrasive action of friction wheel d.

In order to regulate and to maintain the degree of compression of the spring g by pressure upon the tailpiece h against the reaction of the paid coiled spring and to provide a simple and visible adjustment of such pressure-varying means, I provide the main casing a with a series of parallel upstanding closely-spaced cross ribs a^1a^1 and provide the skirt of the cap member c with a similar series of parallel cross-ribs c^1 having intermediate indentations c^2, these indentations being equally spaced apart. These ribs and indentations c^1c^2 are also closely spaced together to correspond with the ribs on the casing a. The foremost indentation c^2 on the cap member c can be sprung over the first rib a^1 approached and later over any succeeding rib a^1 upon the main casing, thereby giving a wide adjustment and easily viewed indication of the pressure of the cap-base upon the tail-piece h of the coiled spring g. As the foremost indentation c^2 on the cap member progresses step by step over the series of ribs a^1a^1 on the main casing, (compare Figures 1 and 2), more indentations c^2 of the cap-member c engage between the ribs a^1 on the main casing, so that wear of the flint k can be taken up and end-pressure maintained upon the tailpiece h and spring g. The interengaging ribs a^1 and indentations c^2 form a guarded spring-rack connection and holding-device between casing a and the sheath-like cap c. The position of the cap indentations c^2 relatively to the cap b gives a visual indication of the degree of compression of the spring g.

Fig. 9 shows the way the ribbed cap member c rides over the indentations in the main casing a. The cross ribs c^1 and indentations c^2 are shown only on one side of the igniter but obviously they can be fitted on opposite sides or faces of the cap member c and casing a.

When it is desired to increase the pressure of the coiled spring g upon the flint k, the sliding movement of the cap-member c upon the main casing will cause the base c^3 of the cap member to press the tail-piece more firmly inwards of the guide tube f, and the co-operating ribs a^1a^1 and indentations c^2 will frictionally hold the cap member c in its desired position.

A secondary adjustment of the spring pressure upon the flint k can be effected by varying the relative position of the spring and tailpiece in the assembly gh; this is done by rotating one of the parts upon the other so that the overall length of spring and tailpiece can be varied and the pressure of the spring g on the flint k can be maintained despite wear of the flint. Thus a main adjustment of the pressure on the spring can be effected by the slidable cap member c through the tailpiece h and a secondary adjustment of the said pressure is obtainable by rotating the spring g on its screw-threaded tailpiece h.

The main casing a and the removable cap members b and c are preferably of a shape which in cross-section resembles a flattened oval. The ribs c^1 upon the cap member c not only give a visual indication of the approximate compression of the spring but give a useful finger-grip when it is desired to remove the said cap member c or even the cap member b.

The tailpiece h is wholly rectilinear and substantially aligned with the spring g when the latter is in the tube f. The tailpiece in all cases is so releasably connected with the coiled spring g that it forms an assembly provided with the retaining means described, and the compressible length of spring projecting beyond the tailpiece into the tube can be varied by axial rotation of the coiled spring along the screw-threads h^1. The sleeve washer i is preferably fitted upon the tailpiece h and against the extremital coil g^2, as will be understood from Figures 6, 7 and 8.

It is to be noted as compared with the arrangement in my co-pending application of the same date, Serial 27,312, that this single tailpiece is rectilinear and is acted on directly by the cap base c^3, its free extremity being in contact with said base.

The coiled spring fitted with tailpiece or stem and its retaining sleeve washer or packing piece, can obviously be fitted to any existing pocket igniter which has a guide tube and also a cap slidable on a main casing and capable of bearing progressively upon the end of said tailpiece.

Although shown with a friction-wheel adapted to be partially rotated by a manual flick, the friction-wheel may be partially rotated by other known means, such as a lever or snuffer.

What I claim is:

1. A pyrophoric igniter including a casing, an ignitible wick enclosed in said casing with one extremity projecting therefrom, a friction wheel mounted on said casing adjacent to the projecting extremity of said wick, a guide tube in said casing with an open end adjacent to said wheel, a flint within said guide tube, a coiled spring mounted in said tube and adapted to press said

flint against said wheel, and a removable cap for said casing, said cap normally covering said wheel and the adjacent extremity of said wick, said igniter comprising further a sheath-like cap slidably adjustable upon said casing at the end remote from said wheel, said guide tube having its other end open within said adjustable cap, a tail-piece slidably housed in said tube and bearing at one end against said coiled spring, the other end of said tail-piece protruding from said other open end of said guide tube, said slidable cap having a closed end making direct contact with the protruding end of said tail-piece to provide an abutment for exerting continuous thrust along said tail-piece upon said coiled spring, and means for automatically securing said slidable cap in an adjusted position against the reaction of said spring.

2. A pyrophoric igniter including a casing, according to claim 1, in which the tailpiece is releasably and adjustably engaged with one end of said spring, the slidable cap is provided with an end closure continuously contacting the protruding end of said tailpiece, and the tailpiece is provided with means for preventing its involuntary ejection from said tube.

3. A pyrophoric igniter including a casing, an ignitible wick enclosed in said casing with one extremity projecting therefrom, a friction wheel mounted on said casing adjacent to the projecting extremity of said wick, a guide tube in said casing with an open end adjacent to said wheel, a flint within said guide tube, a coiled spring mounted in said tube and adapted to press said flint against said wheel, and a removable cap for said casing, said cap normally covering said wheel and the adjacent extremity of said wick, said igniter comprising a rectilinear tailpiece with a head bearing against said spring, a sleeve washer on said tailpiece to afford a sliding fit in said tube, said tailpiece having an end protruding from said casing, a sheath-like cap slidably adjustable upon said casing, said sheath-like cap having a squared end continuously contacting the protruding end of said tailpiece, and a spring-rack connection for automatically securing said slidable cap at any one of a plurality of positions located at closely-spaced intervals on said casing.

4. A pyrophoric igniter including a casing, an ignitible wick enclosed in said casing with one extremity projecting therefrom, a friction wheel mounted on said casing adjacent to the projecting extremity of said wick, a guide tube in said casing with an open end adjacent to said wheel, a flint within said guide tube, a coiled spring mounted in said tube and adapted to press said flint against said wheel, and a removable cap for said casing, said cap normally covering said wheel and the adjacent extremity of said wick, said igniter comprising a rectilinear tailpiece housed in said guide tube and attached at one end to said spring and at the other end protruding from said casing, a skirted cap with a square end slidably adjustable on said casing and continuously contacting said protruding end to maintain the pressure on said spring, closely spaced transverse indentations on the skirt of said cap, and correspondingly spaced transverse indentations on said casing engageable with said cap-indentations to provide a maintained step-by-step adjustment of said cap upon said casing against the reaction of said coiled spring, said cap-indentations also forming a visual indicator of the degree of compression of said spring.

ARTHUR HARRISON ORMESHER.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
970,649	Schon	Sept. 20, 1910
1,734,465	Hardy	Nov. 5, 1929
1,746,321	Taintor	Feb. 11, 1930
1,850,142	Rosenthal	Mar. 22, 1932
1,944,177	Holtzman	Jan. 23, 1934
2,168,732	Dubsky	Aug. 8, 1939

FOREIGN PATENTS

Number	Country	Date
96,858	Austria	May 10, 1924
316,869	Germany	Dec. 6, 1919
691,497	France	July 15, 1930