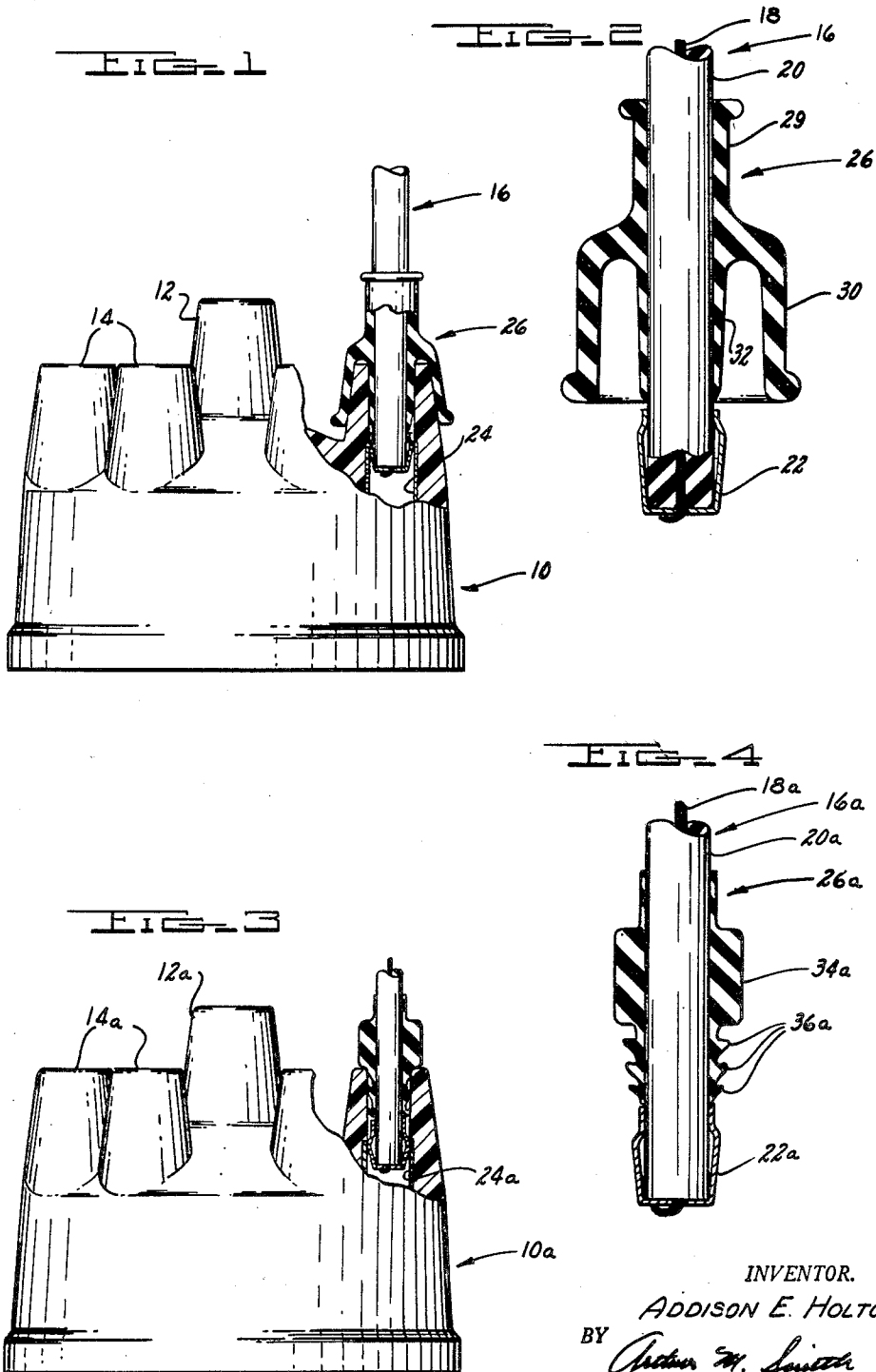


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DISTRIBUTOR CAP INSULATOR

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DISTRIBUTOR CAP INSULATOR

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1 Claim. (Cl. 339—94)

The present invention relates to an insulating cap particularly adapted for use with the wire leads which are detachably affixed to the distributor of an engine ignition system.

At the present time, to applicant's knowledge, all ignition wires at the distributor of the engine in motor vehicles are insulated with some type of detachable or applied insulating cap. Up until the beginning of the last World War, these insulating caps were made with a natural rubber stock. Due to the stress applied to the insulating cap when in position on the distributor, and due to the fact that natural rubber has little ozone resistance, these insulating caps had a very short service life. They would split under the action of the ozone and hence, were useless as a moisture seal. Following the war and the introduction of vinyl resins, the industry redesigned these distributor insulating caps, employing the ozone resistant properties of the vinyl resins. This was an improvement over the existing insulating caps and resulted in increased service life. However, even this improvement failed to provide an insulator which will last nearly as long as the ignition cables.

One of the main difficulties with the vinyl insulating cap is that this insulating cap makes use of the elastomeric properties of the vinyl resin to effect a seal with the ignition cable. In other words, the cable hole in the insulating cap is smaller than the diameter of the cable and is stretched over the cable at assembly. At the beginning this provides an effective seal, but the shortcomings of the insulating cap are soon evident when it is placed in service. The vinyl insulating cap is subject to cold flow and hence begins to flow, approaching the wire diameter, and the residual tension disappears. This flow is speeded by the engine heat and ambient temperature of various locales. It soon progresses to a point where condensed moisture can drain down the wire and pass between the insulator and the wire into the distributor terminal, establishing a tracking path for the high voltage along the cable surface to ground. Inasmuch as the ignition wires from the distributor lead away from the distributor in a loop, this tends to put a great deal more stress upon one side of the insulating cap than on the other. This also aids the progress of the cold flow effect so that the insulating cap opening soon becomes elliptical. After the cold flow reaches a serious point, the insulating cap has a rather large gap on the side opposite the bow, where water gains very easy access into the distributor terminal. Cold flow also occurs on the major diameter of the insulator so that with the passage of time the insulating cap loses its grip on the distributor tower.

Therefore, it is a principal object of the present invention to provide an insulating cap for lead wires, particularly adapted for use with distributor constructions, which insulating cap provides an effective seal and has a long trouble-free service life.

It is another object of the present invention to provide an insulating cap for lead wires, particularly adapted for use with distributor constructions, which insulating cap is simple and provides a firm engagement with the distributor tower.

It is a further object of the present invention to provide an insulating cap for a lead wire, particularly adapted for use with distributor constructions, which insulating cap is integral with said lead wire and is formed of a material which will not readily deform or break down under the presence of ozone.

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Other objects of this invention will appear in the following description and appended claim, reference being had to the accompanying drawings forming a part of this specification wherein like reference characters designate corresponding parts in the several views.

In the drawings:

Fig. 1 is a side elevation of a distributor housing with a spark plug lead cable attached thereto, the spark plug lead cable utilizing an insulating cap embodying one form of the present invention, and portions of the construction being broken away to more clearly demonstrate the present invention.

Fig. 2 is an enlarged sectional view of the lead cable and insulating cap of Fig. 1.

Fig. 3 is a view similar to the view shown in Fig. 1 and disclosing an insulating cap utilizing the second form of the present invention.

Fig. 4 is an enlarged sectional view of the lead cable and insulating cap of Fig. 3.

Before explaining the present invention in detail, it is to be understood that the invention is not limited in its application to the details of construction and arrangement of parts illustrated in the accompanying drawings, since the invention is capable of other embodiments and of being practiced or carried out in various ways. Also, it is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation.

Referring to Figs. 1 and 2 of the drawings, a distributor housing such as is used in the present day automobile is denoted by the number 10. The housing 10 includes the coil tower 12 and the spark plug towers 14. In use in the motor vehicle, a lead cable is disposed between the high tension coil and the coil tower 12, and lead cables are positioned between the spark plug towers 14 and the spark plugs of the engine. One such spark plug cable is demonstrated at 16 in Figs. 1 and 2 of the drawings. The lead cable is comprised of the wires 18, which is surrounded with insulation 20, and a contact portion 22 which is affixed to the end of the wire 18. The contact portion 22 seats in electrical contact with a terminal cup 24 in the distributor 10. This type of assembly is conventional and further explanation is not deemed necessary.

An insulating cap utilizing the first embodiment of the present invention is indicated at 26. This insulating cap is molded onto the insulation 20 of the cable 16 so as to become an integral part of the said cable. In this manner there is no opening between the insulation 20 of the cable and the insulating cap which can become distorted due to wear and cold flow as previously explained. The insulating cap 26 is formed of a compound such as neoprene, Butyl, or Hycar compound. Such compounds have a much higher elongation and lower modulus than vinyl at any temperature and consequently it is easier to install and its grip to the distributor tower is better. Further, these compounds take a much smaller set than vinyl compounds and thus an insulator made of such compounds provides a better grip with the distributor tower which will retain its gripping characteristics for a long period of time. The insulating cap 26 includes a neck 29 which may be used as a finger grip. In this manner it is unnecessary to use pliers when inserting and removing the lead cable from the tower, and the damage which is usually caused by the pliers is avoided. The insulator 26 also includes a skirt 30 which is adapted to fit over one of the towers 12 or 14 of the distributor 10. This skirt provides a grip between the insulating cap and the tower and also aids in preventing moisture from creeping into the tower. A thickened or tapering section is molded at the inside of the insulating cap 26 along the insulation 20 of the cable 16. This thickened section 32 not only provides a firm engagement between the insulating cap 26 and the tower 12 or 14, but its mass also displaces a large amount of air which reduces the amount of oxygen available for ionization and subsequent formation of ozone. As previously explained, such ozone is undesirable in that it tends to break down the insulation.

The second embodiment of the present invention is disclosed in Figs. 3 and 4 of the drawings. A distributor cap

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is indicated at 10a having the coil tower 12a and spark plug towers 14a. A spark plug lead cable is indicated at 16a and this cable includes the wire 18a, the insulation 20a, and the contact 22a. Terminal cups 24a are provided in the distributor 10a to receive the contacts 22a.

The insulating cap of the present invention is denoted by the numeral 26a and comprises generally a head portion 34a and a plurality of thin flanges 36a disposed therebeneath. The head portion can be used as a finger grip thus eliminating the use of pliers as explained in connection with the first embodiment of the present invention. The insulating cap 26a is molded onto the insulation 20a of the cable 16a to provide an effective seal between the cable 16a and the insulating cap 26a. The flanges 36a exceed the diameter of the tower 12a or 14a with which it is used. Upon insertion into the tower, the flanges 36a deform to fit within the inside of the tower in snug engagement with the sidewalls thereof as shown in Fig. 3 of the drawings. The flanges permit the use of the insulator to fit a wide range of tower sizes. This is an important development because the inner diameters of the towers vary over a fairly wide range, depending on the particular manufacturer's product.

From the foregoing, it will be seen that I have provided a solution to a prominent problem, and the resulting structure affords an effective seal and a firm grip when used with distributor towers of varying diameters.

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Having thus described my invention, I claim:

A lead cable adapted to have one end fit into the tower of an ignition distributor comprising an insulated wire and an insulating resilient cap molded onto the end of said cable which contacts said distributor, said cap being further characterized by a tapered center section peripherally adjacent said wire insulation and adapted to substantially fill the inside of said tower upon insertion therein, and a skirt portion peripherally spaced from said center section and adapted to fit over and engage said tower so that the tower is contained between and firmly gripped by said center section and skirt.

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