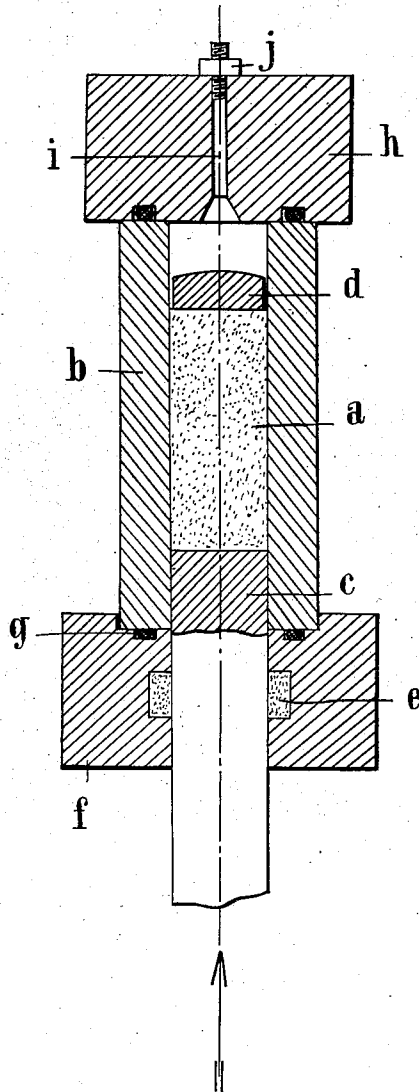


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MANUFACTURE OF REFRACTORY AND INSULATING PRODUCTS.
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MANUFACTURE OF REFRACTORY AND INSULATING PRODUCTS.

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Specification of Letters Patent.

Patented Apr. 12, 1921.

Application filed June 21, 1920. Serial No. 390,581.

To all whom it may concern:

Be it known that we, GEORGES LOUIS DIMITRI, citizen of the Republic of France, resident 7 Rue Victor Considerant, Paris, France, and JULES EDOUARD DELAUNAY, citizen of the Republic of France, resident 9 Rue Clodion, Paris, have invented new and useful Improvements in the Manufacture of Refractory and Insulating Products, which improvement is fully set forth in the following specification.

The manufacture of certain refractory and insulating products is effected by mixing these products in a powdered state, subjecting them to compression and firing them in a muffle at a suitable temperature. This process has been employed in order to obtain refractory products based on ceramic materials such as natural silicate of magnesium and one or more multiple or natural or artificial silicates.

The present invention has for its object an important improvement in the manufacture of refractory products by compression of the said products in a powdered state and subsequent firing, which consists in effecting the molding or compression according to circumstances, in a vacuum which is produced in as complete a manner as possible before compression or at the moment when compression is effected, the mixture to be molded or compressed having previously been prepared in a damp or powdered state. A homogeneity is thus obtained which has never been secured hitherto in the manufacture of refractory products and consequently a hardness of the finished products, which is extremely interesting, in view of the uses to which these products are capable of being put.

It is obvious that the vacuum may be created by any means employed in industrial practice. By way of example the accompanying drawing represents an arrangement which is capable of carrying out industrially the improved process forming the subject matter of the present invention.

The powdered ceramic materials, mixed in suitable proportions, are placed at *a* in the compression chamber of a suitable press *b*, between the piston *c* and a washer *d*. The piston *c* passes through a stuffing box *e* inserted in the support *f*. This stuffing box *e*

with the joints *g* insure the hermeticity of the compression chamber at its lower part. At the upper part the washer *d* is slightly smaller in external diameter than the internal diameter of the compression chamber.

At the upper part its press carries a head *h* pierced by a passage *i*, which is connected at *j* to the pipe communicating with the machine for producing the vacuum.

It will be seen that by means of this arrangement all the air contained in the mass *a* can be extracted without particles of the materials in a powdered state being carried away by the current of air.

Some mechanical means of any kind will connect the member controlling the opening of the vacuum machine or the vacuum receptacle with the member controlling the piston or plunger *c*, in such a way that the vacuum may be created before the rise of the piston or at the moment when this piston rises, but in any case before the agglomeration of the powdered materials *a*.

The vacuum will be maintained during the whole of the pressing operation. As soon as the piston commences its downward stroke, the vacuum machine or receptacle will be shut off from the press, the removal to the product from the mold will be carried out by the usual methods and a fresh charging of the press will take place.

In the construction illustrated the vacuum is created through the upper part of the press, but it must be quite understood that this is an arrangement which is capable of being modified. Thus the vacuum may be created for example through the piston itself, and in a general way at any suitable point of the apparatus. The process applies also to products which do not have to undergo the operation of firing, and to products of reconstituted materials. After desiccation the blocks are cut or fashioned into the form of the articles to be manufactured. These are then fired in a muffle at a temperature of about 1450° C. more or less according to the proportion of flux used.

The articles thus fashioned present an extremely fine grain. They are very compact, very strong and resist breakage and violent blows. They will stand, without breaking, violent variations of temperature which may reach 1000°. Dry or immersed

in water or an oil bath they offer a perfect resistance to the passage of an electric current. They are practically unalterable.

What we claim and desire to secure by Letters Patent of the United States is:—

1. A process of manufacturing refractory and insulating products, comprising mixing together ceramic materials in a powdered state, and molding the powdered mixture under pressure in a vacuum into the form of articles of definite shape; substantially as described.

2. A process of manufacturing refractory and insulating products, comprising mixing together ceramic materials in a powdered state, molding the mixture under pressure in a vacuum into the form of solid blocks, and thereafter shaping said blocks to form the finished articles; substantially as described.

3. A process of manufacturing refractory and insulating products, comprising mixing together ceramic materials in a powdered state, molding the mixture under pressure

in a vacuum into the form of solid blocks, thereafter shaping said blocks to form the finished articles, and then firing the finished articles; substantially as described.

4. Refractory and insulating products comprising a mixture of ceramic materials in a powdered state molded under pressure in a vacuum into the form of articles of definite shape; substantially as described.

5. As a new product of manufacture, an article composed of a mixture of ceramic materials in a powdered state molded under pressure in a vacuum and thereafter shaped.

6. A new product of manufacture according to claim 5, in which the article is fired after having been shaped.

In testimony whereof we have signed this specification in the presence of the subscribing witness.

GEORGES LOUIS DIMITRI.
JULES EDOUARD DELAUNAY.

Witness:

ALPHONSE NICOLÉ.