L. R. SPENCER.

SPARK PLUG.

APPLICATION FILED JAN. 14, 1911.

988,394. Patented Apr. 4, 1911.

Fig. 1.

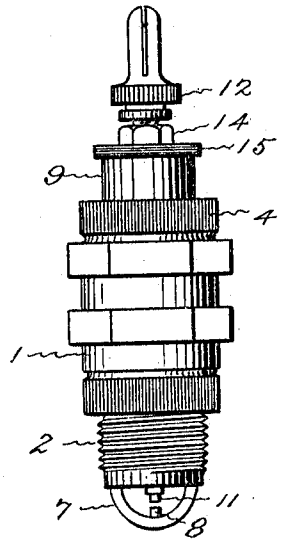


Fig. 2.

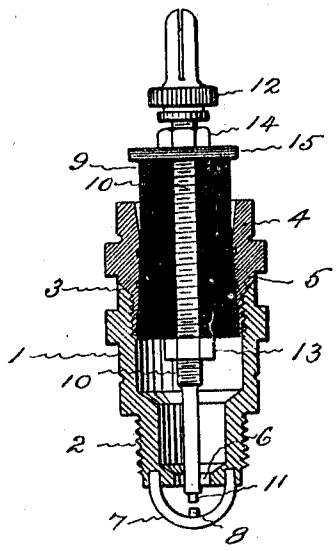
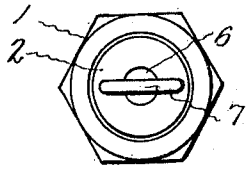


Fig. 3.



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UNITED STATES PATENT OFFICE.

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SPARK-PLUG.

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Application filed January 14, 1911. Serial No. 602,605.

To all whom it may concern:

Be it known that I, LOUIS R. SPENCER, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented a new and useful Improvement in Spark-Plugs, of which the following is a specification.

This invention relates to the construction of spark plugs for internal combustion engines.

The object of the invention is to provide a relatively small, simple and cheap plug which is efficient, durable, and can be readily cleaned and adjusted.

Figure 1 of the accompanying drawings shows a side elevation of a plug which embodies the invention. Fig. 2 shows a central vertical section of the same. Fig. 3 shows a bottom view of the plug.

The plug illustrated has a hollow cylindrical body 1, which is preferably made of steel and provided with an exteriorly threaded hub 2, that is designed to be screwed into the engine cylinder casing. The upper edge of the body has an internally beveled surface 3, and near this edge in the interior the body is provided with a thread. Screwed into this interior thread in the body is the threaded end of a thimble 4. The thimble is desirably made of soft brass and has an external tapering surface 5, which when the thimble and body are screwed together, is adapted to seat against the internal tapering surface 3 so as to form a tight joint between the parts, without the employment of any packing. As a result of this construction, the body and thimble are always fastened together in the same relation to each other, for there is no packing between the two, which would have a tendency to yield, and thus vary the relation of the parts, and which would be liable to burn out or become inefficient under the influence of the heat to which a spark plug body is subjected.

In the lower end of the hub 2 of the body is an opening 6, and spanning this opening is a conducting bow 7 provided with a central terminal point 8. The opening through the thimble tapers or contracts from the bottom upwardly, and driven into this opening from the underside is a porcelain bushing 9. This bushing is larger at the bottom than at the top, the taper however being slight, so that the bushing may be driven tightly into the thimble. As a result of tapering these parts in this manner, the pressure, incident to explosions of gas in the cylinder, tends to drive the bushing upwardly into a more contracted part of the opening in the thimble and thus expand the soft thimble outwardly and cause the threaded and tapered joints between the lower end of the thimble and the upper end of the body to be more tightly closed.

Extending through the central opening in the thimble is a rod 10. The lower end of this rod has a terminal point 11, while the upper end is provided with a wire clamping piece 12. A portion of the rod 10 is threaded, and turning on the threaded part of the rod below the bushing is a nut 13, and turning on the threaded part above the bushing is a nut 14. Mica washers 15, which are larger in diameter than the bushing, are desirably used between the upper nut 14 and the top of the bushing. The nuts permit the rod to be readily adjusted for the purpose of varying the spark gap between the terminal points, when it is desirable or when it is necessary to file down one of the points in order to re-form the end of the terminal. The nuts also hold the rod firmly in position. The mica washers at the upper end of the bushing being larger in diameter than the diameter of the bushing, allow the porcelain to be much shorter than otherwise would be the case, for the washers lengthen the distance and make a break in the continuity of the insulating surface between the upper nut 14 on the rod 10 and the upper end of the thimble. The washers also form a protection for the upper end of the fragile porcelain bushing, and prevent it from being chipped or cracked by the tightening of the nuts, and they also pack the opening through which the rod extends so that no gases can escape and thus tend to lower the compression in the cylinder into which the plug is screwed. With this construction the porcelain may be shortened without decreasing the effectiveness of the insulation, and thus the strength and durability of the plug as a whole is increased, and furthermore, it does not take up as much space, for it does not project as far from the cylinder into which it is screwed as would otherwise be the case. When the central contact carried by the porcelain bushing is adjusted, if the thimble and bush-

ing are removed for cleaning the points, the parts can be screwed back to exactly the same position and the joints made tight, as there is no compressible packing between them, so that the spark gap will always be the same. The bushing and thimble are tightly held together without packings and in such manner that the bushing will not work loose during use, for the pressure of the explosions tends to drive the porcelain more firmly into the soft brass of the thimble and cause the brass to expand in the body and tighten the joints. The central terminal is well separated from the body and is so protected that it is not likely to be sooted by the explosions and become inefficient or permit leakage of current from localities other than at the terminal points.

The invention claimed is:

1. A spark plug having a body provided with an exterior thread at one end and an internal bevel and an interior thread at the other end, a conducting bow spanning the exteriorly threaded end of the body, a thimble with an external bevel and exterior thread adapted to fit the upper end of the body, said thimble having a tapering opening which contracts from the lower end upward, an insulating bushing that is largest at its lower end driven upwardly into the tapering opening in the thimble, a conducting rod extending through the bushing, and nuts on the rod above and below the bushing for adjusting the parts with relation to each other and the lower end of the said rod with relation to the bow at the lower end of the body.

2. A spark plug having a body provided with an exterior thread at one end and an external bevel and an interior thread at the other end, a conducting bow spanning the exteriorly threaded end of the body, a thimble with an external bevel and exterior thread adapted to fit the upper end of the body, said thimble having a tapering opening which contracts from the lower end upward, an insulating bushing that is largest at its lower end driven upwardly into the tapering opening in the thimble, a conducting rod extending through the bushing, nuts on the rod above and below the bushing for adjusting the parts with relation to each other and the lower end of the said rod with relation to the bow at the lower end of the body, and mica washers which are larger in diameter than the diameter of the bushing located between the upper nut on the rod and the upper end of the bushing.

3. A spark plug having a body provided with an exterior thread at one end and an internal bevel and an interior thread at the other end, a conducting bow spanning the exteriorly threaded end of the body, a thimble with an external bevel and exterior thread adapted to fit the upper end of the body, said thimble having a tapering opening which contracts from the lower end upward, an insulating bushing that is largest at its lower end driven upwardly into the tapering opening in the thimble, a conducting rod extending through the bushing, nuts on the rod above and below the bushing for adjusting the parts with relation to each other and the lower end of the said rod with relation to the bow at the lower end of the body, a terminal point projecting upwardly from the center of the bow at the lower end of the body, and a terminal point projecting downwardly from the lower end of the rod.

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