Oct. 28, 1958 A. CANDELISE 2,858,361

SPARK PLUG CENTER ELECTRODE TO INSULATOR CONNECTION

Filed June 11, 1956

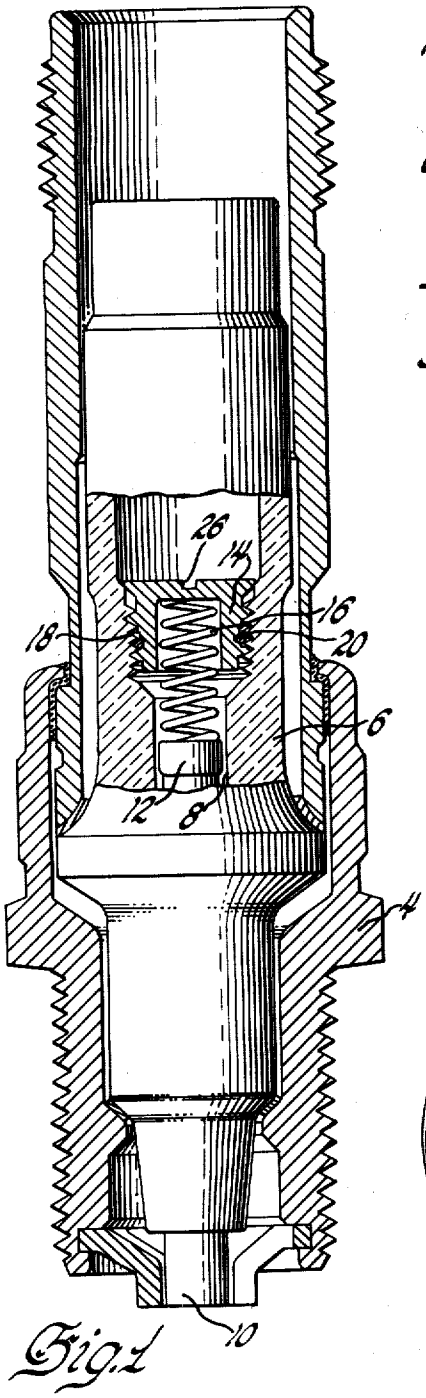


Fig. 1

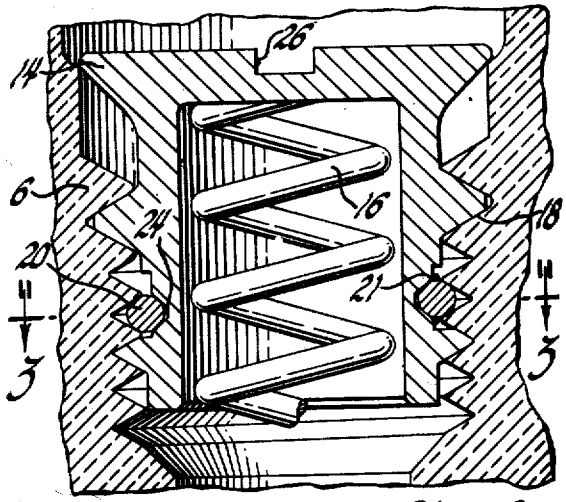


Fig. 2

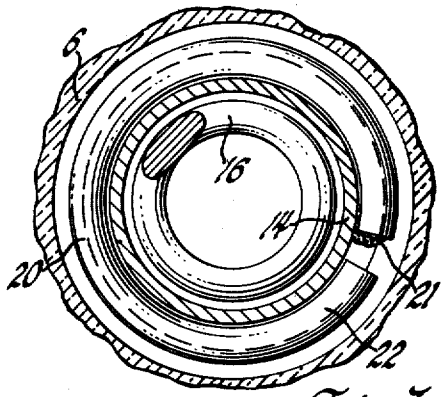


Fig. 3

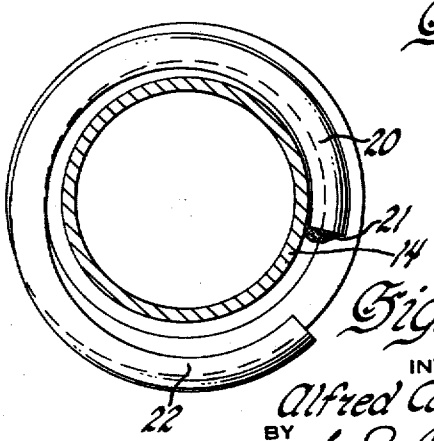


Fig. 4

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SPARK PLUG CENTER ELECTRODE TO INSULATOR CONNECTION

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2 Claims. (Cl. 174—152)

This invention relates to an improved self-locking threaded element particularly advantageous in combination as an electrical contact for spark plugs and the like.

One object of the invention is the provision of an improved self-locking threaded element.

Another object is the provision of an improved electrical contact for spark plugs and the like which is of low cost construction and which may be simply and economically assembled into the spark plug thereby facilitating production operations.

More particularly, it is an object of the invention to provide an improved spark plug incorporating a threaded electrical contact element for the centerwire which may be easily assembled to the spark plug but which, once assembled, is locked against removal therefrom.

Other objects and advantages of the invention will appear more clearly from the following description of a preferred embodiment and from the accompanying drawings thereof in which:

Figure 1 is a side view in partial section of an aircraft type spark plug incorporating the invention;

Figure 2 is an enlarged view of the electrical contact element shown in Figure 1;

Figure 3 is a section on the line 3—3 of Figure 2; and

Figure 4 is a view similar to Figure 3 but showing the contact element prior to assembly within the spark plug.

Referring now to Figure 1, there is shown an aircraft spark plug including metal shell 4 and ceramic insulator 6 having centerbore 8 through which there extends an electrical conducting path, generally referred to as the centerwire, including as separate but electrically connected elements a center electrode spindle 10 which is sealed within the insulator and which terminates in a firing tip, resistor cartridge 12, externally threaded hollow electrical contact cap 14, and contact spring 16 which extends into the hollow contact cap through the open end thereof and is biased between the resistor cartridge and the contact cap. To accommodate assembly of the contact cap 14, a portion of the insulator centerbore is of enlarged diameter and threaded as shown at 18.

In accordance with the present invention, a portion of the external thread on the contact cap is formed by a section or loop of wire 20 one end of which is secured to the contact cap as by the weld shown at 21. It is desirable that the portion of the thread formed by the wire 20 be intermediate the ends and adjacent the middle of the threaded portion and that the wire 20 be of such length as to form slightly less than one turn of the thread. In the preferred embodiment shown, the thread has three complete turns, the middle one of which comprises the wire 20 which is of such length as to form approximately but just less than one complete turn. Prior to assembly of the contact member 14 into the insulator, the wire 20 should curl about but extend slightly outwardly at its free end from the contact cap, as shown at 22 in Figure

4. The wire may be of any suitable metal such as steel, so long as it has sufficient resilience to maintain the free end thereof under tension against the insulator when the cap is in its assembled position within the threaded portion 18 of the centerbore, as shown in Figure 3.

In making the contact cap 14, the body member is formed with an upper threaded portion, a lower threaded portion and an unthreaded center portion having a height equal to that which would otherwise be occupied by approximately one turn of the thread. If desired, a groove 24, for nesting of the wire 20, may be provided in the unthreaded portion. Then one end of the wire 20 is welded adjacent the end of the thread on the lower portion and looped around so that its free end is adjacent the beginning of the thread on the upper portion. It is not essential to precisely position the free end since, when the cap 14 is threaded into the insulator, the wire will be guided by the threads of the insulator into its proper position to form a continuation of the thread formed on the body of the cap 14. To assemble the various elements of the centerwire, the electrode spindle 10 is first sealed into the centerbore as by means of a conductive glass seal of the type shown and claimed in United States Patent 2,248,415, issued to Karl Schwartzwalder and Alexander S. Rulka, after which the resistor cartridge 12 and spring 16 are dropped into place. Then the hollow contact cap 14 is threaded into the centerbore thereby applying tension against spring 16. A slot 26 is provided in the top of the cap as a means for turning it into position. The shape and resiliency of the wire 20 allows the contact cap to be very easily threaded into the insulator, the free end of the wire being free to flex inwardly and nest against the contact cap. But once in, the wire maintains the cap secured against removal, this by way of the binding effect of the free end of the wire against the ceramic insulator. When attempt is made to unscrew the contact cap, the free end of the wire 20 flexes outwardly into binding engagement with the relatively rough surface of the ceramic. Thus, the entire assembly is securly locked into place.

It will be understood that while the self-locking threaded element is particularly advantageous in combination, as an electrical contact, in spark plugs and the like, it is contemplated that it may be used in various other devices and structures. Also, it is contemplated that various changes and modifications may be used, all within the full and intended scope of the claims which follow.

I claim:

1. A spark plug comprising a ceramic insulator having a centerbore with a threaded portion, a generally cylindrical hollow electrical contact member having an open end and an external thread in engagement with the threaded portion of said insulator, and a spiral spring extending into said hollow contact member through the open end thereof and biased against said contact member, a portion of the thread on said contact member being formed by a resilient metal wire having one end secured to said member and the other end in resilient engagement with said insulator to thereby securely lock said contact member within said insulator.

2. A spark plug comprising a ceramic insulator having a centerbore with a threaded portion of enlarged diameter at one end thereof, an electrode spindle sealed within said centerbore at the other end thereof, a resistor cartridge within said centerbore electrically connected to said electrode spindle, a generally cylindrical hollow electrical contact member open at one end thereof and having an external thread in engagement with the threaded portion of said insulator, a center portion of approximately one

turn of the thread on said contact member being formed by a resilient metal spring wire having one end secured to said member and the other end in resilient engagement with said insulator to thereby securely lock said contact member within said insulator, and a spiral spring extending into said hollow contact member through the open end thereof and biased between said resistor cartridge and said contact member.

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