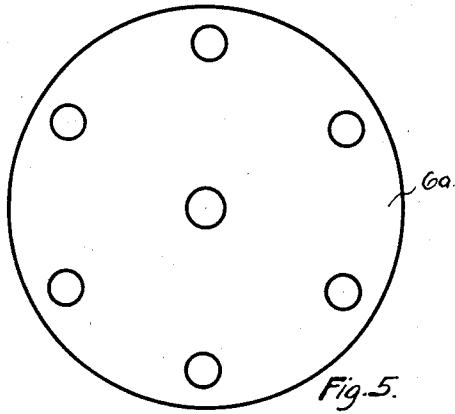
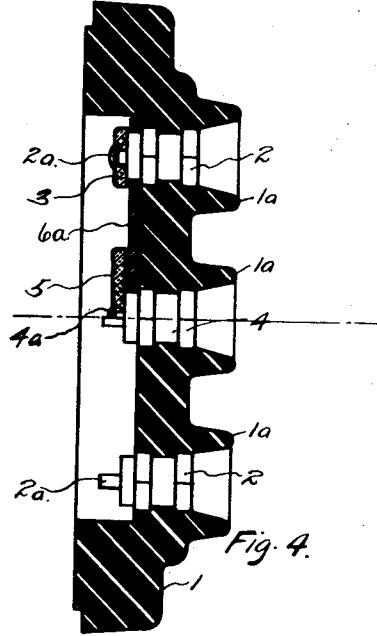
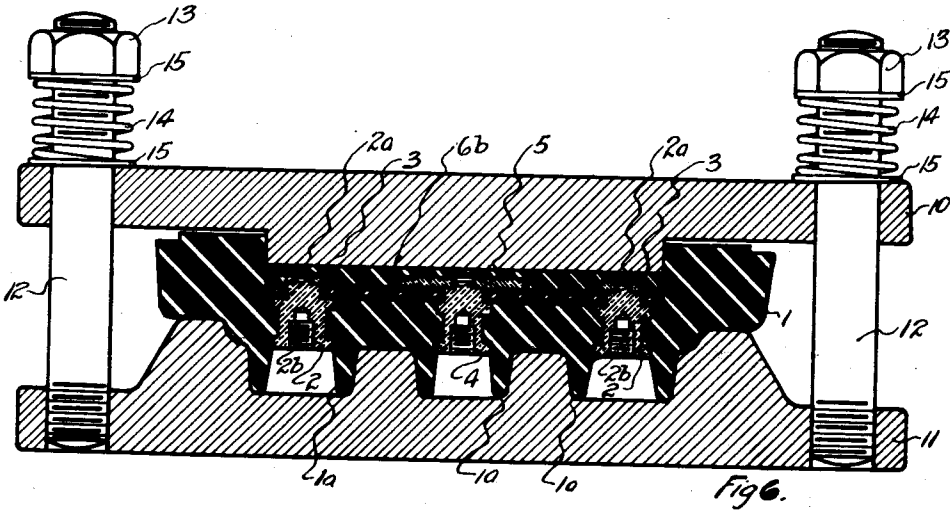


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ARTICLE COMPOSED PARTLY OF RUBBER OR THE LIKE.
APPLICATION FILED MAY 25, 1914.

1,218,596.

Patented Mar. 6, 1917.
2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

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ARTICLE COMPOSED PARTLY OF RUBBER OR THE LIKE.

1,218,596.

Specification of Letters Patent.

Patented Mar. 6, 1917.

Application filed May 25, 1914. Serial No. 840,970.

To all whom it may concern:

Be it known that I, OLIVER F. CONKLIN, a citizen of the United States, residing at Anderson, in the county of Madison and State of Indiana, have invented a certain new and useful Improvement in Articles Composed Partly of Rubber or the like, of which the following is a specification.

This invention has been developed with particular reference to articles forming parts of electrical apparatus, said articles having metal parts held in place by insulating material, of which certain portions are of rubber, and other portions are of other solid insulating material. In electrical apparatus, circuit controlling arrangements are often employed wherein a conductor, such as a brush, slides over a surface, portions of which are of insulating material, and other portions of which are of conducting material. It is frequently desirable to employ a single part including one or more conductors, and also the insulating material associated therewith. Such a part will be referred to herein frequently as a contact member, and the part which slides over the surface thereof, as the brush. It is, of course understood that said sliding action is produced by the relative motion of the brush and the contact member, and it is immaterial to the purpose of the invention whether the brush or the contact member moves, or whether they both move.

A contact member, to be satisfactory, should be composed of insulating material of suitable dielectric strength and this insulating material should also be of such mechanical strength and rigidity as to withstand breakage or distortion under the conditions under which it is employed. It is further essential that those portions of the insulating material over which the brush slides shall be of such physical and chemical properties that the movement of the brush over the surface will not destroy or impair the insulating properties of this surface or produce other undesirable results. The mechanical action of the brush sliding over the surface may be complicated by the presence of electrical phenomena, such as sparks or arcs.

In constructing a distributor for ignition apparatus for internal combustion engines, I desired to construct a contact member which had such dielectric strength as to

enable it to be used in the secondary circuit of an induction coil, and which also even when subjected to the heat present in the neighborhood of an internal combustion engine, still had sufficient mechanical rigidity to prevent warping or breaking. A contact member having a body molded of the material commercially known as bakelite proved satisfactory, both as regards its ability to resist break-down, due to the electric pressure present, and in its mechanical strength and rigidity, even when subjected to the heat in the neighborhood of an engine. However, I employed a brush sliding over the surface of the contact member and engaging alternately the insulating material and the conducting material of which said contact member is composed. It was found that the sliding of the brush over the surface of the contact member in this manner injured the insulating properties of the surface of the contact member over which it slid, when this surface was composed of bakelite. The probable cause of such injury to the insulating properties is that the physical nature of the surface of the bakelite is such that it causes small particles of conducting material to become detached from the brush and embedded in the bakelite. This is, of course, very objectionable, particularly when the voltages used in the ignition circuits of jump spark ignition systems are present, for it permits said voltages to produce currents in other than the intended paths. Hard rubber, it was found, did not show objectionable results due to the sliding of the brush over it, and was therefore satisfactory in this respect. Hard rubber, however, is liable to warp and become distorted when subjected to the heat in the neighborhood of the engine, and for this reason a contact member, the insulating material of which was wholly hard rubber, was not satisfactory. This led me to use a contact member having the greater part of it composed of bakelite, but with those surfaces over which the brush passes composed of hard rubber, so that I obtained a contact member having the mechanical strength and rigidity of bakelite, but with the advantage of having the insulating surface over which the brush slides composed of hard rubber. By making the hard rubber sufficiently thin and mechanically securing it to the other

parts of the contact member, the tendency of the hard rubber to distort was obviated. The construction of such a distributor contact member and the process of making same is described herein in detail as an example of my invention, but said invention may be applied to other uses, and I do not limit myself to the particular application of the invention which I have herein described.

10 Referring to the drawings:

Figures 1, 2 and 3 show the finished product, Fig. 1 being a section along the line 1—1 of Fig. 2, Fig. 2 being a view of the top of Fig. 1 and Fig. 3 being a view from the bottom of Fig. 1.

15 Fig. 4 is a section showing certain steps in the process of manufacture, the parts on the two sides of the horizontal center line being in different stages of manufacture.

20 Fig. 5 shows the disk of unvulcanized sheet rubber used in forming the rubber surface.

Fig. 6 shows the article in the mold, being in section.

25 Referring to Figs. 1, 2 and 3, 1 is the body of the article, and is composed of bakelite or the like. Bakelite, as is well known, is a material from which hard articles can be molded, and is extensively used in the manufacture of electrical apparatus as an insulator. In this bakelite body are contact anchors 2, 2, etc., these being shown as having certain portions of hexagonal cross section in order to prevent their turning in the bakelite. These anchors possess projections 2^a. Riveted to these projections 2^a are the heads 3. The contact anchors also possess tappet holes 2^b for the reception of screws whereby electrical connections may be made. To provide a means for holding the wires which are screwed to said contact anchors, when said contact member is in use, in their proper positions, relative to the body 1, C shaped projections 1^a are shown as forming a part of the body 1. In addition to the above described contacts, including the anchors and head, which I term peripheral contacts, there is a central contact composed of the contact anchor 4 and contact head 5, of the same general construction as the corresponding parts 2 and 3 of the peripheral contact, with the exception of the shape of the head. There is a layer of hard rubber 6 which is introduced particularly for the purpose of providing a rubber surface between the adjacent peripheral contact heads 3. For convenience in manufacture, however, this rubber extends inwardly to the periphery of the projection of the central contact anchor 3. In the use which is made of this contact piece, one brush held by a rotating brush holder rests against the central contact, and another brush revolves so as to pass alternately over a peripheral contact and the hard rubber surface between two peripheral

contacts, the presence of the hard rubber giving the advantages heretofore explained.

The process of manufacture is as follows: The body 1 together with the contact anchors 2, 2, etc., and 4 may be of bakelite or the like, by which I include not only bakelite or other substances similar thereto chemically, but include such substances as will give satisfactory results when subjected to the hereinafter described treatment. The contact anchors are preferably molded in the body, but may be secured therein otherwise. The particular manner of making the body and the contact anchors is not an essential feature of the invention, and will not be described here. The projections 2^a and 4^a of the anchors are preferably of such a material that they may be riveted as hereinafter mentioned, although the heads may be secured otherwise if preferred, for example by screws. The body when ready for the treatment described below, is in a solid and non-plastic state, and remains substantially unchanged throughout the succeeding treatment.

The lower portion of Fig. 4 shows the condition of the contact anchors and the body before the processes described below, forming the particular part of this invention have been applied thereto. A layer of unvulcanized rubber, in the form of a perforated disk 6^a, is placed in the recess in the body in the position shown, the portions of the anchors projecting above the surface of the body serving as a guide in positioning said rubber disk. The contact heads 3, 3, etc., and 5 are then placed on their respective anchors and the projecting portions 2^a and 4^a of the respective contact anchors are riveted over. The upper portion of Fig. 4 represents the article after this stage of the process has been completed. Additional rubber gum is placed on top of the rubber disk 6^a in the space between the contact heads and, if necessary, under the contact heads, and may also be placed over the contact heads. The general position of the rubber is then substantially that shown in Fig. 6. This additional rubber 6^b is not definitely shaped previous to its being placed in position, but is kneaded into position with the fingers or with a suitable hand tool, the operation being similar to that of forcing moderately hard putty into a similar position. To permit this rubber to be more readily kneaded, it may be heated before putting in place. Powdered soapstone is then dusted on the surface of the rubber, so that the rubber will not stick to the mold thereafter used. The article is then placed in a mold as shown in Fig. 6. Said mold consists of upper and lower members, 10 and 11, respectively. Bolts 12—12 provided with nuts 13, 13 and springs 14, 14 and washers 15, 15, provide a means whereby the parts in the mold

may be forced together under the action of spring pressure. This mold together with the article therein contained is then placed in a suitable oven where it is subjected to the action of dry hot air. I find that I obtain better results by the use of air under a pressure of between 80 to 100 lbs. per sq. inch, than at atmospheric pressure. The air is heated by means of a steam jacket surrounding the oven, steam at a pressure of 125 to 140 lbs. per sq. inch, being maintained in said steam jacket. Inasmuch as steam is injurious to the bakelite it is essential that it be kept away from the mold, instead of allowing it to come in contact with the article as is commonly done when making hard rubber articles in a vulcanizer. This hot air treatment is allowed to continue about two hours, at the end of which time the rubber has become thoroughly vulcanized or hardened, but the bakelite is substantially unchanged by this treatment. The springs force the two parts of the mold together. The bakelite, being already hard, is not affected by this pressure, but the rubber is forced together so that no cavities remain in it. It is desirable that the movement of the parts 10 and 11 of the mold toward one another be resisted by the rubber, and not by the part 10, abutting part 11 or the contacts or the bakelite. For this reason, rubber may be placed on top of the contacts before putting the unvulcanized article in the mold, instead of permitting the action of the mold to cause it to flow there.

The mold is withdrawn from the oven, and after being allowed to cool as a matter of convenience of handling, the mold is taken apart and the article removed therefrom. The inner surface of the article is then machined to remove the irregularities in the contacts due to the projection of the rivet heads or other irregularities, after which the article is complete. Examination of the articles made by this process shows that there is some adhesion between the rubber and the bakelite, but even if this be absent, the contacts hold the rubber in place.

I claim as my invention:

1. An ignition current distributor comprising a member having an insulating body portion of phenolic condensation product in combination with an insulating contact surface adapted to constitute a track for the travel of a distributor brush, said contact surface being constructed with suitable chemical and physical properties to permanently maintain its insulating characteristics under the continuous action of the brush.
2. An article of manufacture, comprising

a member having a body composed of phenolic condensation product, and a contact surface composed of rubber and of conducting material.

3. An article of manufacture comprising a contact member, having a body composed of bakelite and a contact surface composed of hard rubber and of conducting material.

4. An ignition current distributor comprising a body portion of phenolic condensation product, a contact surface of rubber and a plurality of metallic contact members embedded in the contact surface and in the phenolic body portion and rigidly securing said portions together.

5. An article of manufacture comprising a body composed of phenolic condensation product and a contact surface composed of rubber.

6. The method of forming an insulating distributor for electrical current distributing purposes which consists in placing a piece of plastic rubber against a solid body of phenolic condensation product pre-shaped as the body of the distributor, then while pressing the rubber against the distributor body, subjecting both to sufficient heat to vulcanize the rubber and contemporaneously to mold it into the distributor body.

7. The method of forming an insulating distributor for electrical current distributing purposes which consists in placing a piece of plastic rubber against a solid body of phenolic condensation product, pre-shaped as the body of the distributor and with contact pieces anchored therein at the desired points, then while pressing the rubber against the distributor body, subjecting the same to sufficient heat to vulcanize the rubber and contemporaneously mold it into the distributor body to form a contact surface, and finally finishing the contact surface to make a uniform travel surface over the rubber and the contact pieces for a distributor brush.

8. As an article of manufacture, a distributor for electric currents comprising a body portion of phenolic condensation product and a contact surface of rubber adapted to cooperate with a distributor brush, said body and contact surface being homogeneously welded together.

Signed at Anderson, county of Madison, and State of Indiana, this 23rd day of May, 1914.

OLIVER FRANCIS CONKLIN.

Witnesses:

JNO. S. MILTON,
JOHN A. VANNEMAN.