Aug. 16, 1955 L. E. LUCAS 2,715,654

SPARK PLUG SHIELD

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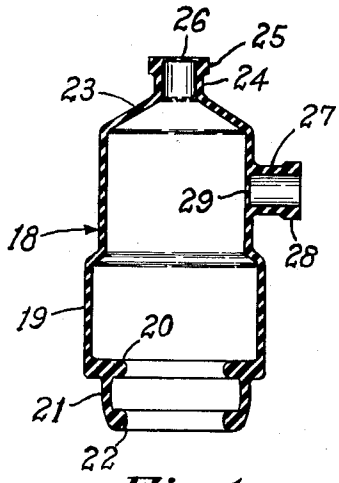


Fig. 1

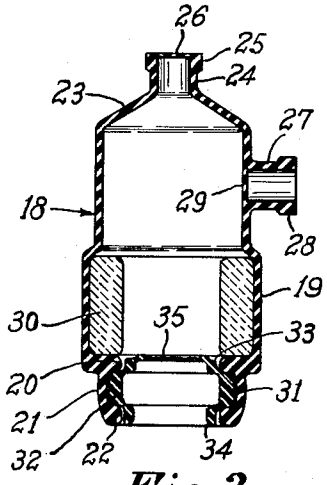


Fig. 2

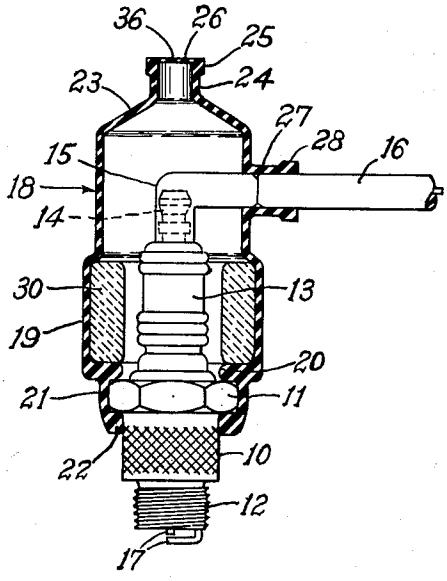


Fig. 3

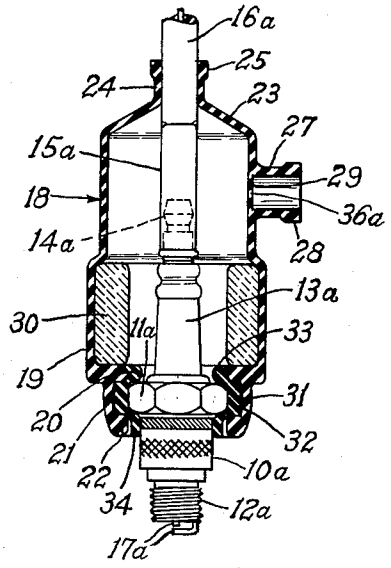


Fig. 5

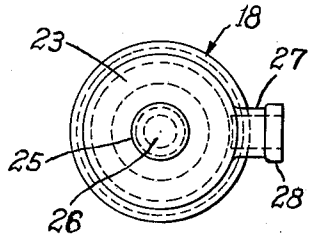


Fig. 4

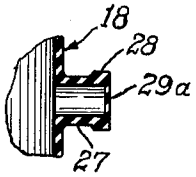


Fig. 7

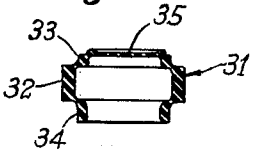


Fig. 6

INVENTOR.

Lyle E. Lucas

BY Frease & Bishop

ATTORNEYS

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SPARK PLUG SHIELD

Lyle E. Lucas, North Canton, Ohio

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2 Claims. (Cl. 174—77)

The invention relates to shields for spark plugs, and more particularly to a flexible rubber shield for preventing short-circuiting of the spark plug by moisture condensing on the surface thereof.

A principal object of the invention is to provide such a shield having means thereon for absorbing any moisture which may condense upon the spark plug when it is inactive and from which the moisture is expelled when the spark plug becomes heated in operation.

Another object is to provide a shield of this character which may be easily and readily applied to an existing spark plug, or which may be incorporated as original equipment on a new spark plug.

A further object is to provide a rubber shield of this character having a molded ring of suitable absorbent material, such as alumina, enclosed therein and surrounding the spark plug.

A still further object is to provide a shield of the type referred to having reduced vertical and angular necks for the attachment of either straight or angular connectors to the spark plug, each neck being originally closed by a thin diaphragm, either one of which may be torn out to insert the connector.

Another object of the invention is to provide such a spark plug shield designed to fit upon a standard size 14 mm. spark plug, and having a removable adapter arranged to be inserted into the lower end thereof for fitting upon a small size 10 mm. spark plug.

A further object is to provide such an adapter with a thin diaphragm whereby the shield with the absorbent ring therein may be shipped and stored with the adapter inserted in its lower end, to seal the absorbent ring against moisture.

The above objects together with others which will be apparent from the drawing and following description, or which may be later referred to, may be attained by constructing the improved spark plug shield in the manner hereinafter described in detail and illustrated in the accompanying drawing, in which:

Fig. 1 is a vertical or longitudinal, sectional view of a rubber spark plug shield embodying the invention;

Fig. 2 a similar view showing the absorbent ring within the shield;

Fig. 3 a vertical, sectional view of the shield with absorbent ring therein applied to a standard size spark plug, with angular connection;

Fig. 4 a top plan view of the shield;

Fig. 5 a view similar to Fig. 3, showing the shield with adapter therein, applied to a small size spark plug, with straight connection;

Fig. 6 a detached, sectional view of the adapter; and

Fig. 7 a fragmentary, sectional view showing a modified form of angular neck.

Referring first to Fig. 3, a conventional standard size 14 mm. spark plug is shown, including the usual metal body **10** with hexagonal portion **11** at its upper end and reduced threaded lower end **12**. The usual porcelain insulator is indicated at **13** and the binding post **14** is

located at the upper end of the spark plug for connection of the usual metal connector **15**, which in this case is shown as an angular connector, for attaching the conductor wire **16** for supplying current to the terminals **17** beneath the threaded section **12** of the spark plug.

The improved shield to which the invention relates is indicated generally at **18** and is formed of flexible rubber, preferably of substantially cylindrical shape, having the enlarged, intermediate portion **19** terminating in the inwardly disposed annular bead **20**, below which is formed the reduced portion **21** terminating in a similar inwardly disposed annular bead **22**.

The upper end of the shield may be conical, as at **23**, terminating in the reduced neck **24**, preferably having the annular rim **25** and provided with a thin diaphragm **26**. At one side of the shield **18**, above the enlarged portion **19**, is provided an angular neck **27** with enlarged rim **28** at its end and provided with a thin diaphragm **29**, which may be located at the inner end of the neck, as shown in Fig. 1, or as indicated at **29***a* in Fig. 7, may be formed at the outer end of the neck **27**.

Within the enlarged, annular pocket **19** of the shield is located the dehydrator ring **30** which is preferably a molded ring of suitable absorbent material such as alumina. The ring may be molded with a binder and then fired, the firing burning out the binder and leaving the alumina in an activated condition. The advantage of using alumina as a hydrator is that it is long lasting and easily reactivated by the application of heat.

An adapter, indicated generally at **31**, and shown detached in Fig. 6, is provided for insertion into the lower end of the shield for adapting the same to a small size spark plug.

This adapter is also made of flexible rubber and has the central annular rib **32**, adapted to be received between the beads **20** and **22** in the lower end of the shield, and the upper and lower reduced portions **33** and **34** adapted to fit within the annular beads **20** and **22** of the shield. A thin diaphragm **35** is formed at the upper end of the adapter.

Referring to Fig. 5, a small size or 10 mm. spark plug is shown, comprising the metal body **10***a* with hexagonal portion **11***a*, a reduced threaded lower end **12***a*, porcelain insulator **13***a* and binding post **14***a* at its upper end for receiving the usual metal connector, which in this case is shown as a straight connector **15***a*, attached to the conductor wire **16***a* for supplying current to the terminals **17***a*.

In applying the shield to a spark plug, assuming that an angular connector is to be used, as shown in Fig. 3, the diaphragm **29** is torn out of the neck **27** so that the connector **15** may be inserted therethrough.

A slit or self sealing incision is made in the diaphragm **26** of the other neck, as indicated at **36** in Fig. 3, as by puncturing with a sharp knife blade. Such an incision may be made in each of the diaphragms **26** and **29**, at the factory, so that when either diaphragm is torn away, to permit the insertion of a connector, the self sealing incision will remain in the other diaphragm.

The hexagonal portion **11** of the metal body of the spark plug is received between the internal, annular beads **20** and **22** in the lower end of the shield, as shown in Fig. 3. The molded ring **30** is thus located around and spaced from the porcelain insulator **13** of the spark plug.

As the reduced lower portion **21** of the shield fits tightly around the metal body of the spark plug and the neck **27** fits tightly upon the connector **15** and conductor **16**, forming a seal at these points, moisture is excluded from the spark plug.

When the spark plug is installed but inactive, any moisture which might condense on the surface thereof is absorbed by the dehydrator ring **30**. Any moisture

which might remain on the plug will be vaporized by the heat generated in the use of the plug and then absorbed by the ring **30**.

Prolonged and uninterrupted use of the spark plug may drive the moisture from the dehydrator through the slit **36** in the diaphragm **26**. However, since alumina absorbs a relatively large quantity of moisture, it may be easily reactivated by applying heat thereto on removal from the spark plug.

As shown in Fig. 5, with the adapter **31** inserted into the lower end of the shield, the adapter will fit over the hexagonal portion **11***a* and upon the metal body **10***a* of the spark plug forming a seal at this point. It is understood of course that the diaphragm **35** should be torn from the adapter when the same is to be used upon the small size spark plug as shown in Fig. 5.

The diaphragm may be torn from the upper neck **24** to permit the use of the straight connector **15***a* in which case a slit **36** may be formed in the diaphragm **29** of the neck **27**.

In order to protect the alumina ring **30** and seal the same against moisture during shipping and storage of the shield, the adapter **31** may be inserted into the lower end of the shield, as shown in Fig. 2, thus completely enclosing and sealing the ring.

In the foregoing description, certain terms have been used for brevity, clearness and understanding, but no unnecessary limitations are to be implied therefrom beyond the requirements of the prior art, because such words are used for descriptive purposes herein and are intended to be broadly construed.

Moreover, the embodiments of the improved construction illustrated and described herein are by way of example, and the scope of the present invention is not limited to the exact details of construction.

Having now described the invention or discovery, the construction, the operation, and use of preferred embodiments thereof, and the advantageous new and useful results obtained thereby; the new and useful constructions, and reasonable mechanical equivalents thereof obvious to those skilled in the art, are set forth in the appended claims.

I claim:

1. A shield for spark plugs comprising a hollow cylindrical flexible rubber shell of a size to surround a spark plug in spaced relation thereto, a spaced pair of internal annular beads at the lower end of said shell adapted to fit over the hexagonal metal portion of the spark plug, an enlarged cylindrical intermediate portion of the shell adapted to surround the insulation portion of the spark plug in spaced relation thereto, and a molded hollow cylinder of absorbent material located in said enlarged cylindrical portion of the shell surrounding and in spaced relation to the insulation portion of the spark plug, a vertical neck and an angular neck on the upper portion of the shell, and a thin integral drum type diaphragm closing one of said necks, said diaphragm having a self sealing incision therein to equalize internal and external air pressure upon the shell when a connector is located through the other neck.

2. A shield for spark plugs comprising a hollow cylindrical flexible rubber shell of a size to surround a spark plug in spaced relation thereto, a spaced pair of internal annular beads at the lower end of said shell adapted to fit over the hexagonal metal portion of the spark plug, an enlarged cylindrical intermediate portion of the shell adapted to surround the insulation portion of the spark plug in spaced relation thereto, and a molded hollow cylinder of moisture absorbent material located in said enlarged cylindrical portion of the shell surrounding and in spaced relation to the insulation portion of the spark plug, a vertical neck and an angular neck on the upper portion of the shell, and thin integral drum type diaphragms closing said necks and adapted to be selectively removed to receive a vertical or an angular connection respectively, each of said diaphragms having a self sealing incision therein to equalize internal and external air pressure upon the shell when a connector is located through the other neck.

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