April 25, 1950 A. F. JACKSON 2,505,328

CIGAR LIGHTER

Original Filed Sept. 30, 1944

Fig. 1

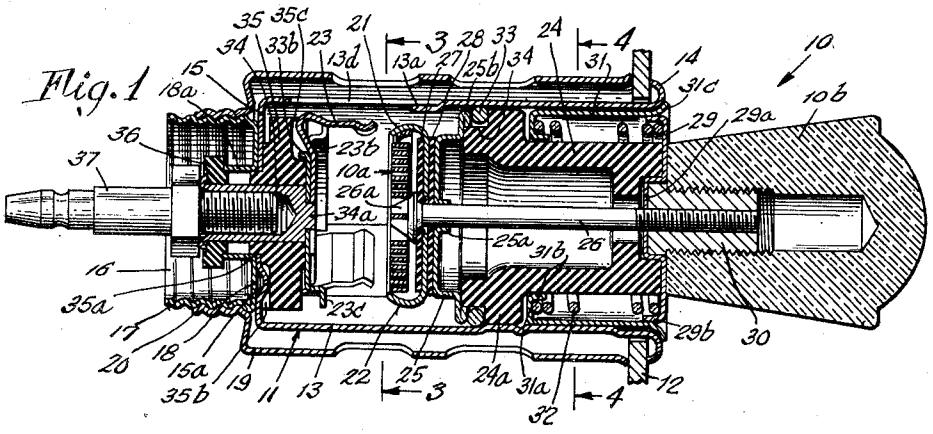


Fig. 2

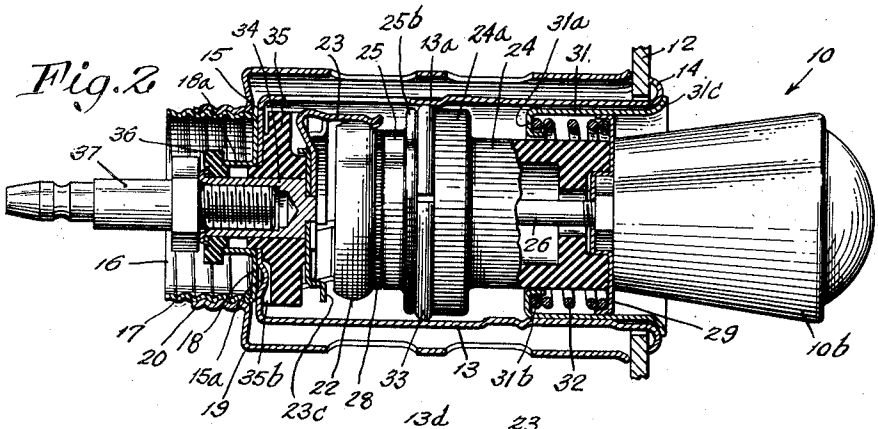


Fig. 3

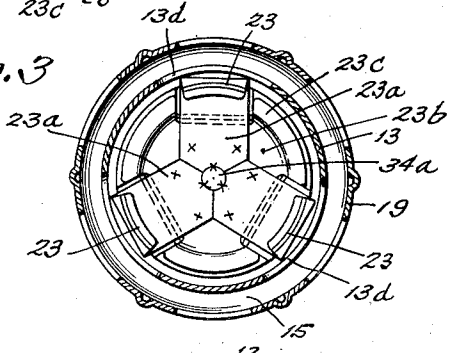
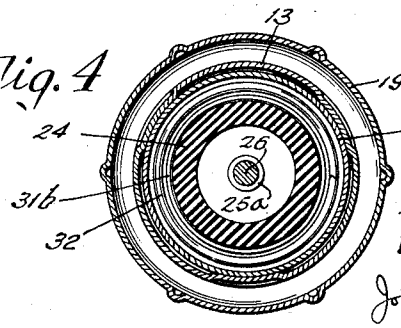


Fig. 4



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CIGAR LIGHTER

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Original application September 30, 1944, Serial No. 556,554. Divided and this application February 26, 1947, Serial No. 731,034

3 Claims. (Cl. 219—32)

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This invention relates to electric cigar lighters having a removable igniting unit and more particularly to the contact means cooperating therewith to energize the same.

This application is a division of my copending application Serial No. 556,554, filed September 30, 1944, and is copending with applicant's application 731,033 directed to similar subject matter.

In automatically operative lighters, the igniting unit is usually stored in a shallow position in the well, and is manually moved for energization to a deep position wherein it is retained by heat-responsive clips, the latter automatically releasing the unit for return to shallow position when the element is heated.

An object of the present invention is to provide an automatic cigar lighter of the removable igniting unit type in which the energization and release of the igniting unit is positive and consistently reliable over an extensive period of use so that the lighter will have a long useful life.

This is accomplished by the provision of an improved supporting contact and detent means associated with the igniting unit and holder whereby when the heat-responsive clips of the lighter are engaged the individual pressures they exert on the coengaging structure are substantially equalized at all times until the clips release the structure, and whereby repeated operation of the clips over an extended period of time consistently follows this performance.

The igniting unit body, which fits comparatively loosely in the holder, has a slidably mounted non-expansible sleeve supporting the unit and engaging portions of the holder adjacent its mouth, the mounting for the sleeve permitting the inner end of the unit to move an extent in any lateral direction. This inner end mounts a shallow metal contact and detent cup for engagement with the heat-responsive clips carried by the holder, a heating coil being nested in the cup. By thus mounting the igniting unit, the contact cup may readily assume a centralized position with respect to the clips when grasped by the latter during energization of the element, and the clips may thereby apply equal pressures on the cup, providing for uniform current distribution and consistently uniform release of the latter in response to heating of the element.

If during installation of the lighter on an instrument panel, the drawn shell of the holder should be deformed slightly, the above supporting and detent structure would still provide for centering of the contact cup, and therefore equalization of pressure thereon, and for free movement without sticking of the igniting unit

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so that the proper functioning of the lighter would be unaffected, and its useful life thereby not shortened.

Reliability of operation of the lighter is further accomplished by means confining the space surrounding the heating element while the latter is being energized. The heat from the element is therefore prevented from being radiated directly into the surrounding atmosphere, and is caused to act on the heat-responsive detent clips which grasp the contact cup, thereby causing more reliable response of the clips to heat from the element.

Other features and advantages will hereinafter appear.

In the accompanying drawings:

Figure 1 is an axial sectional view of the preferred form of lighter of the present invention, showing the igniting unit in shallow nonenergizing or storage position.

Fig. 2 is a substantially similar view but showing the igniting unit in deep energizing position.

Fig. 3 is a transverse section on the line 3—3 of Fig. 1, and

Fig. 4 is a transverse section taken on the line 4—4 of Fig. 1.

The lighter of this invention comprises an igniting unit 10 and attached heating element 10a slidably mounted in a holder 11, which may be secured to an instrument panel 12 of a vehicle or the like. The holder 11 comprises a drawn metal shell 13 having at its mouth an outturned circular flange 14 engaging the front face of the panel 12. Integral with the shell 13 is an end wall or closure 15 on which is mounted in axial alignment with the shell 13 a drawn metal cup 16 having screw threads 17 in its side walls. The shell 13 may be formed of brass, and the cup 16 of steel, the bottom 18 of the cup being securely welded at a plurality of points, preferably six, to the end wall 15 of the shell to provide a rigid and vibration resistant composite structure.

In order to secure the shell 13 to the panel 12, a binding sleeve 19 is provided having a reduced threaded end 20 whereby it may be screwed on the cup 16 so that its large end engages the rear face of the panel 12 and securely holds the shell 13 to the panel.

The heating element 10a is wound in the form of a spiral the outer end of which is secured to the side wall 21 of a shallow metal contact cup 22 carrying the element, the cup being secured to the inner end of the igniting unit 10. An automatic detent and contact means comprising a plurality of heat-responsive bimetallic arms or clips 23 are insulatedly mounted on the end wall 15 of the shell 13 within the latter, the clips being

arranged to grasp between them the wall 21 of the cup 22 when the igniting unit 10 is moved to a deep energizing position as shown in Fig. 2.

According to the present invention, the igniting unit 10 is provided with a supporting structure for engagement with the shell 13, and an improved contact means for connecting the shell 13 to the heating element 10a whereby current may be brought to the latter, and whereby when the igniting unit is in deep energizing position the cup 22 may be centralized with respect to the clips 23 so that the latter exert substantially equalized pressures on the cup, thereby providing substantially uniform current distribution to the clips.

As shown in Figs. 1 and 2 the igniting unit 10 has a tubular body 24 which may be molded of insulating material, the body adjacent its inner end having a peripherally extending shoulder 24a of a diameter to enable the body to loosely fit within the shell 13. At the inner end of the body 24 a shallow cup 25 formed of sheet metal is mounted. The bottom of the cup 25 is apertured and extruded at 25a to provide a sleeve for receiving a stud 26 extending through a central aperture in the bottom of the cup 22 and having a slotted head 26a secured to the inner end of the heating coil 10a, as by pinching and welding, or other suitable means.

As shown in Fig. 1, disks of insulation 27 and 28 are disposed respectively between the heating element 10a and the bottom of the cup 22, and between the bottoms of the cups 22 and 25. At the outer end of the tubular body 24 of the igniting unit a sheet metal disk 29 is provided having a cupped central portion 29a extending into a central counterbore of the body 24. The outer end of the stud 26 is threaded and provided with a nut 30 carrying a knob 10b, the nut being screwed tightly on the stud to clamp the tubular body 24 between the disk 29 and cup 25, thereby holding these parts securely together. Preferably after this assembly, the end of the stud 26 is welded to the nut 30 to prevent inadvertent loosening of the parts.

For supporting the igniting unit 10 in the shell 13 a drawn metal sleeve 31 is provided having an outside diameter enabling the sleeve to loosely fit the inside of the shell, one end of the sleeve 31 having an inturnd flange 31a provided with a cylindrical edge portion 31b forming a bearing sleeve loosely fitting about the outer cylindrical surface of the body 24. Also the disk 29 has a drawn cylindrical edge portion 29b at its periphery to function as a bearing surface for the inside of the sleeve 31 and to permit the latter to slide freely axially of the body 24. The outer end of the sleeve 31 is flared outwardly to provide a flange 31c for engagement with the flange 14 of the holder when the igniting unit is being supported in the latter.

For yieldably holding the sleeve 31 in a predetermined axial position, shown in Fig. 1, on the igniting unit 10, a helical compression spring 32 is provided, one end of the spring engaging the inside of the disk 29 and the other end engaging the flange 31a of the sleeve 31.

According to this construction when the igniting unit 10 is being supported either in its shallow storage position or its deep energizing position in the holder 11, the body 24 will be carried by the bearing surfaces of the portions 31b and 29b respectively of the sleeve 31 and disk 29 in a manner that the cup 22 is permitted a limited movement in all directions laterally of its axis. This limited movement is made possible due to the loose or sliding fits of the aforementioned bearing surfaces between the sleeve 31 and inside of the shell 13 and between the sleeve and body 24, and also because of the clearance provided between the periphery of the shoulder 24a of the body and the shell. As a result, when the igniting unit 10 is moved to the deep energizing position shown in Fig. 2 wherein the cup 22 is grasped between the bimetallic clips 23, the cup may be centralized in response to pressure exerted on it by said clips so that each of the latter will exert substantially the same pressure.

A contact means is carried by the igniting unit 10 for connecting one end of the heating element 10a to the shell 13 when the unit is in energizing position, without materially disturbing or altering the equalized pressures of the bimetallic clips 23. This means comprises, in the embodiment shown, a contractible wire metal spring 33 carried in a groove 34 provided between the shoulder 24a of the body and the lip 25b of the cup 25. As shown in Fig. 1, the lip 25b of the cup 25 is folded inwardly back on itself to provide a double thickness, the inner edge of the folded portion engaging the outer surface of the body 24 at its end so that the cup is thereby securely positioned on the body. The contractible ring 33 is preferably formed with a slightly helical shape so that when it is confined in the groove 34 it continually presses against the lip 25b of the cup, forming an efficient electrical connection thereto. Preferably, the sleeve portion 25a of the cup is welded to the stud 26 so that a secure electrical connection is thereby established between the cup 25 and the inner end of the heating element 10a.

Referring to Fig. 2, the shell 13 of the holder is provided with resilient lanced fingers 13a, so that when the igniting unit 10 is in its deep energizing position the said fingers will be engaged by the contractible ring 33, and the inside diameter of the latter is sufficiently large so that the ring may float an extent on the igniting unit 10. As seen in Fig. 1, a clearance exists between the inside diameter of the ring 33 and the outer surface of the body 24, and as a result of this clearance the ring may assume various positions as determined by the pressures exerted on it by the resilient fingers 13a, without disturbing the centering of the contact cup 22 in the bimetallic clips 23.

Thus the automatic release of the igniting unit 10 when the clips 23 respond to heat from the heating element 10a will occur consistently within a predetermined comparatively narrow temperature range of the element. The degree of heat of the element 10a is thereby closely controlled, and its life greatly extended as a result. Also, due to the uniform distribution of current in the bimetallic clips 23 because of the equalized pressure exerted by them on the cup 22, arcing will be reduced at the time of separation of the cup from the clips, and the efficiency of the electrical connection between the clips and cup will be maintained over a considerable period of time. Therefore, the performance of the lighter will generally be improved, and failures due to pitting of the clips or burning out of the heating element will be considerably reduced, if not eliminated entirely.

In some instances when the lighter is installed on an instrument panel and the binding sleeve 19 is screwed up tightly, a slight deformity of the drawn shell 13 is produced, which tends to throw

out of line the igniting unit 10 and the bimetallic clips 23. Such deformity, however, will not adversely affect the operation of the lighter of this invention since substantial clearances are provided between the supporting parts of the igniting unit and holder, and since the floating contact ring 33 carried by the igniting unit permits self-alignment of the cup 22 in response to the pressures of the bimetallic clips 23.

The contractible ring 33 and the supporting sleeve 31 of the igniting unit 10 are combined with a structure of the shell 13 to provide an improved detent means for holding the igniting unit in its shallow storage position in the holder while also permitting quick and convenient reinsertion of the unit after use, and also for preventing inadvertent ejection of the unit from the holder when, after energization, it is released by the clips 23 and automatically returned to shallow position.

It will be noted that, for the storage position of the igniting unit, a substantial clearance is provided between the ends of the clips 23 and the lip of the cup 22, as shown in Fig. 1 and slight unavoidable overshooting of the unit would not be sufficient to cause actual contact between the clips and the cup. Therefore arcing does not occur at these points during reinsertion of the igniting unit, and a clean condition of the clips is thereby maintained.

Referring to Fig. 2, at the time that the heating element 10*a* becomes hot and the clips 23 release the igniting unit, the spring 32 will automatically snap the unit back to the shallow position shown in Fig. 1. When the unit reaches this position the contractible ring 33 cooperating with the holder 13 will return the unit and prevent it from being ejected from the holder.

The invention also provides a novel and simplified assembly for mounting the bimetallic clips 23 inside the shell 13, this assembly comprising comparatively few parts rigidly secured together either by riveting or welding so that vibration and usage may not loosen or misalign the parts and adversely affect the operation of the lighter.

Referring to Fig. 3, the bimetallic clips 23 have base portions 23*a* extending radially toward the axis of the shell 13, the base portions being mitered so that adjacent edges may abut each other. Disposed adjacent the base portions of the clips 23 is a cupped supporting plate 23*b* having a plurality of outwardly extended flange portions 23*c* adapted to abut the lip of the cup 22 if the igniting unit is moved past deep energizing position. The base portions 23*a* of the clips are welded, preferably each at two points indicated by the *x*'s in Fig. 3, to the supporting plate 23*b*, the latter being in turn welded to a stud 34 extending through the end wall 15 of the shell 13. As seen in Figs. 1 and 2, the stud 34 is centralized in and insulated from the end wall 15 by a molded insulating washer 35 having a shoulder 35*a* extending into a central aperture in the end wall.

To provide for accurate assembly of the stud 34, supporting plate 23*b* and clips 23, the stud is provided with a central projection 34*a* extending through a central aperture in the plate 23*b* and projecting slightly beyond the plate. Also, the base portions 23*a* of the bimetallic clips are cut away along a circle to fit against and abut the projection 34*a* of the stud. According to this construction, at the time that the supporting plate 23*b* is welded to the stud, the two pieces will be accurately positioned, as will also the bimetallic clips at the time they are welded to the supporting plate.

In order to provide a rigid mounting for the stud 34 on the end wall 15 of the shell, the bottom 18 of the threaded cup 16 is pierced and extruded to provide a sleeve portion 18*a* through which the stud 34 extends. A shouldered insulating washer 36 is provided on the outer end of the stud 34 and the latter laid over on the washer so as to securely hold the stud in place. The shoulder of the washer 36 extends into the sleeve portion 18*a* of the cup 16, thereby centralizing the stud 34 in the cup and insulating it therefrom. Electrical connection is made to the stud 34 by means of a threaded pin 37 screwed into the bore of the stud, which latter is also threaded for this purpose. By this construction the stud 34 is securely rigidly mounted on the end wall 15 and insulated by the washers 35 and 36, and since the end of the stud is laid over on the washer 36, the parts cannot become loosened due to vibration, severe handling and usage. Also, by welding the stud 34, supporting plate 23*b* and base portions 23*a* of the clips into a rigid unit, the likelihood of these parts becoming loosened and operating in a defective manner is considerably reduced. Preferably, the projection 34*a* of the stud 34 is also welded to the base portions 23*a* of the bimetallic clips to further reinforce the mounting of the latter. It will be noted that the periphery of the supporting plate 23*b* is cut away to provide clearance for the bimetallic clips 23, so that the latter may have free movement at all times.

To provide for correct positioning of the clips 23 in the shell 13 the end wall 15 of the latter is lanced to provide a projection 15*a* extending into a recess 35*b* in the insulating washer 35. Also, a lug 33*b* is formed on the supporting plate 23*b*, extending into a recess 35*c* in the washer 35. Further clearance for the bimetallic arms 23 is provided by punching apertures 13*d* in the shell 13.

To further provide for more reliable operation of the lighter over an extended period of time, the invention provides heat-confining means for enclosing the space about the mouth of the cup 22, to cause the bimetallic clips 23 to respond more reliably to heating of the element 10*a*. This means comprises the peripheral portions 23*c* of the supporting plate 23*b*, these portions being circularly extended as shown in Figs. 2 and 3 so that they serve to prevent direct radiation of heat from the element 10*a* into the surrounding atmosphere. The heat waves striking the portions 23*c* are reflected and also absorbed and conducted to the clips 23, resulting in more heat being applied to these latter and thereby causing them to more reliably respond to heating of the element 10*a*. As a result, there is avoided excessive lag in the response of the arms 23 to heating of the element 10*a*, so that the latter does not become overheated and suffer shortened life as a result.

Variations and modifications may be made within the scope of this invention and portions of the improvements may be used without others.

I claim:

1. In a cigar lighter, a plug-type removable igniting unit; a holder adapted to slidably receive and to support the igniting unit in a shallow open-circuit position and in a deep closed-circuit position; a shallow metal cup mounted on one end of the igniting unit; a heating element mounted in the cup; separate bimetallic

spring clips carried by the holder, disposed in spaced relation adjacent the lip of the cup to engage and grip the sides of the latter for holding the igniting unit in its deep circuit-closing position in the holder, and for releasing the unit in response to heating of the element; and a cupped metal member located opposite said cup surrounding the heating coil for engagement with the lip of the cup to prevent movement of the igniting unit beyond its deep circuit-closing position when the unit is being moved to the latter, said clips having inturned base portions welded to the inner bottom surface of the cupped metal member in intimate heat-receiving relation therewith, the base portion of each of said clips having two lateral edges each in abutment with a corresponding edge on the base portion of an adjacent clip said cupped metal member substantially enclosing the space at the mouth of the cup not enclosed by the heat-responsive clips when the latter are gripping the cup, so that the clips thereby become heated quickly by the heating element.

2. In a cigar lighter of the removable igniting unit type, a heat-responsive detent for holding the igniting unit in energizing position, and for releasing the unit in response to heating, comprising a plurality of separate bimetallic clips having resilient gripping arms extending in spaced relation for grasping the igniting unit between them, said clips having inturned base portions exposed to the igniting unit, said base

portions lying substantially in the same plane and having two lateral edges each in abutment with a corresponding edge on the base portion of an adjacent clip; a metal supporting plate underlying the base portions and having a face engaging and welded to the base portions of the clips; and a protuberance extending from the face of the supporting plate, the said base portions of the clips being cut away at their abutting edges to fit against the said protuberance whereby the latter positions the clip bases.

3. The invention as defined in claim 2 in which the protuberance extending from the supporting plate is secured to the latter and is welded to the fitted edges of the said base portions of the clips.

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

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Patent No. 2,505,328

Certificate of Correction

ALFRED F. JACKSON April 25, 1950

It is hereby certified that errors appear in the printed specification of the above numbered patent requiring correction as follows:

Column 2, line 42, for "sleeve 10" read *sleeve 19*; column 7, line 18, after the word "clip" insert a comma;

and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 15th day of August, A. D. 1950.

[SEAL]

THOMAS F. MURPHY,
Assistant Commissioner of Patents.

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