

No. 803,816.

PATENTED NOV. 7, 1905.

W. L. R. EMMET.
INSULATING MATERIAL.
APPLICATION FILED NOV. 24, 1900.

Fig. 1.

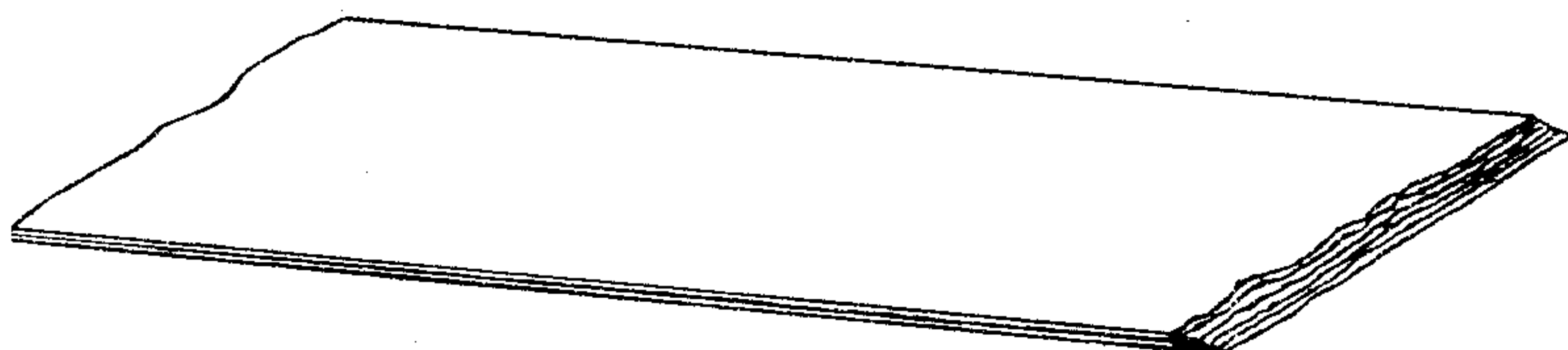
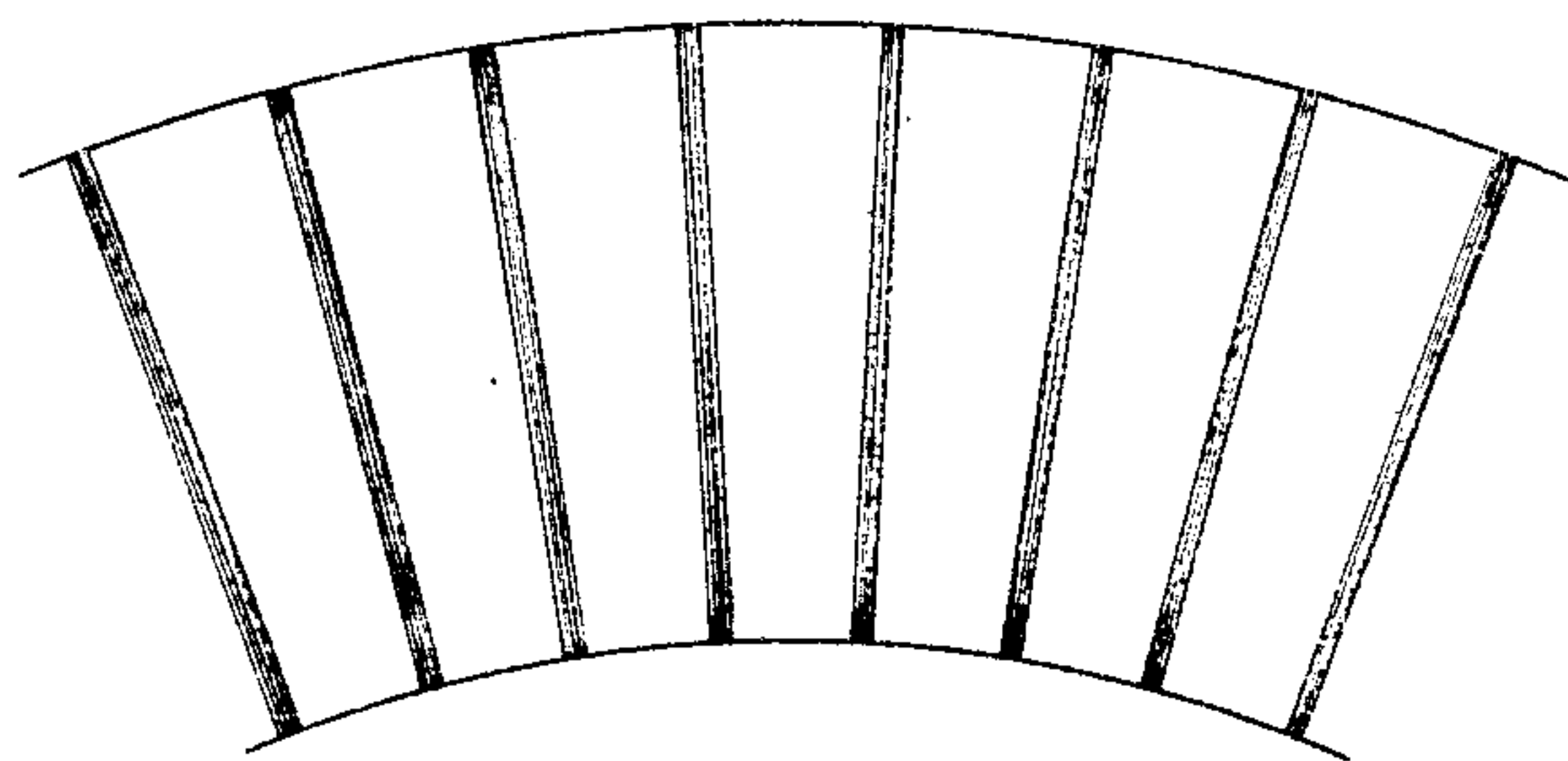


Fig. 2.



Fig. 3.



Witnesses.

Inventor.

John Ellis Glenn.
Benjamin B. Hill.

William Le R. Emmet
by *Albert G. Davis*
Atty.

UNITED STATES PATENT OFFICE.

WILLIAM L. R. EMMET, OF SCHENECTADY, NEW YORK, ASSIGNOR TO
GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

INSULATING MATERIAL.

No. 803,816.

Specification of Letters Patent.

Patented Nov. 7, 1905.

Application filed November 24, 1900. Serial No. 37,584.

To all whom it may concern:

Be it known that I, WILLIAM LE R. EMMET, a citizen of the United States, residing at Schenectady, county of Schenectady, State of New York, have invented certain new and useful Improvements in Insulating Material, of which the following is a specification.

My invention relates to materials having high dielectric qualities, so that they can be used for insulating portions of electrical apparatus having different potentials. The invention is especially designed for insulating the segments of the commutators of dynamo-electric machines. One of the best-known materials for this purpose is mica, which has very high insulating and heat-resisting properties, so that it is especially valuable in building up commutators; but mica comes in comparatively thin sheets, and when a thick sheet is required it must be built up from several thin ones. This building process cannot be carried to any great extent, since the mica varies in thickness and the piling up of a number of sheets produces an unevenness in gage which is very objectionable. Moreover, the mica does not wear down as fast as the copper segments of the commutator, so that in time the surface of the commutator becomes rough by reason of the projecting edges of the mica strips, causing the brushes to jump and spark.

The object of my invention is to provide a substitute for mica which shall have high dielectric and refractory qualities, can be made of any desired thickness and of uniform gage, is hard and incompressible, will not shrink, and will wear away as rapidly as the commutator, so as to preserve a smooth surface.

Certain vegetable oils, and especially linseed-oil, become oxidized when exposed to the air, forming a tough elastic substance resembling caoutchouc and capable of resisting a high degree of heat.

My invention consists in an insulating material composed of one or more sheets of a refractory absorbent substance, such as asbestos paper, treated with an oxidizable vegetable oil or a compound containing it, dried or otherwise treated to oxidize said oil and then baked. When more than one sheet of paper is used, they are separately treated and then united by pressure before baking.

In the drawings, Figure 1 shows a piece of

my insulating material. Fig. 2 is a cross-section on an exaggerated scale. Fig. 3 shows a portion of a commutator.

The asbestos paper A is the ordinary commercial article. Thin sheets of this are dried and then dipped in a varnish composed wholly or in part of boiled linseed-oil. I prefer a compound of oil and gum-copal, preferably made by pouring six parts of the copal into eleven parts of the boiling oil and when cool adding turpentine, benzin, or other flux to thin it to the proper consistency. This compound dries quicker and bakes harder than the boiled oil alone. The separate sheets of paper are first heated to dry them and then dipped hot in this varnish, being preferably dipped twice, and air-dried after each dipping to oxidize the varnish. They are then piled up and subjected to pressure in a heated press until the varnish softens and the sheets stick together. A pad may be placed under the plunger of the press to distribute the pressure evenly. The product is then removed from the press and is baked for about twenty-four hours, more or less, at a temperature higher than that to which it will be subjected in practice. If it should happen to be underbaked, the heat to which it is exposed in a rapidly-running commutator will act to harden and improve the varnish. The composite plate built up in this way is composed of alternate thin layers of oxidized and hard-baked glaze or varnish B and asbestos A. The asbestos is an excellent heat-resisting and insulating substance, and the varnish distils down under the heat of the press and the baking-oven to a condition in which it, too, is a good heat-resisting and insulating material. Moreover, if there are any metallic impurities in the asbestos paper, such as particles of iron, they will be prevented from forming a short circuit through the mass by the intervening layers of refractory oxidized varnish.

The composite sheet is smooth and of even thickness, so that when a commutator is assembled all the bars can be brought accurately to a given circumferential size and the clamping devices will bear evenly on all of them.

Another advantage of my invention is that while the material is hard and practically non-compressible, so that when used in a

commutator it preserves its even thickness and makes the commutator a solid rigid structure, yet it is comparatively brittle, so that it crumbles away under the brushes as fast as the surface of the commutator is reduced by wearing and burning off. This preserves a smooth surface on the commutator and avoids the roughness which invariably results when mica insulation alone is used, mica being so much harder than the copper segments, and therefore resisting the causes which tend to reduce the size of the commutator.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. An electric insulating material composed of multiple layers of an absorbent refractory insulating material united by films of vegetable oil, each of said films being baked hard on one of said layers.

2. An electric insulating material composed of a plurality of sheets of asbestos and layers of oxidized linseed-oil baked hard on the several sheets and serving to unite them.

3. An electric insulating material, com-

posed of asbestos coated with a hardened compound of linseed-oil and gum-copal.

4. An electric insulating material, composed of sheets of asbestos united by intervening layers of hard oxidized vegetable varnish.

5. An electric insulating material, composed of sheets of fibrous refractory material united by an oxidized compound of linseed-oil and gum-copal.

6. The method of making an insulating material, which consists in dipping sheets of asbestos paper into a compound of boiled linseed-oil, gum-copal and a suitable flux, air-drying said sheets, piling them together, subjecting them to heat and pressure to consolidate them, and then baking the composite sheet thus formed.

In witness whereof I have hereunto set my hand this 22d day of November, 1900.

WILLIAM L. R. EMMET.

Witnesses:

BENJAMIN B. HULL,
GEO. P. WHITTLESEY.