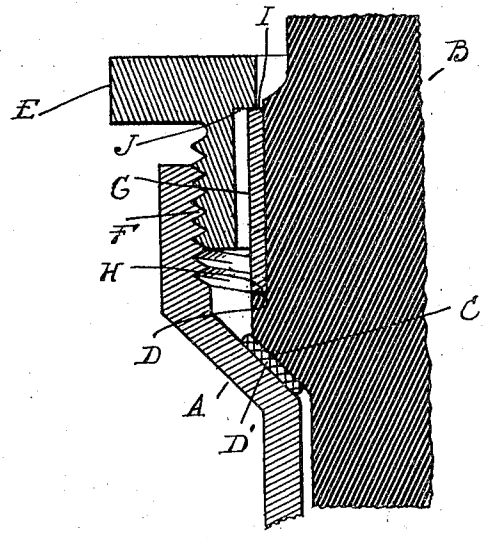
A. SCHMIDT.

SPARK PLUG.

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**1,142,369.**

Patented June 8, 1915.




Witnesses
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# UNITED STATES PATENT OFFICE.

ALBERT SCHMIDT, OF FLINT, MICHIGAN, ASSIGNOR TO CHAMPION IGNITION COMPANY, OF FLINT, MICHIGAN, A CORPORATION OF MICHIGAN.

## SPARK-PLUG.

1,142,369. Specification of Letters Patent. Patented June 8, 1915.

Application filed December 20, 1913. Serial No. 807,869.

*To all whom it may concern:*

Be it known that I, ALBERT SCHMIDT, a citizen of the Republic of France, residing at Flint, in the county of Genesee and State of Michigan, have invented certain new and useful Improvements in Spark-Plugs, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention relates to composite structures in which a metallic member is combined with a body of different material which has a different coefficiency of expansion and in which there is the necessity of maintaining a gas tight joint under different conditions of temperature.

More specifically, the invention relates to spark plugs and has reference to the means of mounting the insulator member in the metal case so as to be unaffected by temperature variations.

In the drawing, a portion of a spark plug is illustrated in longitudinal section, showing my improved construction applied thereto.

A is the metallic case of a spark plug.

B is the insulator of porcelain or similar material having a bearing C for seating upon the case A and an opposed bearing D for the clamping means such as the bushing ring E, having the threaded engagement F with the case.

D′ is a suitable gasket between the shoulder C and the case.

In the present state of the art, there is difficulty in joining the porcelain to the metal so as to maintain a gas tight joint without overstressing the porcelain so as to fracture the same. This difficulty is due primarily to the difference in the coefficiency of expansion of the porcelain and the metal, so that where the requisite clamping pressure is exerted upon the porcelain at one temperature this pressure will be altered at a different temperature. With my improved construction I have overcome this difficulty by providing means for correcting or compensating for the differential in the coefficiency of expansion, with a result that the clamping pressure remains unaltered with all temperature variations.

The means for compensating may be varied, but as shown it comprises the following construction: G is a metallic sleeve surrounding the porcelain B, and having one end H abutting against the shoulder D, while the opposite end I is adapted for engagement with a shoulder J on the sleeve E. The coefficient of expansion of the metal or other material forming the sleeve G is different from that of the metal forming the case A and bushing E, while the length of the sleeve G is so proportioned as to produce the desired compensation. In other words, there will be a differential expansion or contraction of the sleeve G and the case A due to temperature variations, which exactly compensates for the differential expansion or contraction of the case A and the portion of the porcelain B between the shoulders C and D. As a consequence, the length between the shoulders C and D will always correspond to the difference between the shoulder H and the seat for the porcelain on the case A, and there will be neither tightening nor loosening of the porcelain, nor change in the mechanical stress exerted thereon, due to temperature variations.

What I claim as my invention is:

1. The combination with a metallic case, of a member seated within said case formed of a material having a different coefficient of expansion, clamping means for securing said member to its seat, and means for compensating for the differential in the coefficient of expansion to maintain substantially constant clamping pressure.

2. In a spark plug, the combination with a case and the insulator therein, of clamping means for said insulator including means for compensating for the differential in the coefficiency of expansion of the insulator and case to maintain substantially constant pressure under varying temperature conditions.

3. In a spark plug, the combination with the case and the insulator seated therein, of clamping means for said insulator in said case, and means intermediate said clamping means and insulator for compensating for the differential in the coefficiency of expansion, to maintain substantially constant pressure under varying temperature conditions.

4. In a spark plug, the combination with the case, of an insulator having oppositely-facing shoulders, one of which is seated on said case, clamping means for said insulator, and a member intermediate said clamping means and the oppositely-facing

shoulder on said insulator for compensating for the differential in the coefficiency of expansion.

5. In a spark plug, the combination with the case, of an insulator having oppositely-facing annular shoulders, one of which is seated upon the case, a clamping bushing engaging said case, and a sleeve surrounding said insulator intermediate said clamping bushing and oppositely-facing shoulder on the porcelain, the differential in the coefficiency of expansion of said sleeve and case being proportionate to compensate for the differential in expansion of said insulator and case between the oppositely-facing shoulders of the former.

6. In a spark plug, the combination with the case, of an insulator having oppositely-facing annular shoulders, one of which is seated on said case, a clamping bushing having a threaded engagement with said case, and a sleeve or bushing surrounding said insulator between the oppositely-facing shoulder thereof and said clamping bushing, the length of said sleeve and the differential in the coefficiency of expansion thereof and of the case being proportioned to compensate for the differential in the coefficiency of expansion of the insulator and case between the oppositely-facing shoulders thereof.

In testimony whereof I affix my signature in presence of two witnesses.

ALBERT SCHMIDT.

Witnesses:
LOUIS CHEROBY,
R. B. VESSEY.

**Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."**