

H. F. PROVANDIE.

SPARK PLUG.

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954,697.

Patented Apr. 12, 1910.

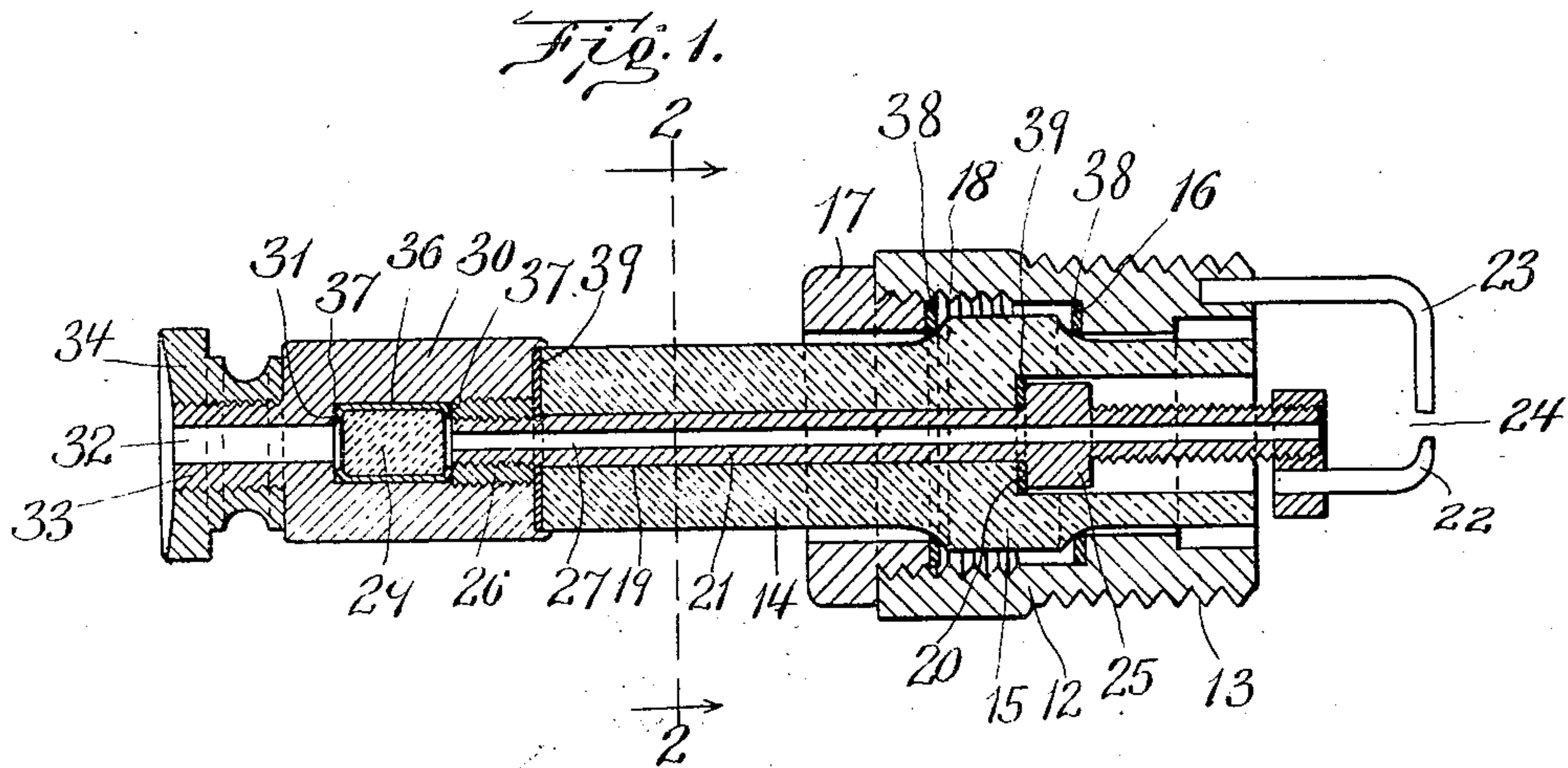
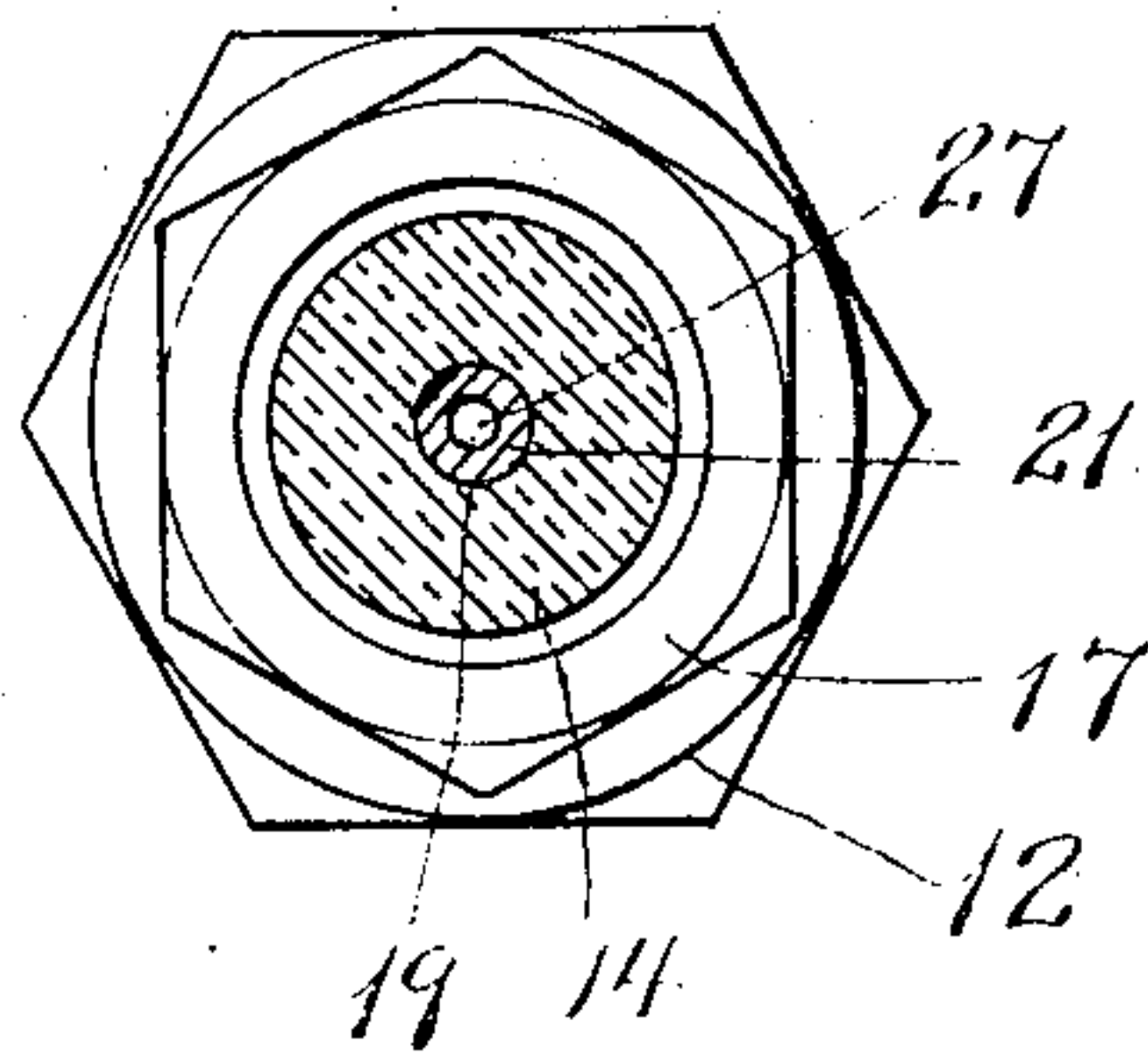


Fig. 2.



Witnesses.

W. S. Matteson
E. B. Schelder

Inventor
H. F. Provandie
by Hugh Brown Lundy May
Atty.

UNITED STATES PATENT OFFICE.

HERBERT F. PROVANDIE, OF BOSTON, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO THE RANDALL-FAICHNEY COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

SPARK-PLUG.

954,697.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, HERBERT F. PROVANDIE, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Spark-Plugs, of which the following is a specification.

This invention relates to a spark plug intended for use in an internal combustion engine as an igniter, and it has for its object to provide a plug of this character of such construction that the stem which passes through the longitudinal center of the plug and supports one of the spark points or electrodes, constitutes also a sight opening substantially in alinement with the spark gap between the two opposed spark points, so that an observer may determine the condition of the interior of the cylinder and ascertain whether the spark plug is operating properly or not, without removing the plug from the cylinder or combustion chamber, an unobstructed view of the spark gap through the longitudinal center of the spark plug being provided.

The invention consists in the improvements which I will now proceed to describe and claim.

Of the accompanying drawings, forming a part of this specification,—Figure 1 represents a longitudinal section of a spark plug embodying my invention. Fig. 2 represents a section on line 2—2 of Fig. 1.

The same reference characters indicate the same parts in both figures.

In the drawings,—12 represents a casing or bushing adapted to be detachably secured to the explosion chamber or cylinder of an internal combustion engine, the casing being here shown as provided with an external screw thread 13 adapted to engage an internal thread in the wall of such chamber.

14 represents a plug or body of suitable insulating material, such as porcelain, which is insertible in the casing 12, and as here shown, has an enlargement 15, one end of which abuts against an internal shoulder 16 in the casing.

17 represents a gland, the externally threaded portion of which engages an internal screw thread 18 in the casing 12, the diameter of the portion of the casing containing the screw thread 18 being greater than that of the shoulder 16. The inner end of the gland is therefore adapted to bear

on the outer end of the enlargement 15, so that the plug 14 is securely clamped between the said shoulder and gland. The plug 14 is tubular, a longitudinal orifice or bore 19 being formed through it from end to end, said bore being enlarged at the inner end of the plug to form a shoulder 20.

21 represents a tubular metallic stem which is formed to enter and closely fit the bore of the plug 14 and extend through the same, the ends of the stem projecting from opposite ends of the plug. The projecting inner end of the plug is provided with an electrode or spark point 22 which is adapted to cooperate in the usual way with a corresponding electrode or spark point 23 affixed to the casing 12, the opposed ends of said spark point being separated by a spark gap 24, as usual. The stem 21 is provided with an enlargement 25 which is seated on the shoulder 20 of the plug 14. The projecting outer end of the stem 21 is screw threaded, and provided with a nut 26 which bears on the outer end of the plug 14, and secures the stem 21 and spark point 22 in place.

It will be seen that the bore 27 of the tubular stem 21 constitutes a sight opening extending through the longitudinal center of the spark plug, substantially in alinement with the spark gap 24, so that an observer may readily determine whether sparks are properly passing across the spark gap, and whether the explosions are properly occurring within the chamber. To prevent the escape of gases through the sight opening, I provide a plate 29, which may be of any suitable translucent or transparent material, such as mica or glass, this plate being held across the outer end of the tubular stem 21 by suitable means such as a collar 30 which is internally threaded to engage an external thread formed on the nut 26, the collar 30 being provided with a shoulder 31 between which and the outer end of the nut 26 the plate 29 is clamped. The collar 30 has an orifice 32 which constitutes a continuation of the above mentioned sight opening. The portion of the collar through which the orifice 32 extends is preferably reduced and externally threaded to form a shank 33 adapted to engage a binding nut 34 which secures an electric conductor to the collar 30.

I do not limit myself to the details of construction here shown and described, and

the same may be modified in various particulars without departing from the spirit of my invention, which is embodied in a spark plug having an insulating body, spark points, and a tubular metallic stem extending through the insulating body, and supporting one of said points, said stem having a sight opening extending through the plug substantially in alinement with the spark gap between the spark points.

The terms "longitudinal center" and "alinement" are used relatively, and I do not wish to be understood as limiting myself to the location of the sight opening at the exact longitudinal center of the plug, or in exact alinement with the spark gap, it being obvious that any location of the sight opening within the periphery of the insulating plug which will enable the light emitted by the spark to be seen through the sight opening, will be in accordance with my invention. Heretofore, an annular space has been provided between the casing 12 and the insulating plug 14, this space constituting a sight opening which is provided with a light-transmitting partition of translucent material formed as an annular flange projecting from the periphery of the insulating plug, and extending across said space, the flange being engaged with clamping members on the casing. By arranging the sight opening entirely within the periphery of the insulating plug, I enable the body of the plug to be directly engaged with the casing, instead of relying on a translucent flange attached to the body of the plug and projecting outwardly therefrom.

The plate 29, which may be termed also a light-transmitting partition or a lens, is preferably a cylindrical body of glass or other suitable light-transmitting material inclosed in a bushing 36, which may be a tube of copper, the ends of which are spun over the ends of the lens 29, thus forming flanges or gaskets 37 which are in contact with the nuts 26 and the shoulder 31, and cooperate with said parts in forming gas-tight joints.

The collar 30 and the lens are removable from the insulating plug 14 to permit the insertion of a slender cleaning device, such as is commonly used for cleaning pipe-stems, the said device being insertible in the sight opening and adapted to be passed through the same to clean the sparking points, the location of the sight opening in substantial alinement with the spark points enabling the cleaning device to act effectively on the spark points, so that the latter may be cleaned without removing the plug from the cylinder. Gaskets or washers 38 of asbestos or other compressible refractory material are preferably interposed between

the ends of the enlargement 15 of the insulating plug and the parts of the casing which cooperate with said enlargement in securing the plug to the casing. Similar gaskets 39 may be interposed between the enlargement 25 of the stem 21 and the shoulder 20, and also between the outer end of the insulating plug and the faces of the nut 26 and collar 30, which oppose said outer end.

I claim:

1. A spark plug having an insulating body, spark points, a metallic stem supporting one of the spark points and having a sight opening extending longitudinally through the body of the plug, a light-transmitting partition which prevents the passage of gases through the opening, and means for detachably securing said partition to the plug.

2. A spark plug having an insulating body, spark points, a tubular metallic stem extending through the insulating body of the plug, the bore of the stem constituting a sight opening, a nut engaged with the outer end of the stem and bearing on the outer end of the insulating body of the plug, said nut being externally threaded, an internally threaded collar engaged with said nut and provided with an externally threaded stem and with an orifice extending through the stem and constituting an extension of the sight opening, and a binding nut engaged with said stem.

3. A spark plug comprising a casing having a spark point, a tubular insulating plug secured in the casing, a tubular metallic stem extending through the plug and supporting another spark point, the bore of said stem constituting a sight opening in substantial alinement with the spark gap between the spark points, a lens extending across the outer end of the stem, and means for detachably securing the lens in its operative position.

4. A spark plug comprising a casing having a spark point, a tubular insulating plug secured in the casing, a tubular metallic stem extending through the plug and supporting another spark point, the bore of said stem constituting a sight opening in substantial alinement with the spark gap between the spark points, a lens extending across the outer end of the stem, said lens being provided with a soft metallic bushing, the ends of which form gaskets at the ends of the lens, and means for detachably confining the lens in its operative position.

In testimony whereof I have affixed my signature, in presence of two witnesses.

HERBERT F. PROVANDIE.

Witnesses:

C. F. BROWN,
P. W. PEZZETTI.