S. ALSOP.

IGNITION APPARATUS.

APPLICATION FILED APR. 13, 1918.

1,289,595.

Patented Dec. 31, 1918.

2 SHEETS—SHEET 1.

Fig. 1.

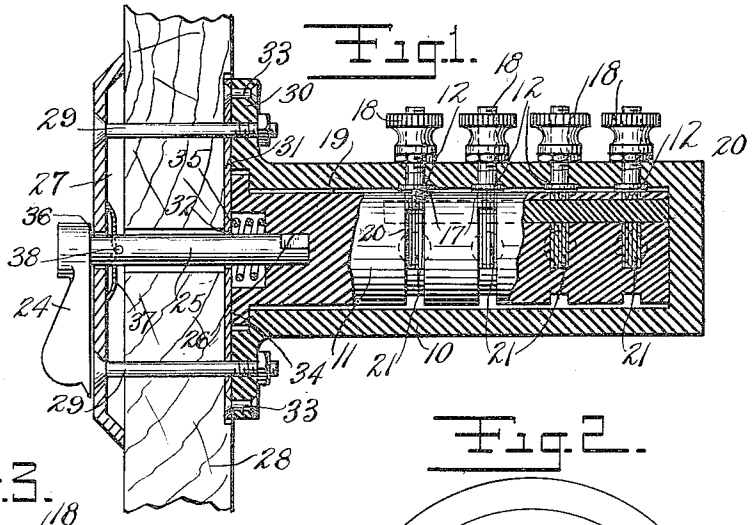


Fig. 2.

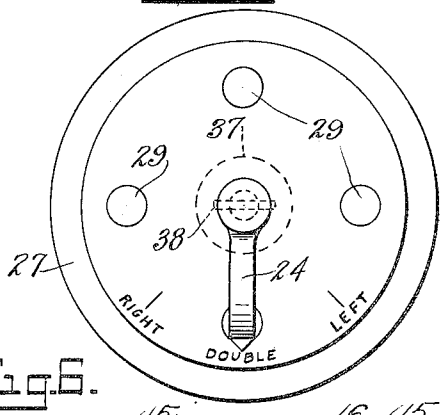


Fig. 3.

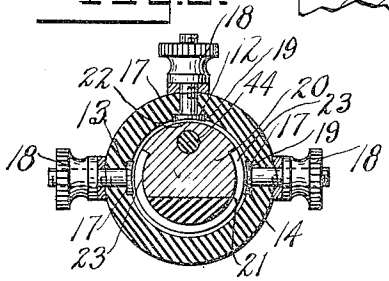


Fig. 4.

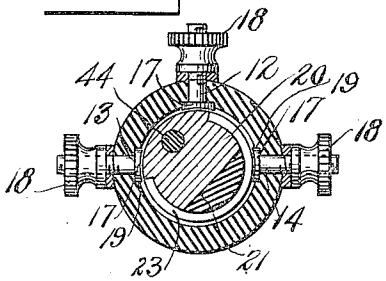


Fig. 5.

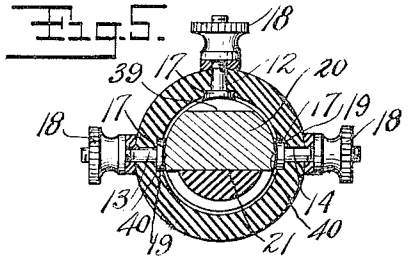
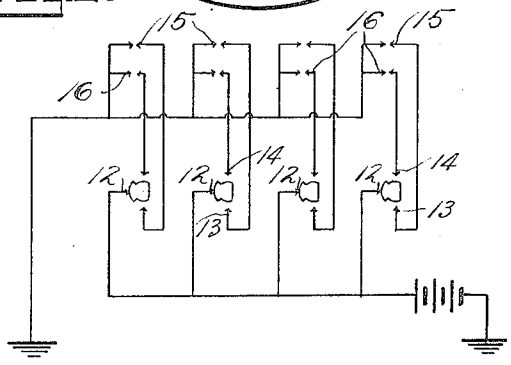


Fig. 6.



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2 SHEETS—SHEET 2.

Fig. 7.

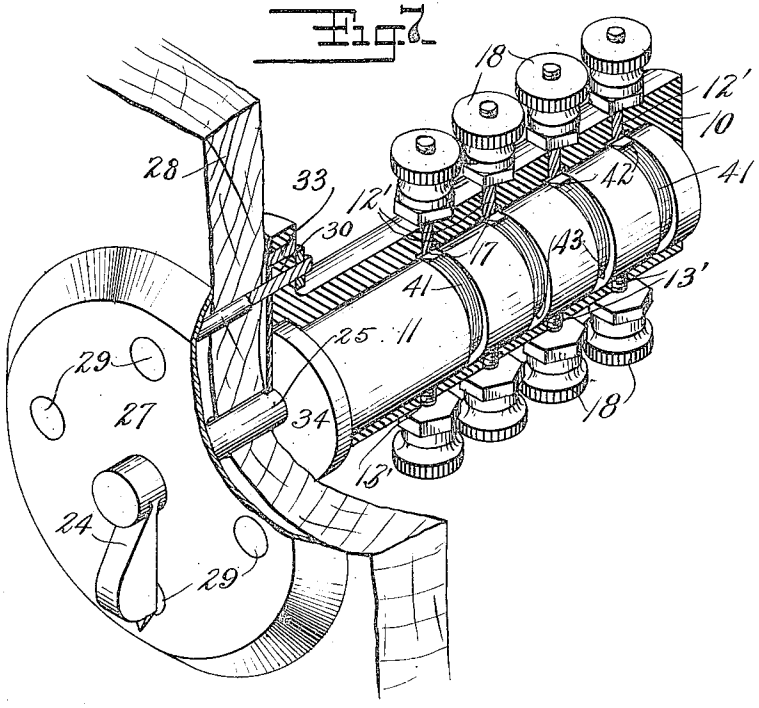


Fig. 8.

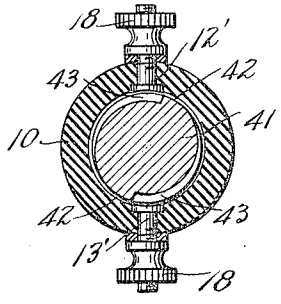
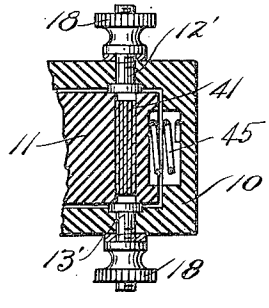


Fig. 9.



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UNITED STATES PATENT OFFICE.

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IGNITION APPARATUS.

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To all whom it may concern:

Be it known that I, SAMUEL ALSOP, a citizen of the United States of America, residing at New York, N. Y., have invented a new and useful Ignition Apparatus, of which the following is a specification.

My present invention relates to ignition apparatus for gas engines and special objects of the invention are to increase the efficiency of such systems by adding to the intensity and power of the igniting spark.

It is a well known fact that under certain conditions, for instance, when the spark plugs become "fouled" with carbon they miss fire, resulting in irregular action of the engine. I have found that by increasing the intensity of the spark, by means of the invention to be described, that such failures due to carbonizing or other causes, can be entirely overcome and that greater power can be developed.

Briefly and in a more or less general sense, the invention may be said to consist of an insulating housing or support, in tubular form and within which is mounted an adjustable plug carrying segments having peripheral portions of different elevations adapted to be carried by the adjustment of the plug into various relations with spark plug terminals mounted within the housing.

The details of the invention and other features will appear as the specification proceeds.

In the accompanying drawings I have illustrated my invention embodied in several practical forms but would have it understood that these are illustrative in character and may be modified in various ways without departure from the true spirit and scope of the invention.

In said drawings:—

Figure 1 is a longitudinal sectional view illustrating a form of the invention as mounted in place on the dash of an automobile.

Fig. 2, is a front view of the same.

Figs. 3 and 4 are cross sectional views, the first illustrating the plug in position with both sets of spark plugs in action and the second illustrating the position with the left-hand set of plugs only in operation.

Fig. 5, is a cross sectional view illustrating a modified form of segment construction.

Fig. 6, is a wiring diagram for the first form of the invention.

Fig. 7, is a perspective and partly sectional view of another modified form of the device.

Fig. 8, is a cross sectional view of the same.

Fig. 9, is a broken sectional view of the end portion of this form of the device illustrating the spring for maintaining a close water-tight joint for the housing.

10 designates the so-called housing or supporting member which is made of insulating material in cylindrical tubular form having a front open end and a closed rear end.

11 designates the so-called plug member which also is shown as made of insulating material and as cylindrical in form, of a size to rotatably fit within the tubular housing.

In the forms of the invention illustrated in the first sheet of drawings, there are provided three sets of terminals, one set of "in-put" or "in-going" terminals 12 and sets of "out-put" or "out-going" terminals 13, 14 at opposite sides of the first set of terminals. The in-put terminals 12 are connected with a suitable source of current, for instance, as indicated in the diagrammatic view, Fig. 6 and the out-put terminals of each set are connected with a set of spark plugs such as indicated at 15 and 16 in the diagrammatic view. These various terminals are shown supported directly on the insulating wall of the tubular housing, having heads 17 exposed to the interior of the housing and binding posts or similar devices 18 at the outside of the housing for connection of appropriate wires therewith. The terminal heads 17 are shown seated in longitudinal grooves 19 formed in the inner wall of the housing, being thereby disposed substantially flush with the inner cylindrical surface of such housing.

The rotatable plug element carries a series of metallic segments 20 seated in transverse slots 21 formed in the plug in line with the terminals of the different sets, it being noted that the in-put terminal and out-put terminals at opposite sides thereof are in each case all disposed in a single transverse plane so that a single segment will coöperate with all the terminals in that particular transverse plane. These segments are in the first form of the invention shown formed with a relatively high rim portion 22 adapted when registered with the terminals to substantially come in contact therewith and with

lowered or reduced portions 23 at opposite sides of such high portion and adapted when registered with the terminals to provide a space or brake. When therefore the plug occupies the position indicated in Fig. 3 the segments will complete circuits to the both sets of spark plugs substantially with contact at the in-going terminals at 22 and with breaks in both the spark plug circuits at 23. This interposition of breaks in both the spark plug circuits provides an intensified spark in both sets of spark plugs which I find especially desirable for high speed where greater power and quicker flame propagation is essential to best results.

A special feature of the segments illustrated is that they are made in laminations or layers which may have a dielectric, such as enamel or oxid therebetween. These laminations provide a plurality of paths for the current and at the same time acting in the capacity of condensers to further intensify the spark produced. By mounting the different segments sufficiently close together in the insulating plug with dielectric material therebetween, substantially as illustrated, a certain condenser action is also obtained which adds greatly to the efficiency of the apparatus. By turning the plug from the intermediate position illustrated in Fig. 3 to the position indicated in Fig. 4 one or the other set of spark plugs may be cut out of circuit as will be apparent.

Any suitable means may be provided for adjusting the plug, such means consisting in the present embodiment of a handle 24 having a shank 25 of special outline engaged in a corresponding socket 26 in the outer end of the plug, said handle registering on a suitable dial 27, to indicate the relative position of the plug. The device may be supported in position on a dash or other support 28 as by means of bolts 29 passed through from the dial at the front of the dash into engagement with an outstanding flange 30 on the forward end of the tubular housing at the back of the dash.

The housing is preferably made substantially water-tight so as to exclude moisture or other foreign matter from the terminals and coöperating segments. This is accomplished in Fig. 1 by providing a closure plate 31 which is applied to the open end of the housing after the plug has been inserted therein, said plate having a suitable opening 32 at its center for the shank of the operating handle. This closure plate is preferably permanently secured to the housing as by means of rivets 33 or other suitable securing devices so as to prevent removal of the plug and disarrangement of the coöperating terminals and segments.

A water-excluding joint is provided between the plug and housing in Fig. 1 by making the plug with an outstanding flange 34 at its outer end bearing against a corresponding shoulder in the front end of the housing, it being held in close frictional engagement therewith as by means of a spring 35 interposed between the plug and the closure plate 31.

To facilitate assembly of the handle with the plug and to permit of adjustment to suit different thicknesses of dashboards or supports, the handle may be pivotally supported in the dial as indicated at 36 and be yieldingly confined to said dial as by means of a spring washer 37 and transverse pin or key 38. This construction enables the housing element being applied to the back of the dash and the dial element being applied to the front of the dash, said dial supporting the handle meanwhile until the inner end of the handle shank is properly engaged in the seat provided for it in the plug.

According to one modification as illustrated in Fig. 5, a single break may be provided at the in-put terminal and the out-put terminals may be in substantially sliding contact with each of the segments in the plug. For this purpose said segments may be formed with an intermediate relatively low or break portion 39 and with relatively high contact portions 40 at opposite sides of said lower portion.

The degree or extent of the breaks may be made adjustable as by constructing the device as illustrated in Figs. 7 and 8. In this construction there are shown only two sets of terminals, an "in-put" set of terminals 12′ and a diametrically opposite set of "out-put" terminals 13′ and the contact segments 41, are more in the nature of plates and are provided with the diametrically opposite relatively high contact portions 42 and with the gradually reduced eccentric portions 43. It will be apparent that by turning the plug in this construction direct contact may be established, or breaks may be inserted in the circuits and varied in extent more or less until the best results are obtained. A spring 45 is shown for forcing the plug outward to maintain a substantially close water-tight joint in the casing.

The conducting plates or segments may be suitably secured in the plug, one method being illustrated in Fig. 3 wherein a pin 44 of insulating material is shown passed through the several segments and the intervening dielectric portions of the plug.

By placing two breaks in series with the spark plugs as indicated in Figs. 3 and 8, an intensely hot and powerful spark is produced and by regulation, in the manner described, the best results may be readily obtained.

I claim:—

1. In electrical ignition apparatus, a tubular insulating support, terminals mounted in spaced relation within said tubular sup-

port, an insulating plug member movably mounted within the tubular support and metallic plates mounted in spaced relation on said plug member and having terminal faces disposed at different distances in respect to the planes of the terminals and adapted to be brought into coöperative relation with said terminals by the movement of the plug member within the tubular support.

2. In electrical ignition apparatus, a tubular insulating support, terminals mounted in spaced relation within said support, a plug rotatably engaged within the tubular support and transversely disposed segmental metallic plates seated in said plug in line with the spaced terminals and having terminal faces disposed at different distances from the planes of the terminals and adapted to be brought into coöperative relation with the terminals by the rotary movement of the plug.

3. In electrical ignition apparatus, a tubular insulating support, terminals mounted in spaced relation within said support, a plug rotatably engaged within the tubular support, transversely disposed segmental metallic plates seated in said plug in line with the spaced terminals and having terminal faces disposed at different distances from the planes of the terminals and adapted to be brought into coöperative relation with the terminals by the rotary movement of the plug and means for rotating the plug and indicating the relatively rotated position of the plug.

4. In an electrical ignition apparatus, a tubular insulating support, spaced terminals within said insulating support, an insulating plug rotatably mounted within said tubular support, segmental metallic plates mounted transversely in said plug with dielectric therebetween, said segmental plates having relatively higher portions for substantial contact with the terminals and lower portions for providing breaks between said terminals and the plates.

5. In electrical ignition apparatus, a tubular insulating support, two sets of terminals mounted in spaced relation within the tubular support, a plug member rotatably engaged within the support and transversely disposed metal segments mounted in said plug with dielectric therebetween, said segments having edge portions of different heights for coöperation with the two sets of terminals.

6. In electrical ignition apparatus, a tubular insulating support, an in-going set of terminals within the tubular support, an out-going set of terminals within the tubular support, an insulating plug rotatably seated in the tubular support and transversely disposed metal segments mounted in said plug with dielectric therebetween and having terminal faces of different heights exposed to the two sets of terminals.

7. In electrical ignition apparatus, a tubular insulating support, an in-going set of terminals mounted in spaced relation within the tubular support, out-going sets of terminals mounted within the support at opposite sides of the in-going set of terminals, a plug rotatably engaged within the tubular support and metal segments set in the plug with dielectric therebetween, said segments having break and contact portions respectively adapted to be brought into registry with the different sets of terminals in the rotary adjustment of the plug.

8. In electrical ignition apparatus, a tubular insulating housing, independent sets of terminals mounted within said housing in different transverse planes thereof, an insulating plug rotatably engaged within said housing and provided with transverse slots therein in line with the terminals and transversely disposed metallic segments seated in said slots and having portions of the rims thereof disposed at different elevations and adapted to be brought into registry with the terminals of the respective sets by the rotary adjustment of the plug.

9. In electrical ignition apparatus, a tubular insulating housing, independent sets of terminals mounted within said housing in different transverse planes thereof, an insulating plug rotatably engaged within said housing and provided with transverse slots therein in line with the terminals and transversely disposed metallic segments seated in said slots and having portions of the rims thereof disposed at different elevations and adapted to be brought into registry with the terminals of the respective sets by the rotary adjustment of the plug, each of said metallic segments consisting of a series of separate laminations.

10. In electrical ignition apparatus, a tubular insulating support, an in-going set of terminals mounted in spaced relation within the tubular support, out-going sets of terminals mounted within the support at opposite sides of the in-going set of terminals, a plug rotatably engaged within the tubular support and metal segments set in the plug with dielectric therebetween, said segments each having a relatively low portion in the rim thereof and relatively higher portions at opposite sides of said lower portion arranged to be brought into registry with the respective sets of terminals in the rotary adjustment of the plug.

11. In electrical ignition apparatus, a tubular insulating support, an in-going set of terminals mounted in spaced relation within the tubular support, outgoing sets of terminals mounted within the support at opposite sides of the in-going set of terminals, a plug rotatably engaged within the tubular sup-

port and metal segments set in the plug with dielectric therebetween, said segments each having a relatively high portion in the rim thereof and relatively low portions at opposite sides of the high portion adapted to be brought into registry with the respective sets of terminals in the rotary adjustment of the plug.

12. In an electrical ignition apparatus, a tubular insulating housing, two sets of terminals mounted in spaced relation within said housing, a plug rotatably engaged within the housing and transversely disposed segments mounted in said plug with dielectric therebetween, said segments having eccentric rim portions adapted to be brought into various relations with the two sets of terminals by the rotary adjustment of the plug.

13. In electrical ignition apparatus, a tubular insulating housing open at one end, different sets of terminals mounted in spaced relation within the housing, a plug insertible within the open end of the housing and rotatable therein, contact segments seated in said plug with dielectric therebetween and adapted to be carried into coöperative relation with the different sets of contacts in the rotary adjustment of the plug and a substantially water-tight closure for the open end of the housing permanently secured to said housing.

14. In electrical ignition apparatus, a tubular insulating housing open at one end, different sets of terminals mounted in spaced relation within the housing, a plug insertible within the open end of the housing and rotatable therein, contact segments seated in said plug with dielectric therebetween and adapted to be carried into coöperative relation with the different sets of contacts in the rotary adjustment of the plug, a substantially water-tight closure for the open end of the housing permanently secured to said housing, and a spring acting on the plug to maintain a substantially water-tight joint at the thus-closed end of the housing.

15. Electrical ignition apparatus comprising, a tubular insulating housing, a plurality of sets of terminals mounted in the insulating wall of the housing exposed at their inner ends within the housing and having external binding posts, a substantially cylindrical plug rotatably engaged within the housing and having transverse slots therein in line with the different sets of terminals, segments consisting each of a set of metal laminations seated in each of the transverse slots and having each portions of different radii for coöperation with the different sets of terminals in variously adjusted positions of the plug and means for rotatably adjusting the plug.

16. In electrical ignition apparatus, a tubular insulating housing having longitudinal grooves in the inner wall thereof, terminals having head portions seated in said grooves substantially flush with the inner surface of the housing and a plug rotatably journaled in the housing having transversely disposed metal conducting parts with peripheral portions of different heights for coöperation with the heads of the terminals aforesaid.

17. In electrical ignition apparatus, a tubular insulating housing, independent sets of terminals mounted within said housing in different transverse planes, an insulating plug rotatably engaged within said housing and transversely disposed metallic contacts mounted in said plug and consisting each of a set of laminations having rim portions of different elevations for coöperation with the terminals aforesaid.

18. In electrical ignition apparatus, a tubular insulating housing, an insulating plug rotatably engaged therein, condenser plates mounted in said plug with their edges exposed at the rim of said plug and terminals carried by the insulating housing in line with said condenser plates.

19. In combination with the spark plugs of an electrical ignition system, switching mechanism included in the ignition circuit and arranged to place two breaks in series with each spark plug.

SAMUEL ALSOP.