J. C. MILLER.

COMBINATION SPARK PLUG TESTING AND GAP ADJUSTING DEVICE.

APPLICATION FILED JAN. 16, 1920.

1,385,222. **Patented July 19, 1921.**

Fig. 1

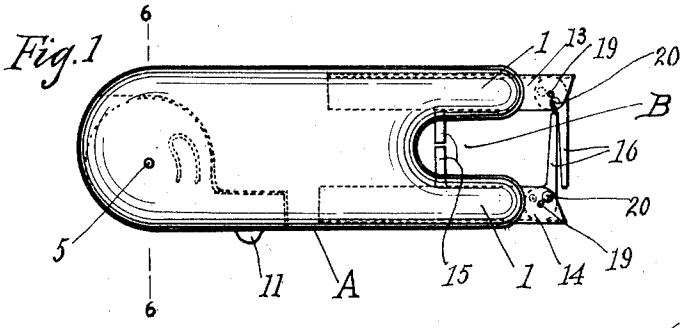


Fig. 2

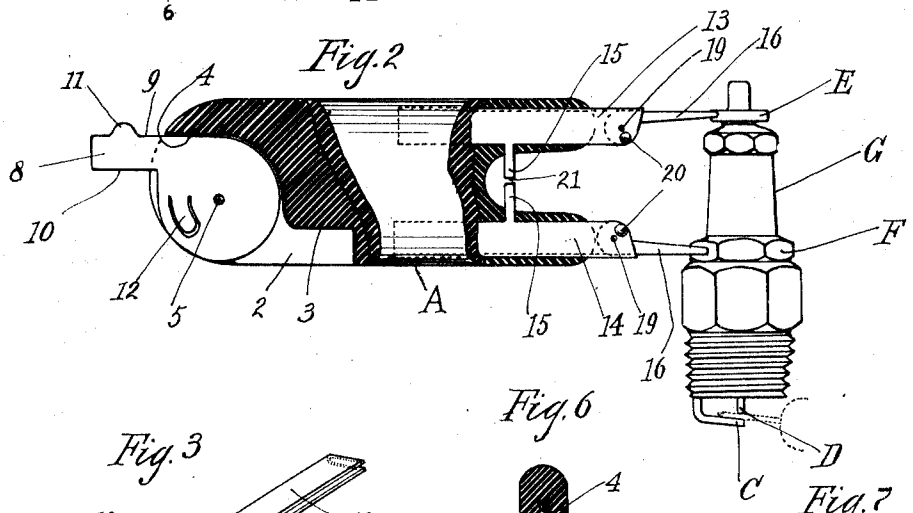


Fig. 3

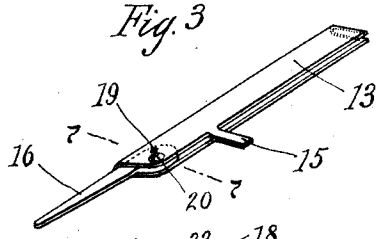


Fig. 4

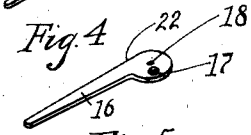


Fig. 5

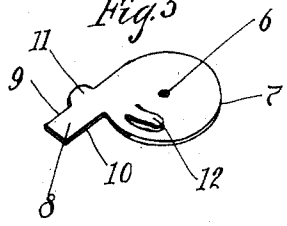


Fig. 6

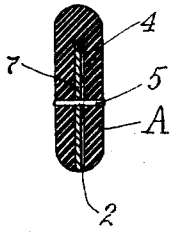
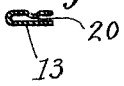


Fig. 7



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UNITED STATES PATENT OFFICE.

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COMBINATION SPARK-PLUG-TESTING AND GAP-ADJUSTING DEVICE.

1,385,222. Specification of Letters Patent. Patented July 19, 1921.

Application filed January 16, 1920. Serial No. 351,751.

To all whom it may concern:

Be it known that I, JOSEPH C. MILLER, a citizen of the United States, residing at North St. Paul, in the county of Ramsey and State of Minnesota, have invented certain new and useful Improvements in Combination Spark-Plug-Testing and Gap-Adjusting Devices, of which the following is a specification.

This invention relates to devices for testing spark plugs used in electric ignition systems for internal combustion engines, such as gasolene motors and the like. In practice spark plugs are usually tested by means of a pair of pliers or other ordinary tools which may be handy resulting frequently in receiving electric shocks and other injuries.

An object of the invention is to provide an article of manufacture of neat appearance and smooth externally which may be conveniently carried about in one's pocket without mutilating the same and which may be easily handled.

A further object of the invention is to provide improved testing means which may be safely handled with one hand, the device being constructed in a manner to protect the contact points thereof when out of use.

A still further object of the invention is to provide improved means for testing spark plugs combined with means for correcting the distance between the electrodes thereof.

To this end the invention consists in the construction, combination and arrangement of parts hereinafter described and claimed.

In the drawings:

Figure 1 is a side view of the invention showing same in folded, out of use position.

Fig. 2 is a side view of the invention partly in longitudinal section showing the device as applied to a spark plug.

Figs. 3, 4 and 5 are perspective views of details.

Fig. 6 is a sectional view on line 6—6 of Fig. 1, and

Fig. 7 is a sectional view on line 7—7 of Fig. 3.

The invention consists of a comparatively thick long narrow incasing block A made of non-conducting material and formed at one end with a crotch B whereby are formed two oppositely disposed longitudinally extending lugs 1. The opposite end of the supporting block is circular in contour so as to present a smooth end such as is found on eye glass cases and the like. The edge surrounding the supporting block as shown in Fig. 6 is well rounded, thereby forming an article presenting a smooth surface to the hand as well as being ornamental in appearance.

Referring to Fig. 6 of the drawing the block is formed with a bifurcation or slit 2 at its semi-circular end, the slit cutting the block edgewise and extending longitudinally along one edge thereof. The contour of the bottom of the slit comprises a longitudinally directed straight portion 3 parallel with the long edge of the block and a straight portion 4 parallel with the edge 3, the two edges being connected by a curved portion arranged concentric with a pivot pin 5 the latter piercing the supporting block transversely and fitting the circular opening 6 of a gage member 7. The gage member 7 comprises a comparatively thin flat circular plate, the circular edge thereof being concentric with the opening 6 and an outwardly extending comparatively long lip 8 disposed tangentially with the plate 7 and having a rectangular outer end, the long edges 9 and 10 thereof being adapted to engage the edges 4 and 3 respectively of the bottom of the slit 2.

The gage member is provided with an outwardly extending finger piece 11 extending from the edge 9 thereof. As indicated in Fig. 2 the gage member is positioned ready for use, the lip 8 extending longitudinally rearwardly from the supporting block, the edge 9 thereof abutting against the edge 4 of the slit, the latter serving as a stop. The contour as a whole of the gage member is such as to fit the contour of the bottom of the slit when it is rotated into folded position as indicated in Fig. 1, the only visible portion thereof being the finger piece 11 which latter protrudes from the edge of the supporting block. By means of the finger piece the gage member may be conveniently rotated upon its pivot as desired.

In order to control the gage member in the slit to hold it in any desired relative position therein, the gage member is provided with a flat spring member 12 preferably struck out of the body of the gage member so that it will extend laterally beyond one side thereof as shown in Fig. 5 of the drawing. Thus, the spring member frictionally engages under stress one wall of the slit thereby frictionally holding the gage member against the opposite wall of the

latter in any position to which it may be shifted. The lip 8 is equal in thickness to the distance which has been found in practice to be the most effective between the electrodes C and D of the spark plug. These electrodes accidentally become displaced but may be easily bent into normal position. In order to insure the proper width of gap between the terminals it is only necessary to insert the lip 8 between them as indicated in Fig. 2 of the drawing, and then bend the terminals C until the lip snugly fits between said electrodes. The outer end of the lip 8 is chamfered from opposite sides so as to form a wedge shaped terminal whereby the spark plug terminals may be easily pried apart when they are found to be too close together.

Referring to the crotched end of the casing block, each of the lugs thereof support longitudinally, so as to extend outwardly therefrom the terminal supports 13 and 14 respectively, each terminal support being made of conducting material and formed of a comparatively long plate folded upon itself so as to be U shaped in cross section as shown in Fig. 7 the legs of the U being springy, thereby forming a spring jaw, a test electrode 15 extending laterally from between the folded sides and being preferably integral therewith. As shown in Fig. 3, each side being so blanked as to form an integral electrode when the sides are folded upon one another. The major portion of the terminal supports are thoroughly embedded in the casing the test electrodes projecting through the respective lugs of the latter.

Pivotally supported to open like the blade of a jack knife one in the outer end of each of the terminal supports between the sides thereof is a contact member 16 having an indent 17 near the pivot opening 18 which latter receives the pivot pin 19 the latter being rigidly secured in the terminal support. The terminal support has an inwardly extending indenture 20 positioned so as to enter the indent 17 in the contact member when the latter is extended outwardly in active position as indicated in Fig. 2, the side walls of the terminal support serving as a spring to urge the indenture constantly against the contact member. As shown in Fig. 2 of the drawing the terminal support 13 projects a distance farther from the supporting block than the terminal support 14, for the purpose of permitting the contact member 16 (Fig. 1) to overlap the other when in folded position. When thus positioned the test electrodes 15 are positioned in opposite relation in the crotch B. As indicated in Fig. 2 the contact members 16 are shown in contact with the terminal cap E and the packing nut F of the spark plug G respectively. Obviously, if the instrument is applied when the current is flowing a spark will jump across the gap 21 between the test electrodes. The contact members 16 are adapted to rest against the terminal support when the indenture is seated in the indent 17, thereby rendering the contact members frictionally rigid against movement. Owing to the thickness of the block, the hand of the user is protected against the spark in the gap 21.

I claim:

1. A testing device for ignition systems comprising a non-conducting comparatively thick long block, two spaced conducting members partly embedded in said block and extending longitudinally beyond the end thereof, said block being cut away to form an open space between the embedded parts of said conducting members, electrodes spaced end for end in said open space one connected with each of said conducting members, and a contact member for each conducting member pivoted at the free end of the latter so as to swing in the same plane toward each other, one of said conducting members extending beyond the other to permit one contact member to fold over the other.

2. A device of the class described, comprising a non-conducting block having a notch in one end thereof, conductors embedded in said block, one on each side of said notch, said conductors being U shaped in cross section the open end of the U directed inwardly to form a spring jaw and projecting beyond the end of said block, an electrode for each conductor extending laterally therefrom toward each other into said notch so as to form a spark gap between them, each conductor having a contact blade pivoted in the spring jaw of its projecting part to be frictionally gripped by the latter for the purpose set forth.

3. A device of the class described comprising a comparatively long non-conducting body member, two longitudinally parallel oppositely disposed conductors embedded endwise in the end of said body member and extending in spaced relation outwardly therefrom, and an electrode for each conductor extending into said space, said electrodes being arranged in sparking relation, said extending portion of each of said conductors being U shaped in cross-section and pivotally supporting a contact member between the legs of said U, so that said contact member will rest against the bottom of said U when in outswung position like the blade of a jack knife to limit its outward swinging movement.

In testimony whereof I affix my signature.

JOSEPH C. MILLER.