

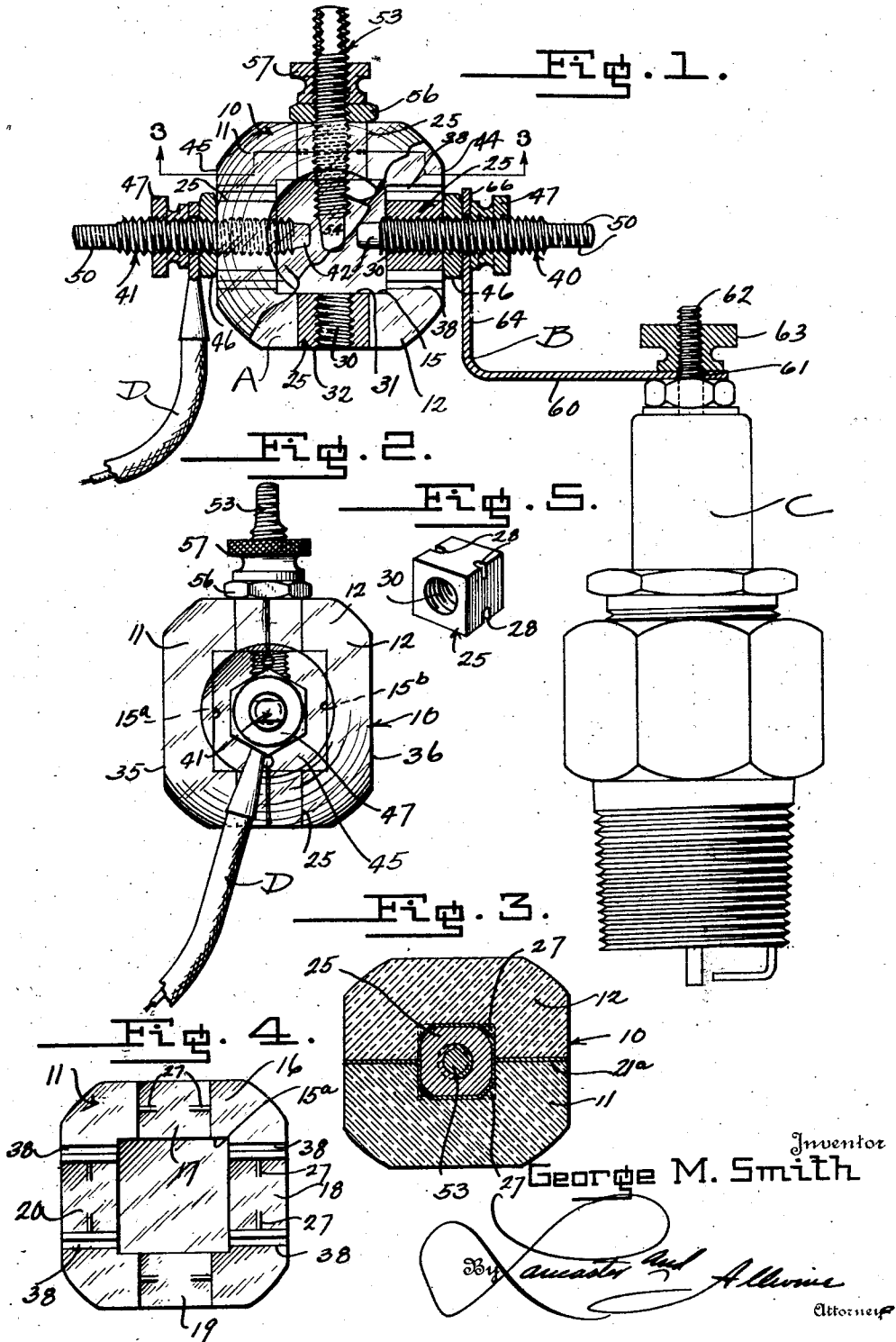
April 12, 1927.

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1,623,982

SPARK INTENSIFIER FOR ELECTRIC CURRENTS

Filed Oct. 6, 1924



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SPARK INTENSIFIER FOR ELECTRIC CURRENTS.

Application filed October 6, 1924. Serial No. 742,026.

This invention relates to improvements in spark intensifiers properly adapted for use with spark plugs.

The primary object of this invention is the provision of an intensifier which is of great practical value as used for intensifying the sparking efficiency of an electric current, in that the same is constructed of permanent and durable materials which will not deteriorate by reason of unfavorable conditions under which the same is used, and which is compact and correct in operating principle.

A further and important object of the invention is the provision of a spark intensifier preferably adapted for use in connection with spark plugs, as an accessory therefor, which embodies electrodes of adjustable and durably mounted character, and means for varying the length of sparking gap provided thereby.

A further object of this invention resides in the provision of a novel housing constructed of insulation material, preferably transparent, and embodying means to adjustably support a plurality of electrodes in sparking relation.

Other objects and advantages of this invention will be apparent during the course of the following detailed description.

In the accompanying drawing, forming a part of this specification, and wherein similar reference characters designate corresponding parts throughout the several views.

Figure 1 is a side elevation, partly in section, showing the improved intensifier and the means for supporting the same in current conducting relation with a spark plug.

Figure 2 is an end view of the improved intensifier.

Figure 3 is a cross sectional view taken substantially on the line 3—3 of Figure 1.

Figure 4 is a side elevation of the inside face of one of the pair of parts which comprise the intensifier housing.

Figure 5 is a perspective view of a novel type of supporting member adapted to adjustably receive an electrode of the intensifier.

In the drawing, wherein for the purpose of illustration is shown only a preferred embodiment of the invention, the letter A may generally designate the improved intensifier which is adapted to be supported by novel conductor bracket means B upon

a spark plug C or analogous device, so that current from a wire or conductor D may be led therethrough and through the conductor B to the proper electrode of the spark plug C.

The intensifier A preferably comprises a housing 10, formed of insulation material, preferably a clear transparent glass, and which housing is of two-part construction, including the parts 11 and 12, of entirely similar formation, and in fact the product of the same mould. The housing 10 is arranged in the form of a cube, with the corners thereof rounded to prevent breaking off of the same, as is illustrated in the drawing, and within the housing 10 a compartment 15 is provided, which is preferably square, and formed by the depressions 15^a and 15^b which are formed inwardly of the facing sides 16 of the parts 11 and 12 respectively. Polygonal shaped recesses 17, 18, 19 and 20 are formed inwardly of the surfaces 16 of each of the parts 11 and 12, as is illustrated in Figure 4 of the drawing, which extend from the recesses 15^a and 15^b, to the outer flat sides of four of the outer surfaces of the cubular shaped housing 10. These recesses 17 to 20 inclusive of each of the parts 11 and 12, when said parts are in assembled relation to provide the housing, provide openings which support the polygonal shaped metal electrode supporting members 25. To properly retain these members 25 in position it is preferred to cast webs or flange extensions 27 in the recesses 17 to 20 inclusive, adapted to fit within recesses 28 provided therefor at the corners of the members 25.

Each of the electrode support members 25 is provided with a screw threaded opening 30 axially therethrough for adjustably receiving an electrode. The inner surface 31 of each member 25 lies flush with an inside surface of the compartment 15 and the outside surface 32 of the member 25 lies flush with the adjacent outside surface of the housing 10. These members 25 are preferably of brass, and in addition to being secured by the extensions 27 these members are cemented in place in the respective openings provided in the housing parts 11 and 12 therefor. Also, this cement is placed on the facing surfaces 16 of the housing parts 11 and 12 for cementing these parts in position, as at 21^a. This cement is a transparent

water-proof heat resisting cement, and permanently holds the housing parts in the assembled relation to provide the cubular shaped housing or body 10. Each side of the cube body 10 provides a substantially circular flat face, and the two opposite faces 35 and 36, are imperforate, and permit an unobstructed view of the sparking which is adapted to take place between the electrodes in the compartment 15. At the diametrically opposed sides of the body 10, vent ducts or passageways 38 are provided through the thickness of the walls of the body 10, to permit atmospheric communication with the compartment 15.

Oppositely disposed electrodes 40 and 41 are provided, the same comprising brass screws which are screw threaded from their outer ends and at the inner ends providing sparking points 42. These screw threaded electrodes are adapted for adjustment in a pair of oppositely disposed bearing blocks 25, so that the electrodes 40 and 41 are in axial alignment with their sparking points 42 in facing relation within the compartment 15, and with their outer externally screw threaded ends exteriorly projecting from the faces 44 and 45 of the body 10. Hexagonal lock nuts 46 are adjusted on each of these electrodes, adapted to be bound in engagement against the adjacent faces 44 and 45 respectively, and each of these electrodes furthermore includes a knurled thumb adjusting nut 47 outwardly thereon, which may be used to clamp either the bracket B or the conductor D between the same and the lock nuts 46. The outer ends of the electrodes are oppositely flattened, as at 50, to facilitate wrench engagement of the same.

A third electrode 53 is provided, of similar formation with the electrodes 40 and 41, the same comprising a screw threaded shank adjustably carried in one of the metal bearing blocks 25 at right angles to the axis formed by the electrodes 40 and 41. This electrode 53 provides a point 54 adapted for adjustment within the gap formed between the sparking points 42 of the electrodes 40 and 41. The screw threaded electrode 53 extends exteriorly of its block 25 and is provided with a hexagonal lock nut 56, and an adjustable thumb nut 57 altogether similar to the nut 47 employed in connection with the electrodes above mentioned. It is preferred that the block 25 oppositely disposed in the body 10 from the electrode 53 be free of any electrode, so that the passageway 30 thereof may be used for communicating the compartment 15 with the atmosphere to permit fresh air to pass therethrough into the sparking compartment 15.

The support B preferably is formed of brass, and is L-shaped in formation, providing a leg 60 at its outer end having an opening 61 therethrough adapted to be disposed

over the conventional screw threaded central electrode 62 of the spark plug C, so that the binding nut 63 may be clamped against the leg 60 at its free end to support the same in laterally extending rigid relation from the spark plug, and at right angles to the axis thereof. The bracket B furthermore includes an upstanding leg 64, at right angles to the leg 60, and which at the upper end thereof is provided with an opening 66 adapted to receive the screw threaded electrode 40 therethrough, so that the knurled thumb nut 47 may clamp this leg 64 against the lock nut 46 to effectively support the intensifier A on the bracket B in rigid fixed relation therewith, so that the axis formed by the electrodes 40 and 41 is horizontally disposed and at right angles to the axis of the spark plug C. The conductor D is to be connected between the nut 47 and the lock nut 46 of the electrode 41.

Referring to the operation of the intensifier, the current from the coil to the spark plug passes through the conductor D, and through the electrode 41. The electrode 53 may be referred to as a neutral electrode, and it is adapted to be adjusted in line at right angles to the axes of the electrodes 40 and 41, so that the end 54 thereof may be disposed in proximate desired sparking relation with the sparking ends 42 of the electrodes 40 and 41. The current passes a spark over the gap between the sparking end of the electrode 41 and the sparking end of the electrode 53, and the current passes thence across the gap between the electrodes 53 and 40 and into the spark plug by way of the supporting bracket B. The current is of course intensified, and delivers a hot intensified spark in the spark plug, rendering all the more efficient the explosion of the fuel in the cylinder of an internal combustion engine to which the spark plug C may be attached.

From the foregoing description of this invention it is apparent that an intensifier has been provided which is formed of parts which are permanently and durably connected, and which will not deteriorate incident to dampness, grease, and other deteriorating influences to which an intensifier are ordinarily subjected. It is well known that conventional intensifiers soon lose their usefulness, because of the fact that they are of flimsy construction. To this end the intensifier has been provided, which is formed of durable materials, and the electrodes are effectively mounted to retain their adjustment, so that they cannot become detached or disconnected or out of adjustment, and the sparks between the gaps in the compartment 15 are always visible through the sides 35 and 36 of the intensifier, and these sides 35 and 36 are disposed in a vertical plane, so that the line of vision may readily

pass therethrough at right angles to the plane formed by the electrodes 40, 41 and 53.

Various changes in the shape, size, and arrangement of parts may be made to the form of the invention herein described and claimed, without departing from the spirit of the invention or the scope of the claims.

I claim:

1. As an article of manufacture a spark intensifier comprising a substantially transparent housing of insulation material having a small compartment interiorly thereof, oppositely disposed electrodes carried by the housing each having ends mounted exteriorly of the housing and ends projecting into the compartment of the housing in spaced spark gap providing relation, and a third electrode adjustably carried by the housing with an end extending exteriorly of the housing and an opposite end extending into the compartment of the housing for adjustment transversely toward and away from the gap of the first mentioned electrodes.

2. In a spark intensifier the combination of a substantially transparent insulation body having a small sparking compartment therein, axially aligning electrodes adjustably carried by the body at opposite sides thereof each having ends extending exteriorly of the body and ends projecting into the compartment of the body in spaced sparking relation, and a third electrode adjustably carried by the body in a line at right angles to the axes of the first mentioned electrodes, the third electrode having an end extending exteriorly of the body and an end projecting into the body in the compartment thereof in the space between the facing ends of the first mentioned electrodes for adjustment towards and away from the space between the sparking ends of the first mentioned electrodes, the body at the opposite side thereof, facing the end of the third electrode which is in the compartment, having a vent duct therethrough from the compartment to exteriorly of the housing.

3. As an article of manufacture a spark intensifier formed of transparent glass material of substantially cubular formation providing a compartment therein with transverse openings through said body into said compartment at four sides of said body, metal bearing blocks in said openings, providing openings therethrough, and electrodes carried in three of the openings of said bearing blocks.

4. As an article of manufacture a spark intensifier formed of transparent glass material of substantially cubular formation providing a compartment therein with transverse openings through said body into said compartment at four sides of said body, metal bearing blocks in said openings providing openings therethrough, electrodes

carried in three of the openings of said bearing blocks, and means for relatively adjusting said electrodes to vary the sparking distance between the facing ends thereof in said compartment.

5. As an article of manufacture a housing for spark intensifier comprising a pair of complementary sections each of which includes a recess substantially centrally inwardly of a face thereof with recesses extending from said first mentioned recess to the outer sides of each of said sections, means assembling said sections in permanent relation so that the recesses of said sections provide a substantially central compartment and openings extending therefrom to the outer sides of said body, metal bushings in said openings providing passageways therethrough, and adjustable electrodes carried in said metal bushing passageways having the ends thereof extending in spaced sparking relation in the compartment of said body.

6. In a spark intensifier the combination of a body formed of a pair of sections which are of identical shape and form, each of said sections including a part having a depression therein and recesses extending from said depressions to the outer sides of said sections, transparent cement connecting said sections together so that said depressions form a compartment in the body with the recesses providing openings from the compartment to the outer sides of said body, metal bushings cemented in said openings and providing screw threaded openings therethrough, a pair of externally screw threaded electrodes adjustably carried in a pair of the oppositely disposed bushings so that the electrodes are in axial aligning relation with the facing ends thereof in sparking relation with the compartment of said body, terminal clamping means on the electrodes at their outer ends without the body, and a third electrode adjustably carried in a bushing of said body in line of adjustment at right angles to the first mentioned electrodes and so that the sparking end thereof may be adjusted between the facing sparking ends of the electrodes first mentioned.

7. In a spark plug intensifier the combination of a transparent insulation body formed of a pair of sections each of said sections providing a depression therein with recesses extending from said depressions to certain of the outer sides of said sections, said recesses having relatively thin retaining ribs extending thereacross, metal bushings of substantially polygonal shaped formation having recesses therein and an externally screw threaded passageway therein, and transparent cement connecting said housing sections together so that the depressions of said sections form a compartment within the housing and so that the bushings are dis-

posed in said recesses with the retaining ribs extending into the depressions of said bushings to hold the same in fixed relation in said recesses.

5 8. A spark intensifier comprising a cubular housing of transparent material providing a compartment therein, said housing having vent openings to said compartment, metal bushings provided through said housing
10 at opposite sides thereof, electrodes adjustable in said metal bushings including sparking ends extending into said compartment, terminal clamping nuts on the outer ends of said electrodes, a third bushing in
15 said housing between said first mentioned bushings providing a passageway there-through, and a third electrode adjustably carried by said bushings in line for adjustment transversely of the axis of said first
20 mentioned electrodes and including a sparking end adapted to extend into the compartment between the first mentioned electrodes.

9. A spark intensifier comprising a transparent insulation body having a sparking
25 compartment therein, oppositely disposed metal bushings in said compartment having aligning screw threaded passageways com-

municating at opposite sides of said compartment and at their outer ends opening exteriorly of the body, a third bushing carried in the body out of alignment with said
30 above mentioned bushings having a screw threaded opening therein transversely arranged with respect to the alignment of the screw threaded passageways of the bushings
35 first mentioned, the screw threaded opening of the third bushing communicating between the compartment and exteriorly of the body, adjustable electrodes carried by the oppositely disposed bushings in the aligning
40 screw threaded passageways thereof having spaced sparking ends thereof in projecting relation in the compartment of said body, and a third screw threaded electrode adjustable in the screw threaded opening of
45 said third bushing transversely arranged with respect to the first mentioned electrodes for adjustment in a line transversely of the adjustment of the first mentioned electrodes, and with an end thereof projecting into
50 spaced sparking relation in the compartment between the sparking ends of said first mentioned electrodes.

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