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Pecota

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[54] NO-RELIGHT CIGAR LIGHTER SOCKET

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[75] Inventor: Walter Pecota, Mountain Lakes, N.J.

[73] Assignee: Wagner Electric Corporation, Parsippany, N.J.

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Primary Examiner—Volodymyr Y. Mayewsky
Attorney, Agent, or Firm—Eyre, Mann & Lucas

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[51] Int. Cl. F23q 7/24

[58] Field of Search 219/262, 263, 264, 265, 219/266, , 267, 270

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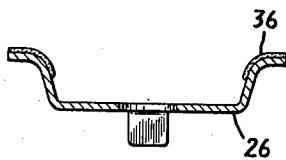
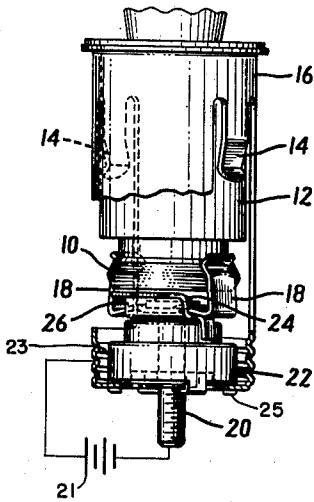
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[57]

ABSTRACT

An improved no-relight cigar lighter socket is disclosed. The stop member is strong yet electrically insulated from the burner cup of the cigar lighter even when the cigar lighter is in its maximum inserted position.

7 Claims, 4 Drawing Figures



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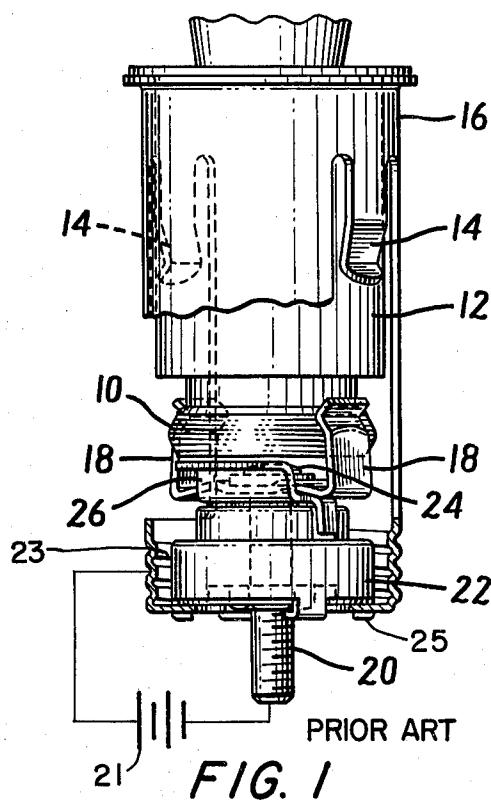


FIG. 1

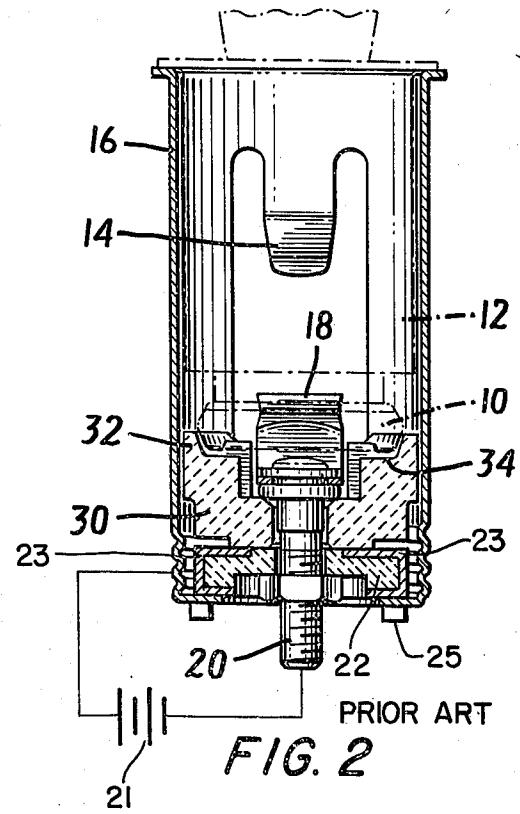


FIG. 2

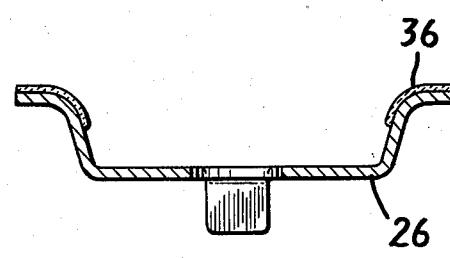


FIG. 3

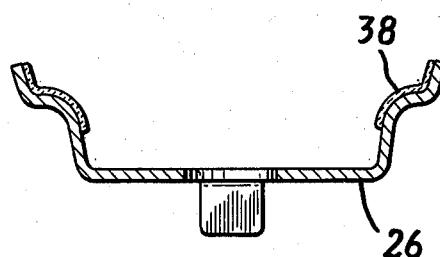


FIG. 4

NO-RELIGHT CIGAR LIGHTER SOCKET

The present invention relates to no-relight cigar lighter sockets.

There is increasing use today in automobiles of plastics in dashboards. In order to prevent excessive panel temperatures, car manufacturers employing plastic dashboards will normally require a cigar lighter having a no-relight capability. A no-relight lighter is one in which retention of the cigar lighter plug in the maximum inserted position in the cigar lighter socket will not result in excessive panel temperatures. The maximum panel temperature normally permissible with a plastic dashboard is approximately 200°F.

Conventional cigar lighters provide continuous power to the heating element when the cigar lighter plug is inserted to its maximum position and held in this position. Such continuous energization of the heating element will usually result in a temperature rise unacceptable in terms of the temperatures which the plastic dashboard can withstand. The present invention is a construction which eliminates such continuous energization even when the lighter plug is held in its maximum insertion position over a period of time.

It is thought that perhaps the best way to understand the instant invention is with reference to the drawings in which:

FIG. 1 shows a standard cigar lighter;

FIG. 2 shows a standard no-relight cigar lighter;

FIG. 3 shows the stop member of a cigar lighter to the present invention; and

FIG. 4 shows the preferred embodiment of the stop member according to the present invention.

Referring now to FIG. 1 there is shown a conventional type of cigar lighter. The burner cup 10 is spring loaded (not shown) in a shroud 12. When the cigar lighter plug is inserted to its maximum position, the shroud is retained from the maximum position by clips 14 in the side wall of the lighter socket 16 while the burner cup 10 advances to engage bimetallic thermostat 18. The bimetallic thermostat is connected to a stud 20 which is electrically insulated from the lighter socket 16 by means of a ceramic washer 22 attached to the socket 16 by a metal shroud 23 with tabs 25. As current is fed to the stud 20 from source 21, it will pass through the bimetallic thermostat 18 to the burner cup 10 and then to the element thereby heating the element which is present in the burner cup. As is well known, the element is a resistance wire formed in the shape of a helix which is connected to the burner cup at its outside perimeter and, by means of the plug, to ground from its center. The element is usually electrically insulated from the plug except in these two areas as for example by means of a mica washer.

As the element heats up, it causes the bimetallic thermostat 18 to heat which in turn causes relaxation of retaining force on the burner cup 10. When the bimetallic thermostat has been sufficiently heated, the spring tension in the lighter plug will overcome the retaining force of the clips and the plug will retract into the shroud 12.

In order to prevent shorting out of the element by coming into contact with the head 24 of the stud, damage to the element by coming in contact with the head 24 of the stud 20 or damage to the bimetallic thermostat 18 by spreading it too much, a stop member 26 is usually provided to limit insertion travel of the burner cup 10. This stop member is usually made of metal such

as stainless steel and as can be seen from the drawing, this stop member is usually assembled as an integral unit with the stud and bimetallic assembly. Since the stop member is in electrical contact with the stud 20 and with the burner cup 10 it will continue to supply electricity to the burner cup even after the bimetallic member has expanded away from the burner cup in those instances where pressure is continued to be applied to the lighter plug e.g., when an impatient driver continues to press on the plug head. Under these circumstances, the self-limiting temperature of the bimetallic thermostat is thwarted and the cigar lighter can become heated to a point where it will be detrimental to plastic dashboards.

Attempts have been made to overcome this problem. The known way to do this is to extend ceramic washer 22 so that it also serves as the stop member. This can be seen more clearly in FIG. 2 wherein ceramic washer 30 is used in addition to ceramic washer 22. Ceramic washer 30 has extensions 32 with shoulders 34 to act as stop and centering members for the burner cup 10 when it is contact with the bimetallic thermostat 18. The disadvantage to this structure is that the ceramic washer does not have sufficient strength to withstand the insertion forces which it normally encounters. Research has shown that the stop member used in a cigar lighter socket should be able to withstand forces of at least 25 pounds since this is the maximum force to which it will usually be subjected. Ceramic washers do not have the strength to withstand such force and they are therefore frequently broken. This not only creates possible problems with respect to damage to the lighter but can also eliminate the no-relight feature and create the possibility that the dashboard will be subjected to panel temperatures higher than it can withstand. It will be appreciated that a driver who uses sufficient force to break a ceramic washer is most likely to be the same impatient one who will hold the cigar lighter in to increase its temperature and will be exactly the one who needs a cigar lighter with a no-relight feature.

A further disadvantage to extending the ceramic washer to also act as the stop member is that it requires additional tooling to so change the shape of the washer and also requires modification of the assembly apparatus since the structure to be made is considerably different from a standard cigar lighter as shown in FIG. 1. In a highly competitive industry such as the automotive industry, such tooling and re-designing of the assembly apparatus can be prohibitively expensive.

In accordance with the present invention, the disadvantages of prior art devices are overcome by making the stop member both strong and yet non-conducting while at the same time making it of the same shape as the shape of the stop member in standard lighters whereby no major retooling or modification of assembly equipment is required. Referring again to FIG. 1, the stop member 26 according to the present invention is shown by itself in FIG. 3. As in FIG. 1, the stop member is made of metal in order to impart good strength. However, in order to impart electrical isolation from the burner cup 10, an insulating coating 36 is applied to the stop member 26 at least in those areas of the stop member which will come into contact with the burner cup 10. It has been found that the insulating coating 36 must be able to withstand temperatures of at least about 1,000°F. without breaking down either mechanically or electrically. The thickness of the coating is not

critical so long as it is sufficient to electrically isolate the stop member from the burner cup at the maximum design panel temperature of the lighter.

Excellent results have been obtained using a ceramic spray coating on the stop member. This ceramic spray coating may be applied only to the edges of the stop member 26 as shown in FIG. 3 but as a practical matter it will usually cover the entire facing surface of the stop member 26. Ceramic coating is, of course, a well known technique. A suitable method for use in the present invention is to apply aluminum oxide by spraying. Typical spraying apparatus is the electric arc type wherein the ceramic is melted by the electric arc and then applied by means of a pressurized gas. A coating of between about 0.1-0.2 mm of aluminum oxide applied to a stainless steel stop member has been found to be suitable. It is, of course, not necessary that the insulating material be sprayed on to the metal and it could suitably be formed by anodizing or the like. The critical feature of the coating is that it withstand the abrasion of the burner cup and at the same time maintain its electrical insulating properties at temperatures up to 1,000°F.

In the preferred form of the present invention, the stop member serves not only as a stop member but also as a centering member as shown in FIG. 4. A cigar lighter socket can have two or three or more bimetallic thermostats 18. Where three or more are employed, there is usually no problem encountered in centering the burner cup. However, where only two are employed, separate means for centering the burner cup are usually employed and as shown in FIG. 4, shoulders 38 on stop member 26 are suitable for this purpose.

Whether using the device of FIG. 3 or FIG. 4 in the assembly of FIG. 1, it is important to note that a direct substitution can be made and it is not necessary to have re-tooling or modification of the assembly apparatus in order to make the cigar lighter sockets of the instant invention. Furthermore, it is possible to make both re-light and no-re-light cigar lighter sockets on the same assembly line by simply changing the stop member 26 employed. This is quite a useful adaptation since certain motor vehicle manufacturers still employ metal dashboards and prefer to have a cigar lighter with re-light capability.

It will be understood that the claims are intended to cover all changes and modifications of the preferred embodiments of the invention, herein chosen for the purpose of illustration, which do not constitute departures from the spirit and scope of the invention.

What is claimed is:

1. A no-re-light cigar lighter socket comprising:
 - a. a metal socket housing;
 - b. an electrical stud secured to and electrically insulated from the socket housing;
 - c. a bimetallic thermostat affixed to said stud, said bimetallic thermostat being capable of retaining an electrical burner cup of a cigar lighter plug when the same is inserted therein;
 - d. a metal stop member affixed to said stud for limiting the maximum insertion of the burner cup of the cigar lighter plug;
 - e. said stop member being coated with an insulating material which electrically insulates the stop member from the burner cup when the burner cup is in its maximum inserted position thereby preventing the flow of electricity from the stop member to the burner cup when the burner cup is in contact with the stop member; and
 - f. said insulating material maintaining its electrical insulating properties at temperatures up to the maximum design operating temperature of the cigar lighter socket.
2. The cigar lighter socket of claim 1 wherein the stop member also acts as a centering member for the burner cup.
3. The cigar lighter socket of claim 1 wherein the insulating coating is aluminum oxide.
4. The cigar lighter socket of claim 3 wherein the stop member is stainless steel.
5. The cigar lighter socket of claim 4 wherein the insulating coating is between about 0.1 and 0.2 mm in thickness.
6. The cigar lighter socket of claim 3 wherein the stop member is aluminum.
7. The cigar lighter socket of claim 1 wherein the stop member is capable of withstanding insertion forces of at least about 25 pounds.

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