Dec. 26, 1922. 1,440,142

G. FUEGEL ET AL.
ELECTRICAL CONDENSER.
FILED DEC. 27, 1918.

Fig. 1.

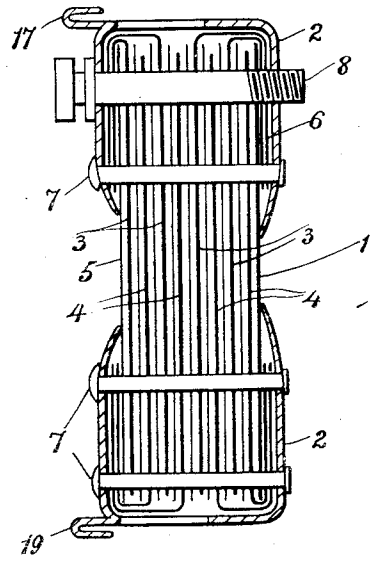


Fig. 2.

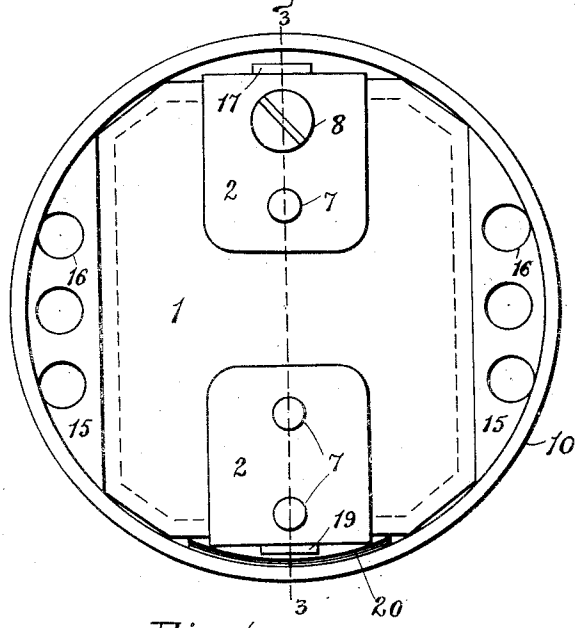


Fig. 3.

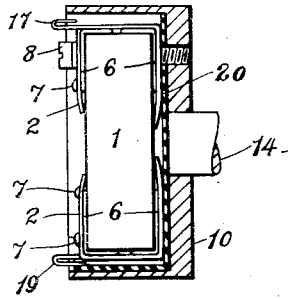


Fig. 4.

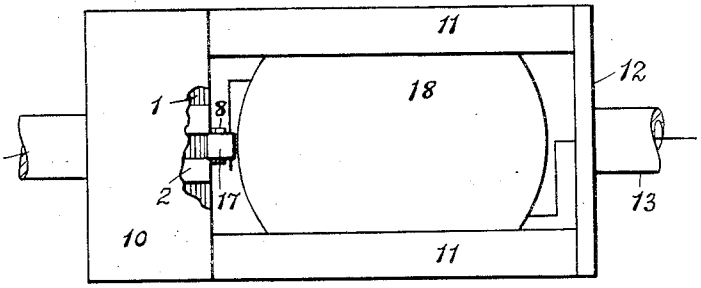


Fig. 5.

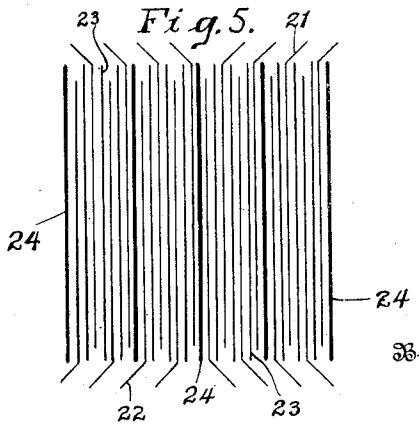
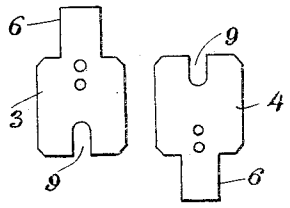


Fig. 6.



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GOTTLOB FUEGEL.
By their Attorney
William F. Nickel

Patented Dec. 26, 1922.

1,440,142

UNITED STATES PATENT OFFICE.

GOTTLOB FUEGEL AND HERMAN SCHMID, OF BROOKLYN, NEW YORK, ASSIGNORS, BY MESNE ASSIGNMENTS, TO APOLLO MAGNETO CORPORATION, OF BROOKLYN, NEW YORK, A CORPORATION OF DELAWARE.

ELECTRICAL CONDENSER.

Application filed December 27, 1918. Serial No. 268,551.

To all whom it may concern:

Be it known that we, GOTTLOB FUEGEL and HERMAN SCHMID, who were formerly subjects of the German Emperor, but who have severally renounced all allegiance to said potentate and declared our intentions of becoming citizens of the United States, residing in Brookyln, in the county of Kings and State of New York, have invented certain new and useful Improvements in Electrical Condensers, of which the following is a specification.

Our invention relates to an improvement in electrical condensers; particularly condensers for magnetos employed in the ignition systems of internal combustion engines.

An object of our invention is to provide a condenser which can be carried upon the armature of a magneto and secured so as to prevent jarring and vibration. Thus we obviate the liability of the condenser becoming damaged or short-circuited; and the efficiency of the condenser is maintained and its life increased.

Another object of our invention is to provide a condenser which is so constructed that it has a positive ground connection with the body of the armature of the magneto; this ground connection serving for both one terminal of the condenser and one terminal of the winding of the armature; and being located so that access can be had thereto without the armature winding having to be first removed.

A further object of our invention is to provide a condenser of special construction so designed that it can be easily assembled and readily taken apart in sections, whereby a defect or fault can be quickly located, and the condenser given the necessary attention to permit further use of same.

The above and other objects and advantages of our invention will be apparent from the following description taken in connection with the accompanying drawings; and the novel features of our improved condenser will be precisely defined in the appended claim. This disclosure, however, is explanatory only, and we reserve the right to resort to embodiments of our invention other than what we actually show, within the scope and spirit of our invention, to the full extent of the general meanings of the terms in which the claim is expressed.

On the drawings,

Figure 1 is a longitudinal section through a condenser made according to our invention;

Figure 2 is a front view showing the same in a cup-shaped casing, which enables it to be mounted on the armature of a magneto;

Figure 3 is a section through such a casing taken on the line 3—3 of Figure 2, showing the condenser in side elevation;

Figure 4 shows our condenser applied to the armature or a magneto and the manner in which the generating coil and the condenser are connected together;

Figure 5 is a more or less diagrammatic view showing the manner in which a condenser of this type is preferably built up to enable it to be most conveniently handled when repairs are needed; and

Figure 6 is a detail view showing the shape of the electric charge receiving elements and the manner in which they are assembled.

The same numerals identify the same parts throughout.

The body of the condenser is indicated by the numeral 1 and it of course comprises a number of elements for receiving electrical charges, with intervening members of dielectric material. The receiving elements may be sheets of metallic foil, and the dielectric members may be sheets of any suitable insulating material. The receiving elements and the dielectric material in between them are bound together at each end of the condenser by means of the metallic clips 2, and these receiving elements and dielectric members may be treated with an adhesive, such as glue, to make them stick together over their entire extent of surface. As usual we divide the receiving elements into two sets; one set indicated by the numeral 3 and the other set by the numeral 4; the former set being shown in Figure 1 as being joined together at the top of the condenser and engaging the adjacent clip 2, which makes a common terminal for the elements 3; while the other set 4 is shown as joined together at the bottom, and being in electrical connection with the other clip 2. The dielectric members are indicated at 5. We may give the condenser any desired shape or outline; such as that indicated in Figures 2 and 6; and to facilitate uniting the elements 3 and 4 we provide these elements with tabs or pro-

jections 6. At each end of the condenser, half of the tabs of each set are bent forward and laid flat against one face of the condenser; while the other half are bent the opposite way and laid flat against the other face of the condenser; beneath the clips 2; whereby undue thickness of these projections beneath the clips 2 at each end is avoided, and the size of the condenser reduced. We illustrate the clip 2 which engages the projections 6 of the elements 4 as being secured in place by two rivets 7 which pass through holes in the elements 4, indicated in Figure 6, and placed near projections 6. For the other clip 2 we provide a similar rivet, locating it near the ends of the arms of the clip; and at a slight distance from it, we make an opening through the condenser for a retaining screw 8, which has the function of securing the condenser to the support upon which the condenser is to be mounted. Both this rivet 7 and the screw 8 will be located close to the tabs 6 of the elements 3; therefore the retaining screw 8 and the adjacent rivet 7 may have electrical connection with the elements 3. Likewise the rivets 7 of the other clip 2 may have contact with the elements 4, because, as above stated, these rivets and the screw are in proximity to the tabs 6 of these elements. There will be a sufficient area or surface between the screw 8 and its associated rivet 7 and the opposite ends of the elements 3; and between the other two rivets and the opposite ends of the elements 4 to give the required effect. The rivets 7 which make contact with the elements 4 are prevented from making contact with the elements 3 by notches 9 in the adjacent ends of the elements 3 and similar notches in the ends of the elements 4 prevent contact between these elements and the other rivet 7 and screw 8. See Figure 6. Ordinarily the support for the condenser will be a casing or housing indicated by the numeral 10 in Figures 2, 3 and 4, and adapted to be secured to the armature of an ignition magneto. This casing and the condenser therein will rotate with the armature; and when the screw 8 is made tight it will anchor the condenser in the housing 10 so that any jarring or vibration will be prevented. In practice, the housing 10 may be a brass or other metallic casting.

The casing 10 as indicated in Figure 1 will be cylindrical and it will be cup-shaped; with an inside configuration corresponding with the outline of the condenser which it is to receive. We of course make the condenser fit the inside of the housing 10 as closely as possible; but if there is any space between the sides of the condenser and housing, it may be filled with pieces of cardboard or the like until the condenser is packed to the required degree. The housing 10 will be at one end of the armature of a magneto; and, as the screw 8 passes entirely through the condenser, the latter, when it is properly disposed in the housing, will not only be firmly held in place, but it will also have through the bolt or screw 8, a positive ground connection with the body of the armature. That is to say, the elements 3, which are all in electrical connection with the clip 2 at the adjacent end of the body 1, will all be joined to ground through the screw 8. This screw being very strong, any likelihood of the ground connection of the condenser ever becoming broken is avoided; and, as jarring and vibration are likewise prevented, there is no liability of the condenser ever becoming disconnected or any of the elements becoming worn or short circuited; so that the maximum efficiency and life are obtained.

As indicated in Figure 4, the armature to which the housing 10 is applied will consist of a pair of pole pieces 11 affixed to a plate 12 at one end and to the housing 10 at the other. In an ordinary magneto, this armature will be of the usual shuttle-wound or H-shaped type, with the pole pieces 11 connected by a metallic core, on which the generating coils are wound. The sides of the housing 10 may be made thicker, as indicated at 15 in Figure 2, so as to provide segment-shaped portions against which the adjacent ends of the poles 11 will fit; and these portions may be provided with openings 16, to receive fastening elements to hold the armature together; these fastening elements securing the parts 10, 11 and 12 in a single compact structure. The plate 12 may carry a spindle 13 to form one end of the armature shaft, and the casing 10 may carry a similar spindle 14 to make the opposite end of the armature shaft, as will be understood.

The clip 2 through which is to be passed the screw 8 is shown as provided with a projection 17 which is cut out therefrom and bent so as to provide a binding device. On the armature the generating winding is indicated at 18, and one terminal thereof will be connected to this binding device 17; the projection 17 being bent around the same and made to grip it tightly. As usual the other end of terminal of the winding 18 will be led out through the spindle 13, which will be hollow, to the contact points of the interrupter or timer. By this arrangement the ground terminal of the armature is made very accessible, and in case of accident the entire armature does not have to be unwound in order to reach the grounded terminal, as when this terminal is connected to the core extending between the pole pieces; and carrying the winding 18.

The other clip 2 is provided with a similar projection 19, cut therefrom and bent into the same position as the projection 17. This

projection is made to engage and bind the end of a wire which also runs to the contacts of the magneto timer carried on the end of the above mentioned spindle 13; the connection of the condenser being made in such a manner that it will be in parallel both to the timer contacts and the generating winding 18. In order to separate this clip 2 from the bottom of the housing 10 we place insulation 20 in the housing against the bottom and the side of the same, so that this clip will be in contact with the insulation 20. Thus grounding of the elements 4 through the clip which joins them is avoided.

In practice the winding 18 may be used either alone as a low tension coil or as the primary of a high tension magneto with the secondary wound over same. In either case the condenser is mounted in such a manner as to be held firmly in place and have a positive ground; and at the same time enable one terminal of the winding 18 to be connected to the ground through the screw 8. Hence, not only can the condenser itself be readily removed for inspection and repair but also the armature winding 18 is capable of being arranged in the most advantageous fashion; and the benefits of our invention flow not only from the structure and the arrangement of the condenser itself, but also from the manner in which the winding 18 is combined with same.

In Figures 1 and 2 the condenser and housing are shown somewhat enlarged for the sake of clearness; and in Figures 3 and 4 they appear in approximately the size they are actually given in practice. However, we may make the condenser in any size that may be called for.

In practice when the magneto needs repairing it is only necessary to take out the armature and remove the housing 10. After that the condenser can be taken out merely by turning back the screw 8 and both the condenser and armature given the attention they require.

In Figure 5 we show a method of constructing the condenser by placing between the elements 3 and 4 sheets of paper for the most part, with a small number of sheets of mica. The two sets of electrical receiving elements are indicated by the numbers 21 and 22 and the paper dielectric is indicated at 23. We use the number 24 in connection with the sheets of mica, and these may be placed with a greater or less number of sheets of paper between each two of them. The effect of this construction is to divide the condenser into sections which can be separated one from the other and tested singly when one of the sheets of insulation becomes punctured. In other words, the mica sheets mark so many planes of cleavage at which the body of the condenser can be split, and by testing each section alone the faulty section can be quickly ascertained. Thus the number of elements and sheets of dielectric which must be removed to replace the punctured dielectric members is reduced to a minimum, and the work of repairing greatly simplified.

Having described our invention what we believe to be new and desire to secure and protect as Letters Patent of the United States is:

The combination of a support, a condenser carrier by the support, said condenser including charge-receiving elements with intervening members of dielectric material, a binding screw passing through the condenser and engaging the support and serving to secure the condenser to the support, said screw being in electrical connection with said support and a portion of said elements, a clip engaging one end of said condenser and being in electrical connection with a portion of said elements, and said screw, and a clip engaging the other end of the condenser and being in electrical connection with the remaining elements, said clips having projections to enable electrical conductors to be attached thereto.

In testimony whereof, we have signed our names to this specification this 1st day of November, 1918.

GOTTLOB FUEGEL.
HERMAN SCHMID.