

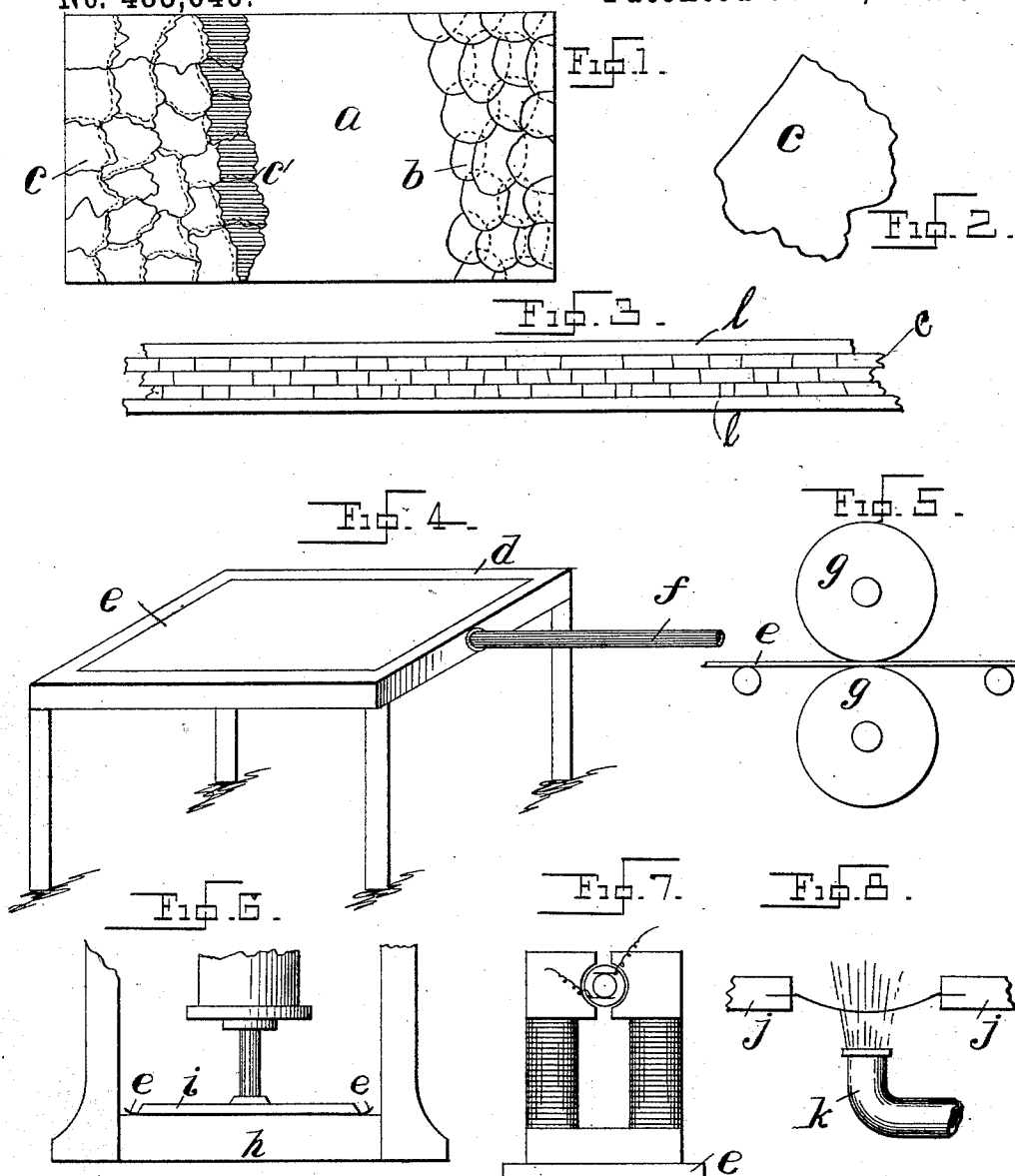
(No Model.)

A. H. S. DYER.

PROCESS OF MAKING ARTIFICIAL MICA SHEETS FOR ELECTRICAL INSULATION.

No. 483,646.

Patented Oct. 4, 1892.



Witnesses

W. A. Courtland

Nellie L. Pope

Inventor

Arthur H. S. Dyer.  
BY HIS ATTORNEY

Edward P. Thompson

# UNITED STATES PATENT OFFICE.

ARTHUR H. S. DYER, OF SCHENECTADY, ASSIGNOR TO EUGENE MUNSELL & CO., OF NEW YORK, N. Y.

PROCESS OF MAKING ARTIFICIAL MICA SHEETS FOR ELECTRICAL INSULATION.

SPECIFICATION forming part of Letters Patent No. 483,646, dated October 4, 1892.

Application filed June 1, 1892. Serial No. 435,216. (No specimens.)

## *To all whom it may concern:*

Be it known that I, ARTHUR H. S. DYER, a subject of the Queen of Great Britain, and a resident of Schenectady, in the county of Schenectady and State of New York, have invented certain new and useful Improvements in the Process of Making Artificial Mica Sheets for Electrical Insulation, of which the following is a specification.

Heretofore it has been proposed and common to construct insulating-plates of pulverized mica mixed with a hardening-cement, the same being further sometimes modified by being reinforced by coarse fabrics or mechanically or chemically combined with other substances, such as pulverized talc, silica, and similar pulverized electrical insulating substances. Plates formed in this manner are much more imperfect as to durability and efficiency and more costly and difficult of manipulation than the sheets formed by my process.

In order to understand the object of my invention, it may be stated that in the construction of electrical apparatus—such, for example, as armatures and field-magnets of dynamos and commutators—it is at present customary to place natural plates of mica for the purpose of insulating the elements of the apparatus between which the said plates are placed.

The natural plate of mica is very costly, especially when large. It is easily broken when handled or bent, cracks at the edges when cut or trimmed, and is accompanied by many other difficulties well known to electrical manufacturers. These difficulties are removed by the process of my invention. When natural plates are employed, spaces exist between the laminae and are apt to contain conducting liquids, such as moisture. This is another important defect overcome by my invention. It is difficult to find natural mica plates of uniform thickness, rendering it unfit for use in separating commutator-sections.

A very important outcome of my invention is that I can form artificial plates superior to the natural by means of small scales formed from very small or "waste" mica.

Briefly described, my invention involves

the combination of laminated elementary scales of mica of any given sizes and shapes, fastened together irregularly by an insulating-cement under pressure, and elementary scales of larger size similarly fastened to the sheet upon one or both sides or in the middle as a core.

In order that the exact details of the invention may be understood, the accompanying drawings are described.

Figure 1 is a plan of a portion of a sheet in the process of making, two varieties of mica being represented. Fig. 2 shows a single scale, representing a typical element from waste mica. Fig. 3 is a greatly-enlarged cross-section of a completed sheet, the magnification relating to the direction of the thickness. Fig. 4 represents a perspective view in diagram of apparatus applicable in a step in the process for the manufacture of the product herein claimed—namely, drying the mica sheet. Fig. 5 is a diagram of means suitable for rolling the sheet in a step of the manufacture. Fig. 6 shows the means for pressing the sheet. Fig. 7 shows an application of an artificial plate which serves as an insulating-foundation for a dynamo. Fig. 8 shows clamps for holding the mica sheet to be bent.

*a* is a plate of soapstoned sheet-iron forming a table upon which the artificial sheet is composed. It is necessary that the product or sheet formed finally by my process should be easily removed from the iron table. This is the reason why the table is rubbed with soapstone, which allows the mica sheet or plate when formed to be split or scaled off from the iron table. The scales *b*, circular, oval, or elliptical, as obtained from the trimmed waste from India, or the irregular scales *c*, or both, indiscriminately are placed upon the iron, which has a coating of fresh varnish, in such a manner that the edges of the various scales overlap each other. When a sufficient area of the iron is covered, a second layer or lamina is formed in the same manner, the first layer having first been coated with varnish, shellac, or similar insulating coating. Upon the second layer a third lamina is formed, as before, and the number of laminae is increased until a sufficient thickness for the purpose

intended is obtained. While the sheet is still wet with the adhesive liquid, it is dried by heat, as by laying it on a steam-table *d*. The sheet is lettered *e*. The steam enters the pipe 5 *f* and passes below the upper surface of the table *d*. By this step the alcohol of the dissolved shellac or the oil and turpentine of the varnish are partially evaporated. I next 10 roll the sheet *e* between rollers *g* to expel the varnish from between the plates, except as to what will naturally be left in consequence of adhesion. Subsequently and before the sheet is hardened I subject it to a very heavy pressure. It is placed on a plate *h*, and the plate 15 *i*, for example, of a hydraulic press is brought down on the sheet *e*, whereby it is compressed into a compact laminated sheet nearly in a hardened state. By placing it upon a cold plate it is chilled and hardened, and finally 20 sawed into the desired shapes and sizes. It is of such a nature that it can be milled or planed, whereby it is reduced to uniform thickness.

Another part of my invention consists in applying to one or both sides large scales of 25 mica and fastening them by cement, and, if desired, redrying, rerolling, and re-pressing.

It is true that the invention may be still further modified. For example, the sheet, either with or without the applied extra-large 30 scales, may be formed into curved sheets having a permanent set by allowing it to become chilled while held between clamps *j* or in molds. The chilling may be accomplished, for example, by a blast of cold air from a nozzle *k*. 35

Although I have mentioned India mica, it is evident that my invention is applicable, also, to other varieties—as, for example, phlogopite, biotite, lepidomelane, muscovite, or lepidolite. 40 By the term “scale” I mean that which is understood by that term as used in mineralogy, it being the thinnest sheet of mica which can be practically obtained by the continued process of cleavage.

45 It is evident that the invention may be modified. For example, the scales *c* may be built up on top of each other and overlapping each other (see Fig. 3) and finally large

50 sheets *l* of mica applied to opposite sides, as shown in Fig. 3.

I claim as my invention—

1. The method of manufacturing electrical insulating mica sheets, the same consisting in varnishing a large sheet of iron or similar foundation-plate and placing thereon a series 55 of smaller mica scales with their edges overlapping each other, varnishing the layer of scales and applying a second series of smaller sheets with their edges overlapping, continuing in the same manner until a plate of the 60 required thickness is formed, heating the sheet to partially evaporate the solvent of the varnish, rolling the same to remove the excess of the varnish, subjecting the sheet to a heavy pressure, and finally cooling it, as hereinbefore 65 described.

2. The herein-described method of building up electrical insulating mica sheets, consisting in varnishing a foundation-plate, placing mica scales thereon while the varnish is 70 still wet or soft with their edges overlapping, varnishing the mica sheets, thus forming a second and third, &c., layer of mica in a similar manner until the required thickness of mica sheet is obtained, and chilling the sheet 75 while rigidly held in a curved position.

3. The hereinbefore-described method of manufacturing electrical insulating sheet mica, consisting in cementing together with lapped joints scales of mica of various shapes 80 of given size, varnishing the sheet thus formed, laying a second layer of scales in the same manner as before and repeating these steps until the desired thickness is obtained, and finally cementing to the sheet thus formed 85 a larger sheet upon one or both sides of the sheet which is made of the said small pieces.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 18th day of May, 90 1892.

ARTHUR H. S. DYER.

Witnesses:

S. W. JACKSON,  
A. H. JACKSON.