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ELECTRIC CURRENT CONTROLLER AND SPARK INTENSIFIER.

APPLICATION FILED DEC. 16, 1920.

1,413,140. Patented Apr. 18, 1922.

Fig. 1

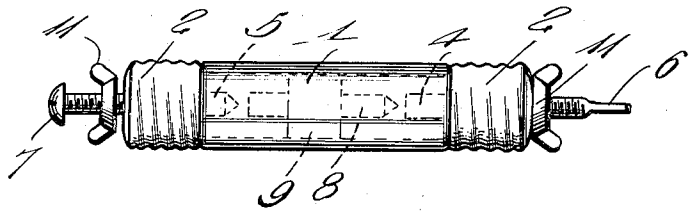


Fig. 2

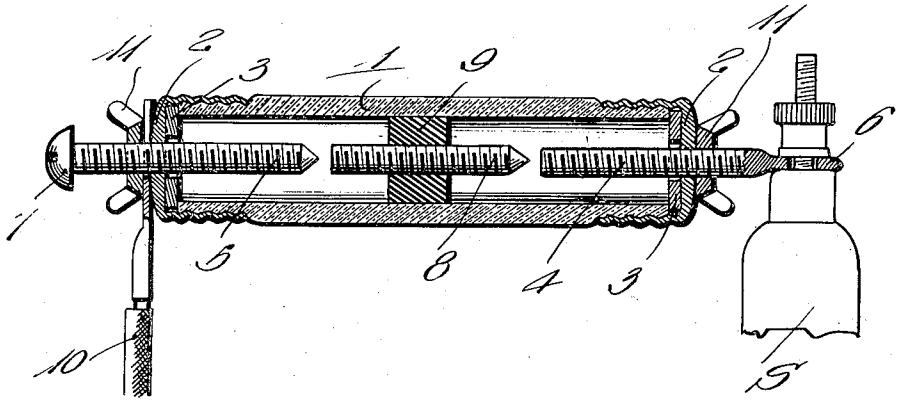
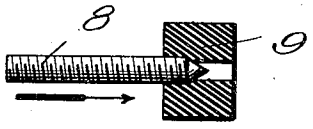


Fig. 3



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ELECTRIC-CURRENT CONTROLLER AND SPARK INTENSIFIER.

1,413,140. Specification of Letters Patent. Patented Apr. 18, 1922.

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To all whom it may concern:

Be it known that I, ROBERT MARION SUTHERLIN, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented certain new and useful Improvements in an Electric-Current Controller and Spark Intensifier; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to an improved electric current controller and spark intensifier, and it has for one of its objects to generally improve upon devices of this class by the production of one of extreme simplicity and durability, in which the construction is such that the sparks can be seen at all times, one in which the size of the gaps can be easily and readily varied, and one which is very valuable and advantageous in that it serves to rejuvenate weak and dirty and otherwise undesirable plugs.

Another and important object of the invention is to provide a device of the above mentioned character which embodies a plurality of spaced electrodes, thus providing a plurality of spark gaps; these electrodes being movable toward and from each other to adjust the gaps, and the employment of a plurality of gaps greatly increasing the intensity of sparks from approximately one to two hundred per cent more than in cases where a single gap only is employed.

A further object of the invention is to provide a device of this class embodying two end electrodes and one or two intermediate independent electrodes, one of the end electrodes being provided with an apertured flattened head for quick attachment and detachment to or from the spark plug, and the other end electrode being provided with a slotted head to permit it to be easily and quickly adjusted.

A still further object of the invention is to provide a device of this class embodying the electrodes above mentioned, the intermediate or independent electrode being supported in a novel holder of expansible material, and this holder being provided with a bore of less diameter than the electrodes which passes through it, so that when the latter is passed through the bore, the periphery of the holder will be expanded into snug engagement with the interior of the sparking chamber in which it is disposed.

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

In the accompanying drawings forming a part of this specification, and in which like numerals are employed to designate like parts throughout the same:

Figure 1 is an elevational view of a device constructed in accordance with this invention.

Figure 2 is an enlarged central longitudinal sectional view, with parts in elevation, showing the manner in which the device is associated with a spark plug.

Figure 3 is a detail view of the intermediate electrode and its holder, the electrode being shown as extending partially into the bore of said holder.

Referring to the drawings, wherein the preferred embodiment of the invention is clearly shown, the numeral 1 designates a transparent tube of glass or the like which has its opposite ends reduced in diameter and externally screw-threaded. Fitted on and closing the opposite open ends of the tube are screw-caps 2 of substantially the same diameter as the tube. Arranged in the caps and resting against the ends of the latter and the ends of the tube are metal washers 3. Disposed in horizontal alinement and extending through central apertures formed in the screw-caps are two relatively long electrodes 4 and 5 respectively. The first named electrode has its outer end extended beyond the end of the cap by which it is supported and it is provided on its free end with a flattened apertured head 6 for attachment to the exposed end of the electrodes of the spark plug S. While on the description of this electrode, I wish to direct attention to the fact that the inner end thereof is blunt and provides an increased area for receiving the spark from the adjacent electrode and thus increases the life of this electrode. The other end electrode 5 has a slotted head 7 provided on its outer end to permit use of a screw-driver or the like for the purpose of adjusting this electrode to increase or decrease the gap between it and the adjacent electrode. The inner end of this electrode is pointed as shown to give an increased heated spark. Arranged in the tube 1 is a third and intermediate or independent electrode 8 which has

its ends spaced from the inner ends of the end electrodes for the purpose of providing a plurality of spark-gaps, which insure an extremely intense spark. It is to be noted that the end of the intermediate or independent electrodes adjacent the electrode 5 is blunt for the same reason that the inner end of electrode 4 is constructed in this manner. Also, the opposite end is pointed for a purpose already set forth. For the purpose of positioning the electrode 8 in horizontal alinement with the other electrode, I make use of a novel holder 9. This holder could be of any other construction, but it is preferably in the form of a sleeve which is made from suitable insulating and expansible material. Special attention is directed to the fact that the bore of this sleeve is of less diameter than the diameter of the electrode 8 which passes therethrough, this construction being clearly disclosed in Figure 3. I make use of this particular construction because of the fact that when the electrode is passed through the bore, it will cause the peripheral portion of the sleeve to be expanded into tight engagement with the interior surface of the tube 1, thus securely anchoring this sleeve in position and preventing accidental displacement thereof. This is an important feature of construction to be considered. With this construction, it is to be understood that the sleeve 9 is placed in position and held against movement toward one end of the tube in any manner and the electrode 8 is forced into the bore and rotated, thus expanding the sleeve and positioning the electrode in the proper place for effective operation of the device. In order to complete an electrode circuit between the ignition system and the spark plug S, the usual wire 10 leading from the coils is connected with the electrode 5 and held in position by one of the wing-nuts 11.

In applying the device to a spark plug, the usual nut is removed and the head 6 is placed on the exposed upper end of the electrode of the spark plug, and the binding nut is again replaced. Then, the current wire 10, which leads from the coil box, is connected with the electrode 5 in the manner disclosed, being held in position by means of adjacent wing-nuts. The gaps may be varied from time to time owing to the adjustability of the end electrodes 4 and 5. This adjustment may be secured without removing the device from the spark plug by simply grasping the glass tube with the fingers and rotating to increase or decrease the size of the spark gaps as the case may be, it being understood, of course, that it is first necessary to loosen the wing-nuts before the tube can be rotated. The space between the inner end of the electrode 5 and the adjacent end of the one 8 can be varied by adjusting the electrode 5 with a screw-driver or the like. Thus, it will be seen that the desired size of gaps may be easily and readily obtained without fear of getting an electric shock. All of the parts of the device may be readily removed and replaced and for this reason the device will be found extremely advantageous. Furthermore, in view of the extreme simplicity of the device, it may be manufactured and sold at a very low cost. Employment of this device embodying a plurality of spark-gaps will insure that the power of the spark will be greatly intensified even though the spark plugs to which the device is connected are weak and faulty. Another and very important feature of the device resides in the fact that the adjustable electrodes may be caused to directly engage one another and thus permit the current to pass therethrough without being disturbed or without producing the additional visible sparks. Thus, my device can be rendered practically ineffective. However, as soon as improper working of the engine is noticed, it can be overcome by simply separating the electrodes in the aforesaid manner to provide a plurality of gaps, thereby intensifying the spark and insuring effective firing of the fouled plug. These and other advantages and features of the invention have, no doubt, become apparent.

Careful consideration of the foregoing description taken in connection with the accompanying drawings will enable persons skilled in the art to which this invention relates to obtain a clear understanding of the same, therefore a more lengthy description is deemed unnecessary.

While I have shown and described a device wherein two spark gaps are provided, I wish it to be understood that the intermediate electrode could be eliminated in some instances so as to provide a single gap. Also, there may be, if desired, other electrodes added for the purpose of producing five or six gaps.

Since probably the best results may be obtained with the construction and arrangement shown and described, I take such construction and arrangement as a preferred embodiment of the invention. However, I wish it to be understood that various minor changes in the shape, size, and arrangement of parts may be resorted to so long as no departure from the spirit of the invention or scope of the adjoined claims is made.

I claim:

1. A device of the class described comprising a transparent tube having its opposite ends reduced in diameter and externally screw-threaded, screw-caps engaging said threads and closing the ends of the tube, aligned electrodes passing through and having adjustable connection with said caps, the latter being of the same diameter as said tube, apertured washers arranged in the caps between the ends of the latter and the

ends of the tube, one of said electrodes being provided on its outer end with a slotted head and the other one being provided on its corresponding end with a flattened apertured head for connection to a spark plug, nuts on said electrodes, an intermediate electrode in said tube having its ends spaced from the inner ends of the first named electrodes, and means for supporting the intermediate electrode.

2. In a device of the class described, the combination with a sparking chamber provided with electrodes at its ends, and an intermediate or independent electrode spaced from the inner ends of the first electrodes, and a holder for the intermediate electrode consisting of an expansible sleeve, the bore of which is of less diameter than the diameter of the electrode which passes therethrough.

In testimony whereof I have hereunto set my hand.

ROBERT MARION SUTHERLIN.