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SECONDARY IGNITION WIRE END ASSEMBLY

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Fig. 1

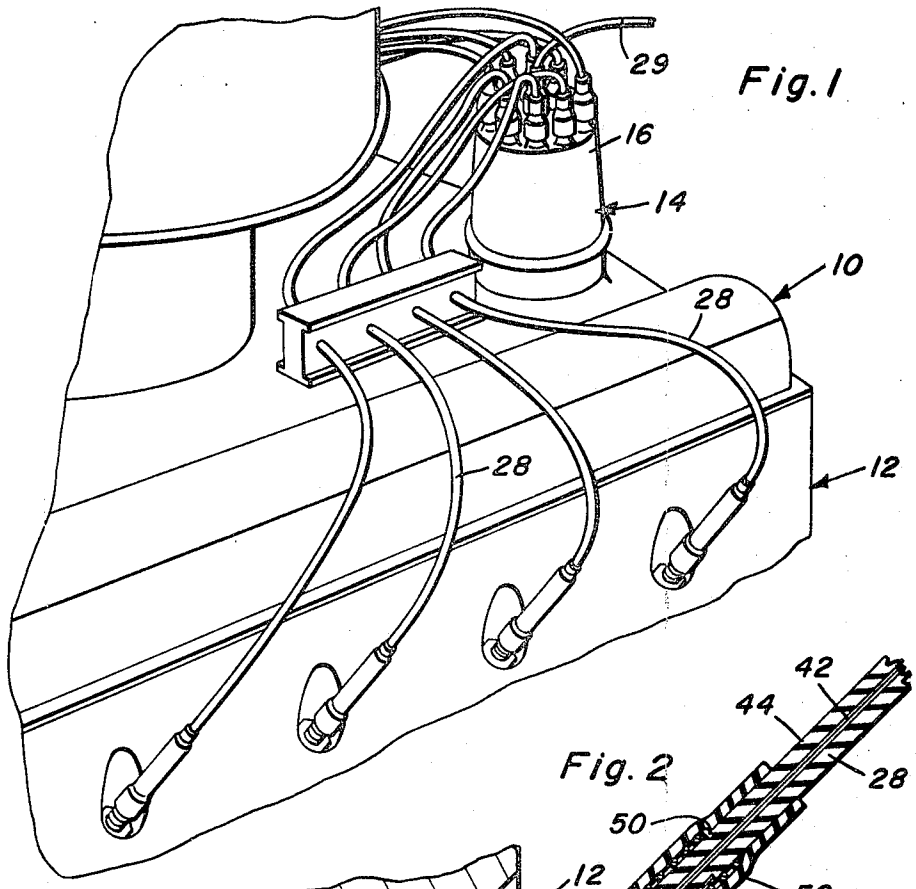


Fig. 2

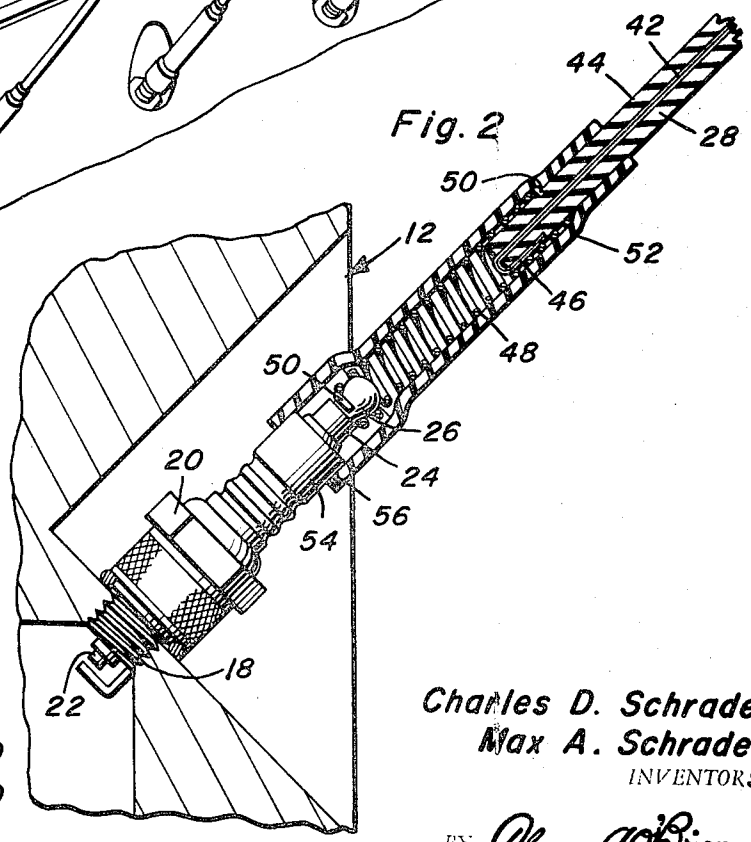
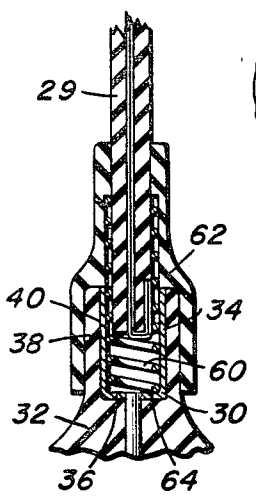


Fig. 3



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SECONDARY IGNITION WIRE END ASSEMBLY

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ABSTRACT OF THE DISCLOSURE

A secondary ignition wire end assembly defined by a conductive, stiff and resilient coil spring tightly threaded onto the dielectric resilient covering of one end of a secondary ignition wire with several convolutions of the coil spring passing over a backturned exposed end of the conductive core of the ignition wire and at least the endmost convolution of the spring threadedly engaged with the ignition wire inwardly deflected and tightly frictionally engaged with the resilient outer covering of the ignition wire so as to prevent axial as well as rotational shifting of the coil spring relative to the ignition wire covering. The coil spring includes a free end projecting outwardly beyond the ignition wire for telescopic engagement over a spark plug terminal and the endmost convolution of the free end of the spring is inwardly deflected for tight frictional engagement with and biting into a diametrically reduced portion of the spark plug terminal with which the free end of the coil spring is engaged.

This invention relates to a novel and useful wire end assembly and more specifically to a wire end assembly specifically adapted for use on an internal combustion engine secondary ignition wire. The end assembly of the instant invention may be utilized on either end of a spark plug wire for the purpose of establishing a good electrical connection between the spark plug wire and an associated spark plug and also between a spark plug wire and the associated distributor cap terminal. Still further, the wire end assembly of the instant invention may also be utilized on either or both ends of the secondary coil wire extending from the coil to the center electrode of an associated distributor cap.

The main object of this invention is to provide a secondary ignition wire end assembly which may be utilized to establish a good electrical connection between a secondary ignition wire conductive core and an associated terminal of an engine ignition component.

Another object of this invention is to provide a wire end assembly in accordance with the preceding object and which will be readily disengageable from the associated terminal of an engine ignition component.

Still another object of this invention is to provide a wire end assembly which is readily engageable with a terminal of an associated engine ignition component and which is adapted to have a dielectric weather protective terminal cap operatively associated therewith.

A final object of this invention to be specifically enumerated herein is to provide an ignition wire end assembly in accordance with the preceding objects which will conform to conventional forms of manufacture, be of simple construction and easy to use so as to provide a device that will be economically feasible, long lasting and relatively trouble-free in operation.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIGURE 1 is a fragmentary perspective view of a conventional form of V-type internal combustion engine illustrating the wire end assembly of the instant invention operatively associated with the various end portions of the secondary ignition wires of the ignition system of the engine;

FIGURE 2 is an enlarged fragmentary vertical sectional view taken substantially upon a plane passing through one of the spark plug bores of the internal combustion engine and illustrating the associated wire end assembly in longitudinal section; and

FIGURE 3 is a fragmentary enlarged longitudinal sectional view of another wire end assembly of the instant invention operatively associated with the output terminal of the coil of the internal combustion engine.

Referring now more specifically to the drawings, the numeral **10** generally designates a conventional form of internal combustion engine including a pair of cylinder heads, one of which is generally designated by the reference numeral **12**, and a distributor assembly generally referred to by the reference numeral **14** and including a conventional form of distributor cap **16**. The cylinder head **12** includes a plurality of threaded spark plug bores **18** in which corresponding spark plugs **20** are threadedly engaged.

Each of the spark plugs **20** includes a center electrode **22** whose upper end **24** defines an electrical terminal therefor. The terminals **24** each include a diametrically reduced portion **26** and each is electrically connected to the associated distributor cap terminal by means of a secondary ignition wire **28**. In addition, a further secondary ignition wire **29** extends between the center distributor cap terminal (not shown) and the output terminal **30** of the coil **32** of the internal combustion engine **10**.

The output terminal **30** of the coil **32** is defined by a conductive cup or sleeve **34** including an end wall **36** and which is recessed in a boss **38** carried by the coil **32** and having a bore **40** formed therein in which the sleeve **34** is secured. The center terminal of the distributor cap **16** as well as the eight outer terminals of the distributor cap **16** with which the secondary ignition wires **28** are connected are constructed in substantially the same manner as the output terminal **30** of the coil **32** and are hence not specifically illustrated.

The secondary ignition wire **28** includes a conductive and flexible inner core **42** covered by a flexible and dielectric covering **44** of resilient material such as rubber or the like. All of the spark plug ends of the ignition wires **28** are constructed as illustrated in FIGURE 2 of the dawings and both ends of the ignition wire **29** and the distributor cap ends of the ignition wires **28** are constructed as illustrated in FIGURE 3.

The spark plug end of each ignition wire **28** has the core **42** projecting outwardly of the covering **44** and bent back upon the outer surface of the covering **44** as at **46**. Then, one end portion of a coil spring-type terminal **48** has a plurality of its convolutions tightly wound about the covering **44** and over the backturned end portion of the core **42**. Of course, the convolutions of the terminal **48** are not wound about the covering **44** when applying the terminal **48** to the ignition wire **28**, but the corresponding end of the terminal **48** is "threaded" onto the end of the ignition wire **28**. In addition, the extreme terminal end of the terminal **48** includes an inturned terminal end **50** which bites into the covering **44** and thus resists both rotational and axial displacement of the terminal **48** relative to the ignition wire **28**.

The end of the terminal **48** remote from the ignition wire **28** is slipped over the terminal **24** in the manner illustrated in FIGURE 2 of the drawings and also includes an inturned terminal end portion **50** which is seated and

bites into the diametrically reduced portion **26** of the terminal **24**. Finally, a waterproof elongated protective cup or sleeve **52** has one end tightly telescoped about the covering **44** and the other end tightly telescoped over the porcelain insulating portion **54** of the spark plug **20** as at **56** to form a waterproof seal between the inner core **42** of the wire **28** and the terminal **24**.

The opposite end of the ignition wire **29** and the ends of the ignition wires **28** remote from the spark plugs **20** are constructed in substantially the same manner except that the coil spring-type terminals **60** secured thereto are somewhat shorter than the terminals **48** and the cups **62** are also shorter than the cups or sleeves **52**. Further, the free ends of the terminals **60** include outturned terminal end portions **64** in lieu of inturned terminal end portions and therefore bite into the terminals in which they are telescoped.

While the wire end assembly has been illustrated as being utilized on a motor vehicle engine, it is to be understood that it can be used on any secondary ignition wire such as ignition wires on tractors, lawn mowers, chain saws, outboard motors and industrial engines, etc.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. In combination with a spark plug of the type including a center electrode with one outer end portion thereof exposed and defining an electrical terminal provided with a diametrically reduced portion adjacent but spaced from the outer end face of the electrical terminal, a secondary ignition wire end assembly comprising a secondary ignition cable including an inner conductive core covered by an outer resilient insulative cover, said conductive core having one end projecting outwardly of the corresponding end of said cover, a substantially constant diameter, conductive and resilient coil spring-type of terminal having one end portion thereof tightly wound about said corresponding end of said cover and the other end portion projecting outwardly of said corresponding end, said other end portion of said terminal being snugly telescoped over said electrical terminal, said one end of said core being bent back upon itself over the outer surface of the corresponding end of said cover and a plurality of convolutions of said one end portion of said coil spring-type of terminal being wound tightly thereover, the terminal end of said one end portion of said coil spring-type of terminal being slightly laterally inwardly deflected for tighter frictional engagement with the adjacent portion of said cover thereby resisting rotational as well as axial displacement of said coil spring-type of terminal relative to said cover, and the terminal end of said other end portion of said coil spring-type of terminal being also inwardly deflected and tightly frictionally engaged with and at least partially impaling and biting into the outer surface portion of said diametrically reduced portion of said spark plug electrical terminal.

2. The combination of claim **1** including a tabular dielectric terminal cap telescoped over said cover at said electrical point spaced therealong from said coil spring-type of terminal, opening toward and at least substantially entirely enclosing said coil spring-type of terminal and adapted to provide a substantially weather-tight seal between said cover and a terminal with which said coil spring-type of terminal is engaged.

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U.S. Cl. X.R.

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