

W. S. THOMAS.
HEAD STRUCTURE FOR SPARK PLUGS.
APPLICATION FILED NOV. 16, 1920.

1,411,229.

Patented Mar. 28, 1922.

Fig. 1.

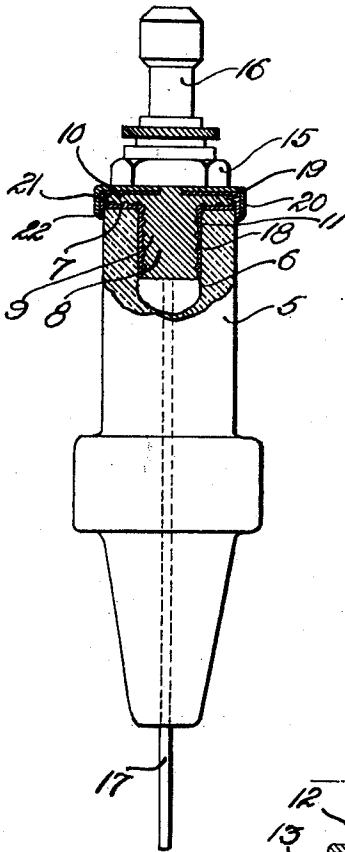


Fig. 2.

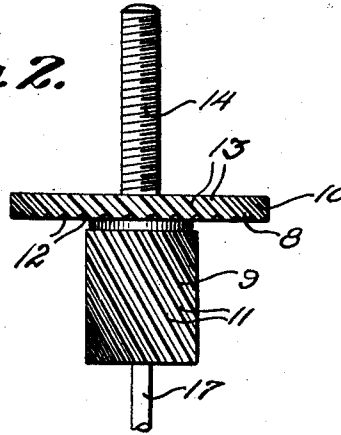


Fig. 3.

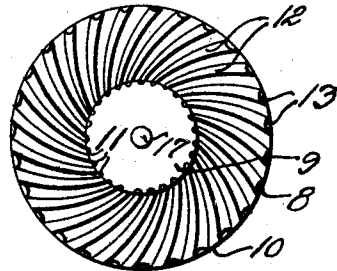
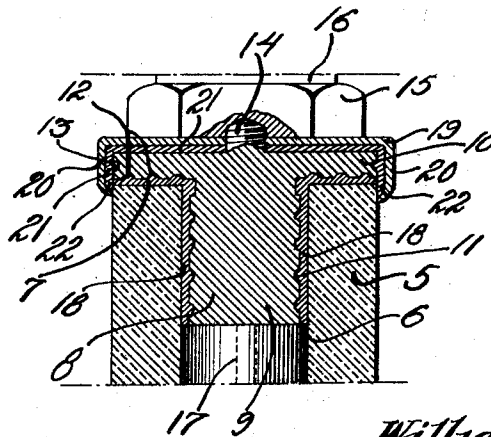


Fig. 4.



Witnesses
Geo. A. Gruss
Augustus B. Coppes

Inventor
William S. Thomas
By Joshua R. H. Tott
his Attorney

UNITED STATES PATENT OFFICE.

WILLIAM S. THOMAS, OF ROSELLE PARK, NEW JERSEY.

HEAD STRUCTURE FOR SPARK PLUGS.

1,411,229.

Specification of Letters Patent. Patented Mar. 28, 1922.

Application filed November 16, 1920. Serial No. 424,436.

To all whom it may concern:

Be it known that I, WILLIAM S. THOMAS, a citizen of the United States, residing at Roselle Park, in the county of Elizabeth and State of New Jersey, have invented certain new and useful Improvements in Head Structures for Spark Plugs, of which the following is a specification.

One object of my invention is to provide an improved head structure for spark plugs which will be of particular advantage when used in internal combustion engines and will serve to protect the insulator thereof from contamination with oils and moisture.

Another object is to so make my improved head structure that it will effectively form a seal to prevent the leakage of the products of combustion upwardly from the cavity in the insulator casing.

A still further object is to so design the parts of my invention that they can be quickly put together so that the resulting structure can be cheaply manufactured.

These objects, and other advantageous ends which will be described hereinafter, I attain in the following manner, reference being had to the accompanying drawings in which—

Figure 1 is an elevation illustrating my invention in connection with an insulated electrode for spark plugs; part of the same being shown in section to more clearly illustrate the features of the invention.

Figure 2 is an elevation of certain of the parts of my invention and drawn on a larger scale than that shown in Figure 1.

Figure 3 is an inverted plan view of the structure shown in Figure 2, and

Figure 4 is an enlarged fragmentary section of certain of the parts shown in Figure 1 and illustrated on a greatly increased scale.

Referring to the drawings, 5 represents an electrode insulator casing which may be made of porcelain. This casing has a cavity 6 which leads downwardly from its top surface 7. A metallic head 8 includes a plug portion 9 which extends downwardly into the cavity 6 and a flange portion 10 adapted to abut the top surface 7 of the porcelain insulator casing 5. Both the plug portion 9 and the flange portion 10 of the head 8 are externally knurled; the plug portion 9 having its knurled ribs extending at a slant downwardly as clearly shown at 11 in Figure 2 while the under surface of the

flange portion 10 has curved ribs 12 as clearly shown in Figure 3. The peripheral surface of the flange portion is also knurled to provide ribs 13 which slant as shown in Figure 2. A screw threaded stem 14 is preferably formed integral with the head 8 and is adapted to receive a binding nut 15 and a cap nut 16 as shown in Figure 1.

The plug portion 9 of the head 8 has an electrode rod 17 secured thereto so that the head 8 in the operation of the plug will serve as a conductor of electric current to the electrode rod 17 by the attachment of the usual electric conduit wire to the head 8 through the medium of the cap nut 16.

In applying the head 8 and electrode rod 17 to the insulator casing 5 the outer surface of the plug portion 9 and the under surface of the flange portion 10 is coated with cement 18 and the plug is forced downwardly within the cavity 6; the electrode rod extending down through the cavity 6 with its lower end portion projecting beyond the bottom of the casing 5 for sparking purposes. When the head is forced downwardly said cement 18 penetrates between the ribs or knurled parts of the plug and flange portions and also engages the porcelain insulator casing 5 at the top surface 7 and the inner surface forming the cavity 6.

After the above mentioned operation, the structure is baked to harden and set the cement and cause it to adhere to the porcelain insulator and to the head. After this operation a cap 19 having a skirt flange 20 is placed over the flange portion 10 of the head 8; said skirt flange 20 of the cap 19 being of sufficient depth as to extend below the top surface 7 of the insulator casing 5. A layer or coating 21 of cement is interposed between the inner surface of the cap 19 and the outer surfaces of the flange portion 10 and porcelain insulator casing 5 so that a portion of the cement 20 extends annularly around the peripheral surface of the flange portion 10 of the head 8 and across the cement coating 18 between the flange portion 10 and the casing 5. Thus a double seal is provided by the cement coatings 18 and 21 as clearly shown in Figure 4 so that during the use of a plug made in accordance with my present invention if there would be any possibility of leakage of gases upwardly through the cavity 6 which would work either way laterally between the

cement 18 and either the head or the insulator casing, the part 22 of the cement 21 would serve as a second seal and prevent the escape of the gas to the atmosphere.

5 It has been found by tests that this gas leakage under ordinary conditions is intermittent and I have found that by providing the second seal namely the cement 21 which is confined within the cap 19 that the escape
10 of such gas under pressure can be positively prevented. If this leakage is prevented the value of the insulator will consequently be greatly improved since there will be less possibility of impairing the electrode rod which occurs if subjected to the
15 gases during passage of the gases through the insulator casing cavity. Furthermore by providing a head constructed in accordance with that above described there is practically no chance for the head to work loose
20 from the insulator casing since the arrangement of the knurled surfaces including the ribs serve as efficient means for binding the head to the insulator and no amount of necessary manipulation of the cap nut 16
25 or binding nut 15 will serve to loosen the head from the insulator casing.

While I have described my invention as taking a particular form, it will be understood that the various parts of my invention may be changed without departing from the spirit thereof, and hence I do not limit myself to the precise construction set forth, but consider that I am at liberty to make
30 such changes and alterations as fairly come within the scope of the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:—

40 1. The combination in a spark plug of an insulator casing; an electrode head having a flange portion opposed to the end of said casing and cemented thereto; a cap for covering said flange portion and said end of
45 the casing; and cement within said cap and extending across the parting between the flange portion and said end of the casing; substantially as described.

2. The combination in a spark plug of

an electrode insulator casing having a cavity extending downwardly from one end; an electrode head having a flange for abutment with the end of said casing; a plug portion for fitting within said cavity; cement interposed between said casing, plug
55 and flange portions; a cap fitting over said flange portions; and cement interposed between said cap and flange portion, said latter cement having a part bridging the parting between the flange and said end of the
60 casing; substantially as described.

3. The combination in a spark plug of an electrode insulator casing having a cavity extending downwardly from one end; an electrode head having a flange for abutment
65 with the end of said casing; a plug portion for fitting within said cavity; cement interposed between said casing, plug and flange portions; a cap fitting over said flange portions; and cement interposed between said
70 cap and flange portion, said latter cement having a part bridging the parting between the flange and said end of the casing, said head having knurled portions in engagement with said first cement; substantially
75 as described.

4. The combination in a spark plug of an electrode insulator casing having a cavity extending downwardly from one end; an electrode head having a flange for abutment
80 with the end of said casing; a plug portion for fitting within said cavity; cement interposed between said casing, plug and flange portions; a cap fitting over said flange portions; and cement interposed between
85 said cap and flange portion, said latter cement having a part bridging the parting between the flange and said end of the casing, said flange having knurled portions on its under surface for engagement with
90 said first cement; substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM S. THOMAS.

Witnesses:

ELIZABETH GARBE,
CHAS. E. POTTS.