Jan. 26, 1954 P. E. ASHTON 2,667,562

CIGAR LIGHTER

Original Filed July 25, 1946 2 Sheets-Sheet 1

Fig. 1.

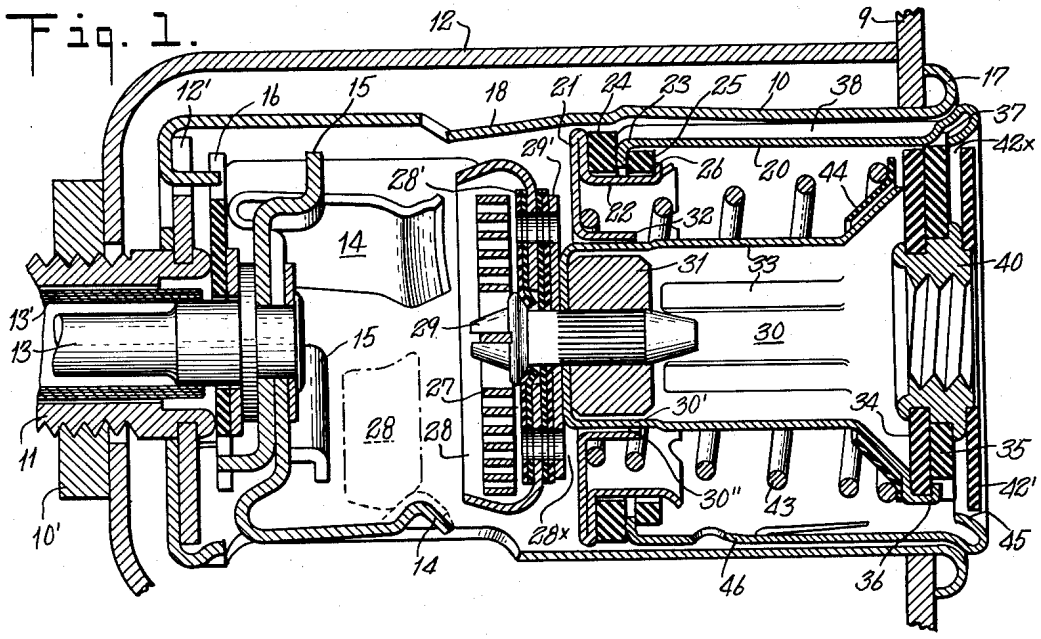


Fig. 2.

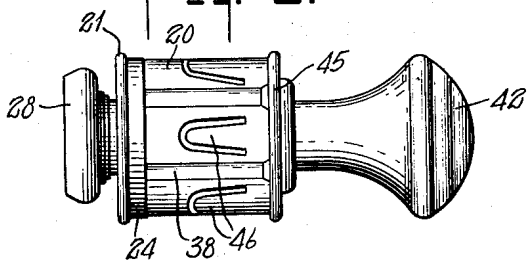
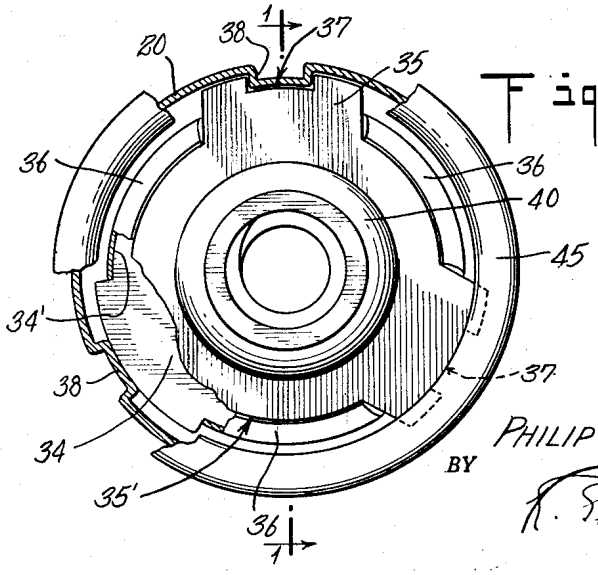


Fig. 3.



INVENTOR.
PHILIP E. ASHTON
BY
ATTORNEY

Jan. 26, 1954 P. E. ASHTON 2,667,562

CIGAR LIGHTER

Original Filed July 25, 1946 2 Sheets-Sheet 2

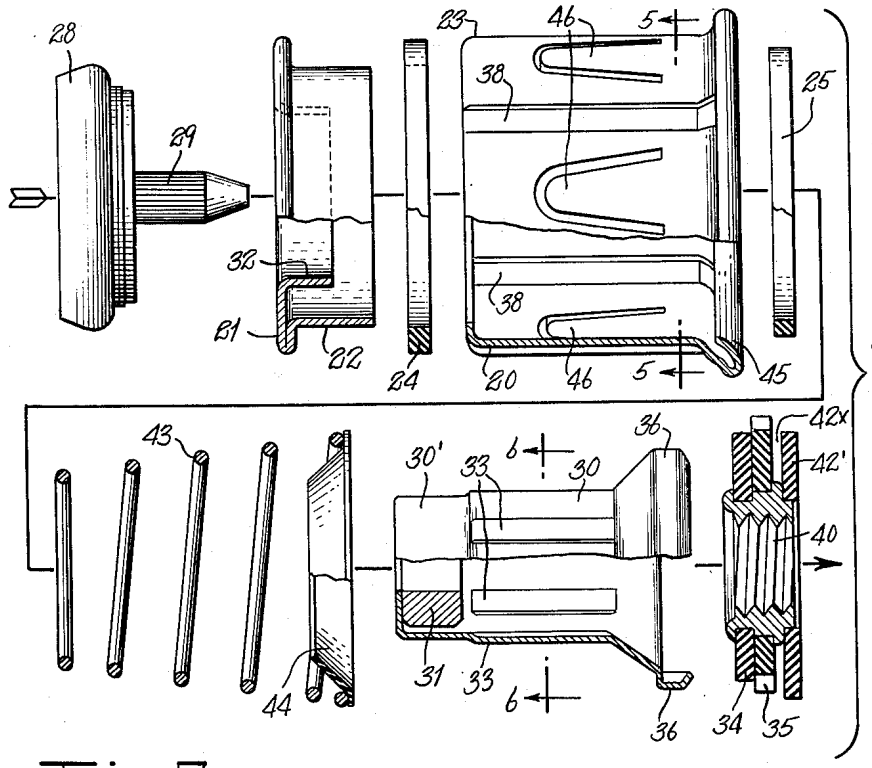


Fig. 4.

Fig. 5.

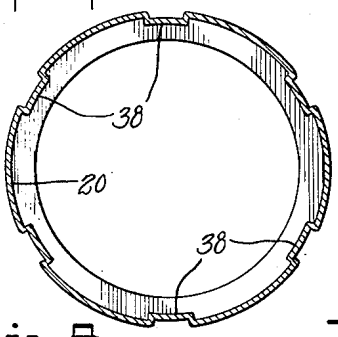


Fig. 6.

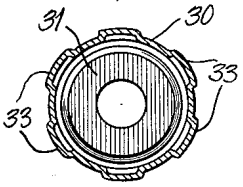


Fig. 7.

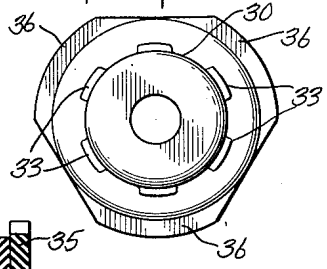


Fig. 8.

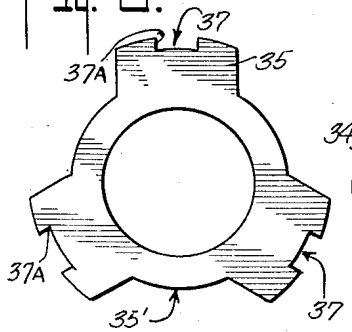


Fig. 9.

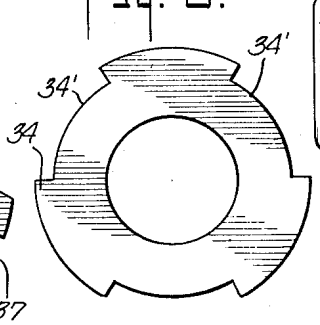
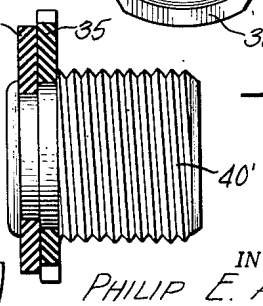


Fig. 10.



INVENTOR.
PHILIP E. ASHTON
BY
ATTORNEY

Patented Jan. 26, 1954

2,667,562

UNITED STATES PATENT OFFICE

2,667,562

CIGAR LIGHTER

Philip E. Ashton, Meriden, Conn., assignor to The Cuno Engineering Corporation, Meriden, Conn., a corporation of Connecticut

Original application July 25, 1946, Serial No. 686,188. Divided and this application January 10, 1950, Serial No. 137,747

7 Claims. (Cl. 219—32)

1

My invention relates to what are commonly termed cordless electric lighters for cigars, cigarettes and pipes and of the type suitable for installation in motor vehicles. They may be used however anywhere.

The main object is to provide a small, reliable lighter plug which can be made economically according to ordinary shop practice and interchangeably used in sockets which will also be of factory production. In other words, the plugs and sockets need not be matched but any plug will fit any socket of a lot for which it is designed.

One object is to make as much of the device as possible of metal and yet provide a quick starting lighter which will have long life and will not become overheated.

Another object is to avoid the use of parts made of molded insulation such as thermosetting resins which, if overheated by careless handling of the lighter, may be distorted, swell or blister causing the plug to bind in the socket and rendering the lighter useless. Such distortion occasionally locks the plug in closed circuit position with very undesirable results.

A further object is to provide a cigar lighter plug having substantially all of the parts made of stampings which when produced in bulk by ordinary commercial processes are more precise as to dimensions and less costly than similarly functioning parts produced by molding phenolic resins or by automatic lathes.

A further object is to provide a lighter plug of pleasing appearance, excellent functional properties and low cost when produced in large quantities which frequently involve several hundred thousand lighters per year in commercial practice. The majority of automobiles now produced are fitted with cigar lighters as standard equipment. This offers the manufacturers of cigar lighters a very large, but cost and quality conscious market. The difference of as little as one cent per unit between competing makes may result in the gain or loss of orders totaling many thousands of dollars. In the past, the use of lighter components produced by molding phenolic resins and of components produced on automatic machines known as "screw machines" has been commonly accepted practice. The total production of such parts has run into many millions in the last decade. The cost of parts of the current type of lighter plugs is quite high as compared with parts of broadly similar functions made from sheet metal and sheet insulation.

I have, therefore, devised a construction which employs components suitable for high production at low cost by simple stamping or drawing press operations and which construction by the suitable disposition of air gaps, small contacting conductive areas, reflective surfaces and simple insulating washers to arrest or retard heat flow to the knob are useful and acceptable for general use.

2

I have further improved over commercial constructions of the prior art by eliminating screw threads except for mounting the knob. The knob is usually supplied in shape and material to match the other control knobs of the automobile on which the lighter is to be used and which vary widely between different makes of cars and different models of the same maker.

The preferred form constitutes improvements over that of United States Letters Patent 1,980,157 and 2,338,565.

Fig. 1 is an aligned sectional view of a socket and one form of plug of my invention on an enlarged scale and showing how such a socket may be mounted.

Fig. 2 is a side view of the plug of Fig. 1 with a knob on a smaller scale.

Fig. 3 is a rear end view of the plug of Fig. 1 without the knob, part of the shell being broken away. Fig. 4 is an exploded view of the parts of the plug of Fig. 1 on a somewhat smaller scale, parts being shown in section.

Figs. 5 and 6 are cross-sectional views on the planes of the lines 5—5 and 6—6, respectively, of Fig. 4.

Fig. 7 is an end view of the plunger part of the plug of Fig. 1.

Figs. 8 and 9 are detail face views of insulating washers of Fig. 1.

Fig. 10 is a side view and section of guiding washers such as shown in Figs. 1, 3, 4, 8 and 9, with a screw stud for receiving a knob.

In Fig. 1, I have shown a sectional view of one form of plug made according to the invention and mounted in a type of socket assembly with which the plug may be used. Such a socket is generally used on automobiles and is attached to the instrument panel 9. The socket 10 passes through a hole in the instrument panel and is pressed against it by nut 10' and shell 12. Nut 10' is threaded on sleeve 11 to which is attached washer 12'. The above parts are incorporated into the ground side of the electric system of the automobile of which socket 10 becomes one terminal.

Central terminal stud 13 carries suitable contacts such as bimetal latch contacts 14 and secondary spider contacts 15 which are insulated

and supported by sleeve 13' and washer 16. These contacts 14 and 15 form the live terminals of the socket as stud 13 is connected to the ungrounded side of the electric system of the automobile. The side wall of the socket usually has one or more spring fingers 18 biased inwardly to engage some part of the plug and serve as spring loaded ground contacts. It should be understood that, while bimetal latch contacts are shown, they are not essential as the secondary contacts 15 will suffice to engage cup 28 and close the circuit.

The plug has two main assemblies, i. e. the shell 12 and the plunger element. The shell is the part which is normally supported and stationary in the socket and the plunger element has the igniter unit and the knob or handle which is mounted to move the plunger element within the shell.

The plug itself which is the subject of my present invention has a tubular metallic shell 20 and a metallic front end disc 21. In the form shown in Fig. 1, this disc 21 has a tubular ring 22 integral therewith surrounded by and appreciably smaller than flange 23 of shell 20. Insulating washers 24 and 25 serve to prevent contact between any part of shell 20, disc 21 and ring 22. Washer 25 is so proportioned as to centralize ring 22 in the opening of flange 23. When the rear end of ring 22 is staked over at several points such as 26, the parts are secured in accurate relationship with only small areas in contact with each other and with a continuous air gap between ring 22 and flange 23. The seemingly minor matter of maintaining only small contiguous areas is important as the transmission of heat from the igniter unit to the rear rim of the shell 20, which may be contacted by the fingers of a user of the lighter, is thereby minimized.

The igniter unit, generally of conventional form, may have any suitable resistance coil 27 having one end secured to the cup 28, which serves as the plug's live terminal, and the other end secured to the grounded central stud 29 which is electrically and mechanically connected to the plunger tube 30. The cup 28 is insulated from the stud 29 and from washer 29' by mica or equivalent washers, such as 28'. The units is noteworthy in that it has only two small perforations 28x, used to align the parts during assembly, instead of the conventional six or thereabouts, relatively large perforations. The rear washer 29' is made of bright stainless steel or other similar material. I have found that this construction with minimum perforations and a backing having bright reflective surfaces materially aids in retarding the flow of heat to the rear of the plug.

The igniter stud 29 is secured to the plunger sleeve or tube 30 for instance by being frictionally driven into and held by a metal washer 31 in the bottom of the tube 30. This tube 30 at its end 30' is smaller in diameter than the passage in the tube 32 and has outwardly extending ribs 33 which are an accurate sliding fit in the guide tube 32 which is integral with disc 21 and concentric with ring 22. These ribs, however, only engage guide tube 32 when the plunger is in the forward or circuit closed position when contact between the ribs and the guide tube forms part of the grounded side of the circuit. The basic diameter of the tube 30 is appreciably smaller than the inside diameter of the guide tube 32 and the difference between these diameters affords an annular air gap 30'' which offers resistance to the flow of heat from the igniter unit through tube 30 to disc 21 after the circuit has been broken and the heated igniter is available for use.

The rear end of the tube 30 is flared outwardly and firmly secured to two insulating discs or washers 34 and 35 which are guided in the shell 20. The flared rear end of tube 30 has three arcuate flanges 36 which fit and are crimped over the edges 34' of the notches of washer 34. The circumferential surface of the major diameter portions of washer 34 is proportioned to slide freely on and be guided by the interior surfaces of ribs 38 of shell 20. Insulating locking disc washer 35 has three outwardly extending arms with grooves or notches 37 which straddle and are guided by the radial faces of ribs 38 within the shell 20. The effective diameter of washer 35 at the bottom of the notches 37 is slightly less than the major diameter of washer 34 and contact between washer 35 and shell 20 is only on the radial faces 37A of the notches 37. The angular extension between the arms of washer 35 is greater than the angular extension of arcuate flanges 36 of the tube 30 and the effective diameter of washer 35 at the edges 35' is smaller than that of the crimped-over edges of arcuate flanges 36 so that there is no direct contact between washer 35 and tube 30. This arrangement aids effectively in minimizing the transmission of heat from tube 30 to shell 20 and to the knob mounting means.

This arrangement comprises a bushing 40 (Fig. 1) or a stud 40' (Fig. 10) which securely connects washers 34 and 35 together at the center. Washer 35 is substantially thicker than the metal of flanges 36 of tube 30 which are crimped over washer 34 so that there is no possibility of direct contact between the base of a knob such as 42 and tube 30. If desired another washer 42', which is intended primarily as an ornamental or trim medium, may be used to engage the base of the knob and provide an air gap 42x as a further heat barrier. Due to the interlock between washer 35 and ribs 38 of shell 20 there can be no relative rotation. This facilitates tightening a knob on its threaded support while holding the outer shell 20 by any suitable means.

A spring 43 is interposed between the disc 21 and the outer end of the tubular plunger 30 with an insulating washer 44 preferably between the spring and the tube. The shell 20 has an inwardly curled flange 45 which serves to limit the incursion of the plug into the socket and also serves as an outer abutment for the outer edges of washers 35. Spring fingers 46 serve to frictionally hold the plug in the socket.

In the form shown in Fig. 1, it is understood that the edge of the disc 21 engages the spring finger 18 and the circuit is closed by pressing the plug plunger into the socket until the igniter cup 28 engages the latch contacts 14 as shown by the broken line view of a portion of cup 28 or the stationary contacts 15.

When heated to the predetermined degree, the latches 14 will release the igniter cup, break the circuit and the spring 43 will retract the plunger ready to permit the plug to be withdrawn and used.

From the foregoing description, it will be seen that by the careful employment of air gaps, restriction of the areas of contacting surfaces and the use of simple flat insulating washers, the transmission of heat from the heating element to the shell and knob is effectively blocked although metallic materials form the major constructional media.

The device may be easily inserted and actuated. It will not overheat even though repeatedly used. The plug will not jump out of the socket when released by the latches and it may be held in for reheating if desired.

According to Fig. 1, the contact flange 21 is carried by the stationary part of the outer shell.

The igniter cup and the contact rim will serve to close the circuit by contact either simultaneously or sequentially depending upon their positions relative to the contacts in the stationary socket with which the plug is used and similarly the circuit will be broken simultaneously at both contacts or at either one depending upon the design of the socket and plug.

The invention requires a minimum cost and affords a maximum of simplicity, strength, long life, and reliability.

The method of supporting and guiding the plunger and igniter as shown and described permits the use of knobs which require either bushings or studs for their connection by the simple substitution of the supporting and guiding washers with the necessary bushing or stud.

This application is a division of my copending application Serial Number 686,188, filed July 25, 1946, now Patent 2,531,901.

I claim:

1. An electric lighter plug comprising a shell formed of two parts, an outer part being cylindrical for sliding in a socket and having an inturned flange at its front end, the other part of the shell having an end disc, a ring carrying insulating washers on opposite sides of the inturned flange and also having a tubular guide portion, the rim of said disc constituting the sion spring surrounding said plunger member comprising a body of tubular form slidable in the tubular guide portion of the shell and having an outwardly flaring portion, an insulating disc secured in the latter portion and guiding the plunger in the outer shell part, a compression spring surrounding said plunger member between said discs, knob mounting means secured in said insulating disc and an igniter element secured at one end of the tubular body portion of the plunger.

2. An electric lighter plug comprising a shell member formed of two parts, one part being cylindrical for sliding in a socket and having a curled edge at its rear end and an inturned flange at its front end, the other part of the shell member having an end disc with a rim constituting the outer contact of the plug, a ring carrying insulating washers on opposite sides of the inturned flange and a tubular guide portion, a plunger member comprising a body of tubular form slidable in said tubular guide portion and having an outwardly flaring portion at its rear end, an insulating disc secured in the latter portion for guiding the plunger in the cylindrical shell, an insulating locking disc carried by the plunger and having a non-rotative sliding connection in the shell, knob mounting means secured in said insulating disc, an igniter element secured at the front end of the tubular body portion of the plunger, and a compression spring enclosed within the shell member around the plunger member between a contact disc and the rear end of the plunger member.

3. An electric lighter plug comprising a shell formed of two parts, an outer ribbed part being cylindrical for sliding in a socket and having a curled edge at one end forming an abutment and an inturned flange at the other end, the other part of the shell comprising an end disc having a ring carrying insulating washers on opposite sides of the inturned flange and also having a tubular guide portion, a plunger member comprising a body of tubular form slidable in the tubular guide portion, insulating means secured to said body and guiding the plunger in the outer shell and having a non-rotatable sliding connection on the ribs of the outer shell part, a bushing secured in said insulating means, an igniter element secured at one end of the tubular body portion of the plunger and a spring interposed between said disc and said insulating means for retracting said plunger, said insulating guiding means abutting against said curled edge when retracted.

4. An electric lighter plug comprising a shell formed of two parts, an outer part being cylindrical for sliding in a socket and having a curled abutment edge at one end and an inturned flange at the other end, the other part of the shell having an end disc, a ring carrying insulating washers on opposite sides of the inturned flange and a tubular guide portion, a plunger member comprising a one-piece body of tubular form having longitudinal ribs slidable in the tubular guide portion, an insulating disc secured to said body and guiding the plunger in the outer shell, an insulating locking disc having notches formed in its periphery, said shell having means interlocking with said notches to provide a non-rotative sliding connection in the shell, an igniter element secured in the end of the tubular body portion of the plunger and a spring interposed between said ring and said insulating disc for retracting said plunger.

5. An electric cigar lighter plug comprising a metallic shell formed in two parts, the outer part thereof being substantially cylindrical for silding in a socket and having a curled abutment at its outer end and an inturned flange at its inner end, said outer part further being formed with substantially longitudinally extending internal ribs, the inner part thereof comprising an end disc and a ring integral with said end disc and carrying an insulating washer secured on each side of said inturned flange, said inner part further comprising a tubular guide portion integral with said end disc and concentric with said ring, said plug further comprising a metallic plunger member, said plunger member comprising a one-piece body of tubular form, said body comprising external substantially longitudinally extending ribs slidably engaging said guide portion, said body further comprising insulating disc means non-rotatably secured thereto at the outer end thereof, said disc means comprising circumferential surfaces slidably engaging said ribs of said outer part, said disc means further comprising portions formed with grooves, said ribs of said outer part further seating in said grooves to provide for slidable non-rotatable movement of said plunger in said shell, said plunger further comprising an igniter element secured to the inner end of said body and a spring interposed between said ring and said insulating disc means and urging said plunger member toward said curled abutment.

6. In a lighter plug according to claim 5, said insulating disc means comprising two discs firmly secured together, one of said discs being firmly secured to said plunger body and comprising circumferential surfaces slidably guided in said internal ribs of said shell, the other disc comprising substantially radial surfaces slidably and non-

rotatably guided on said internal ribs, said other disc being otherwise in spaced relation to said metallic shell.

7. A metallic plug for a cordless electric cigar lighter having a substantially cylindrical electrically conductive socket connected to ground, comprising, in combination, a substantially cylindrical metal shell formed with internal, substantially longitudinal ribs, said shell having connected to the front end thereof a metal disc, said disc having two concentric tubular portions integral therewith, one of said tubular portions carrying two insulating washers, said shell having a flange extending between said two washers, the other of said tubular portions constituting a guide tube, a plunger tube having a reduced forward portion located within said guide tube and radially spaced therefrom in open circuit position, said plunger tube further comprising external ribs slidingly guided in said guide tube in closed circuit position, said plunger tube having at its rear end insulating washer means firmly connected thereto, said shell having at its outer end an inwardly curled flange, a compression coil spring surrounding said plunger tube and actuating said insulating washer against said inwardly curled flange as an abutment, and an igniter element mounted on the front end of said plunger tube and electrically connected thereto.

PHILIP E. ASHTON.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
2,180,069	Sinko	Nov. 14, 1939
2,223,654	Ashton	Dec. 3, 1940
2,224,034	Lehmann	Dec. 30, 1940
2,236,483	Bahr	Mar. 25, 1941
2,244,234	Ashton et al.	June 3, 1941
2,256,876	Wolfson	Sept. 23, 1941
2,305,084	Johnson	Dec. 15, 1942
2,338,565	Ashton et al.	Jan. 4, 1944
2,473,890	Kroll et al.	June 21, 1949
2,498,116	Sinko	Feb. 21, 1950
2,531,901	Ashton	Nov. 28, 1950