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Fig. 1

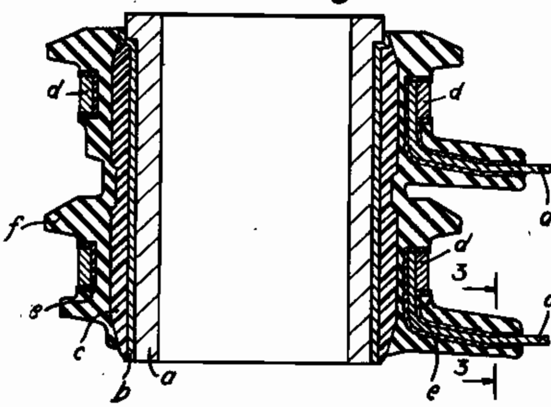
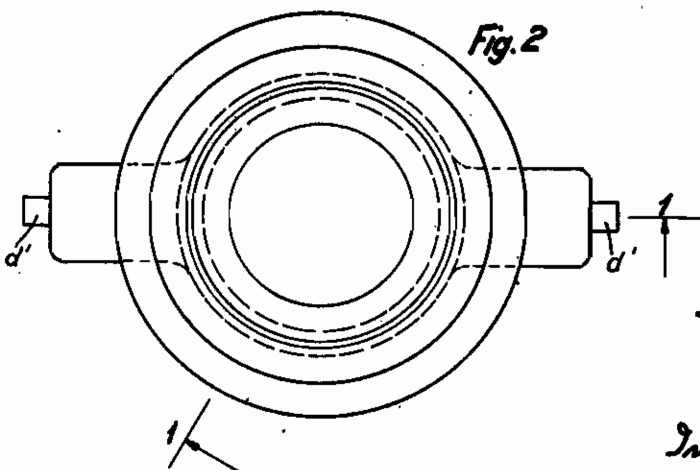


Fig. 3

Fig. 2



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RUBBER INSULATION FOR METALLIC CONDUCTORS

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It is known to make insulations of hard rubber (vulcanite) for metallic parts which are built into apparatus of various kinds. These vulcanite mixtures made from natural raw rubber have a heat-stability of about 90–110/ C. (according to Martens) and a medium elasticity that suffices to prevent strains and cracks at the vulcanized-in metal insertions. If, however, it is attempted to increase the heat-stability of such insulations, as is in itself urgently necessary, for instance by the addition of suitable filling materials, they become extremely brittle as the specific gravity rises, and mechanically of inferior value and thus useless.

It is further known while using artificial rubber to make vulcanite insulations which, with a heat-stability of 150° C. (according to Martens) and upwards, and at the same time of low specific weight, are still sufficiently firm or solid. Such vulcanite mixtures remain stable and firm even at high working temperatures and do not suffer in their moulding quality by softening or shrinkage. They have, however, the drawback of being almost inelastic, and therefore the vulcanizing-in of metal parts, especially parts of difficult shape, which are generally anchored on all sides, is not advisable in such vulcanite compositions, owing to the risk of cracking associated therewith.

The present invention removes these defects by a finished vulcanized intermediate layer being interposed between the metal parts and the highly heat-stable vulcanite insulation.

This intermediate layer, on the one hand, absorbs for the most part the shrinkage stresses resulting during the succeeding vulcanization or when in use, and thus prevents the formation of cracks, and, on the other hand, forestalls a part of the general shrinkage. This intermediate layer must be more elastic than the highly heat-stable vulcanite layer. As a rule, it will be of high or the highest elasticity so that great strains which would cause cracks can be elastically absorbed. Where the insulation is of relatively large dimensions, normal heat-stable material even of medium elasticity will be advantageously used for the purpose, in order to absorb elastically as far as possible the shrinkages occurring during vulcanization owing to the large dimensions of the insulations, which also necessitate comparatively thick walls for the highly heat-stable vulcanite. Such an intermediate layer of high or maximum or medium elasticity has in its turn already undergone a shrinkage in the vulcanizing-on process and therefore the general shrinkage of the insulation is considerably reduced. The thickness of the walls of the elastic vulcanite layer will thus be made as great as possible. An intermediate layer of medium elasticity has, furthermore, also the advantage that when the highly heat-stable vulcanite is moulded under pressure round it or wrapped round it, it remains sufficiently firm without softening and without being pressed out of place by the metallic part.

In the elastic vulcanite mixture for the intermediate layer, consisting of raw rubber, sulphur, and suitable additions, the sulphur content should preferably be below 32% of the raw rubber content so that the vulcanite may not be brittle. For the same reason, the total additions suitable for the purpose do not amount to more than 5% of the raw rubber content.

The accompanying drawings illustrate the invention in one example of construction. In the drawings:

Figure 1 is a section through the hub of a distributor of a twin-magneto.

Figure 2 is a corresponding plan view.

Figure 3 is a section of the ignition member on the line A—A of Figure 1.

The distributor hub shown in Figure 1 consists in known manner of an aluminium tube *a*, which is preferably provided with a coating or covering of soft iron *b*, for example, by the Schoop metal-spraying process. This coating or covering of soft iron is necessary in this example, because the vulcanized-on vulcanite layer *e* of high mechanical strength having a normal heat-stability of 90–110° C. does not firmly adhere directly to the aluminium surface, while it adheres firmly to the iron. This is perhaps to be ascribed to the greater adhesiveness of the intermediate layer to a sulphide probably occurring on the surface of the metallic iron, which may arise by the action of the sulphur contained in the vulcanized elastic vulcanite on the iron. The adhesion of the elastic layer to iron is also better to copper, for example, although instead of iron other metal can also be used. It is particularly advantageous to apply this intermediate layer of iron by spraying, although other metallizing processes, e. g. thermal vaporizing, electrolytic metal coatings and so forth, or oxidized metals, for instance anodized aluminium, may also be employed for the purpose.

The spraying gives a more or less uneven surface on the coating metal to which the elastic layer c adheres particularly well. In some cases, the vulcanite layer is turned after the vulcanization. The current-conducting slip-rings *d*, which are electrically connected to the distributor electrodes *d'*, are coated or covered in accordance with the invention, and corresponding to the circumstances of the case on all sides or not on all sides, with a highly elastic rubber layer *e* which sometimes itself may consist of several layers of different elasticity, and the thickness of which layer may amount, for example, to 3 mm. Instead of the highly elastic intermediate layer, one of a normal heat-stable material of medium elasticity may also be employed in some cases within the scope of the invention. The sleeve covered or coated with the vulcanite layer of high mechanical strength is then assembled with the prepared metal part in a suitable mould, and a highly heat-stable vulcanite layer which is built up on artificial rubber, moulded round them under pressure. Finally, the finishing vulcanizing is done.

The multi-layer insulation according to the invention is not limited only to current-carrying parts, but may also be employed in other cases, for example, as a heat insulation.

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