

UNITED STATES PATENT OFFICE.

VALENTIN CONTI AND ARMAND LEVY, OF PARIS, FRANCE.

FUEL-BRIQUET AND METHOD OF MAKING SAME.

SPECIFICATION forming part of Letters Patent No. 790,109, dated May 16, 1905.

Application filed July 6, 1904. Serial No. 215,481.

To all whom it may concern:

Be it known that we, VALENTIN CONTI, a subject of the King of Italy, and ARMAND LEVY, a citizen of the French Republic, both residing in Paris, France, have jointly invented certain new and useful Improvements in Fuel-Briquets and Methods of Making Same, of which the following is a specification.

This invention relates to fuel-briquets composed of comminuted carbonaceous material mixed with a binder or agglomerating substance and pressed into blocks; and the object of the invention is to produce a briquet which will not be sensibly affected by water or by changes of temperature, which will burn evenly with a clear flame and without smoke, which will maintain its form and integrity while burning, and which shall be reasonably cheap.

The invention resides in part in the binder, in part in other ingredients mixed with the other elements of the briquet for the purposes to be hereinafter explained, and in part in the method of making the briquet.

The binder consists of a metallic oxid and a metallic chlorid which by their combination in the briquet form an oxychlorid after having bound together the solid carbonaceous particles which make up the main portion of the briquet. With this binder is combined sodium and potassium bichromates, potassium nitrate, and ammonium carbonate. The bichromates and the potassium nitrate, which are called "comburants" or "burners," are employed for breaking up or decomposing the oxychlorid under the influence of heat and for facilitating and rendering more homogenous the combustion of the briquet. The ammonium carbonate is employed to neutralize the hydrochloric acid set free by the decomposition of the oxychlorid when the briquet is burned. For commercial reasons preference is given to the employment of magnesium oxid (calcined magnesia) and magnesium chlorid for forming the oxychlorid used in the binder.

A composition which will produce excellent results as a binder and combustible for admixture with coal-dust may be as given below.

which is to form the briquets calcined magnesia, twenty kilograms; magnesium chlorid, as anhydrous salt, eight kilograms; potassium bichromate, .1 kilogram; sodium bichromate, .2 kilogram; potassium nitrate, .2 kilogram; ammonium carbonate, .1 kilogram; total, 28.6 kilograms.

In the manufacture of the briquets, which is conducted entirely without heat, the following procedure may be followed with good results. Where coal-dust is used as the basis of the fuel-briquets, this material is moistened with about one per cent. of water and solutions of the sodium and potassium bichromates, the potassium nitrate, and the ammonium carbonate are added. The whole is then thoroughly mixed. The calcined magnesia is then thoroughly incorporated with the mass and the solution of magnesium chlorid then added by sprinkling. The order of the procedure given above is quite important, as it is desirable that the particles of coal shall be able to absorb the solutions of salts first incorporated before the calcined magnesia is added, and the solution of magnesium chlorid is added last. This prevents certain alterations of the salts at the time of mixture and prepares the particles of coal the better for the contest to be sustained against the oxychlorid during combustion. When all the ingredients are carefully and thoroughly mixed together, the mass is formed into briquets by pressure in molds or otherwise, as desired. After removal from the molds the briquets may be allowed to dry in the open air or in chambers through which hot or cold air is passed. Ordinarily the briquets will be in condition for transportation in about twenty-four hours from the molding.

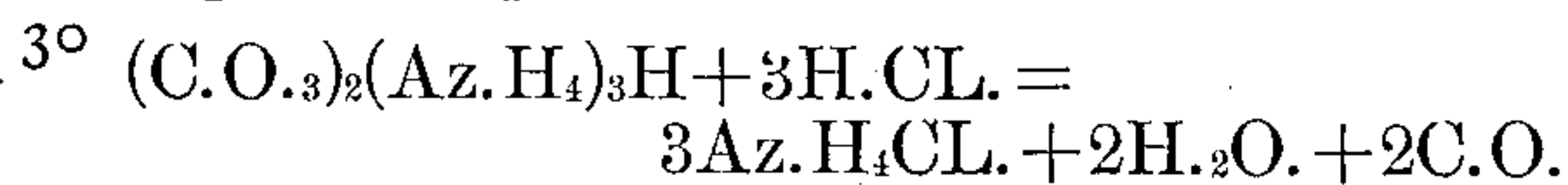
The calcined magnesia employed is preferably that produced by heating the carbonate up to 400° centigrade and maintaining the temperature for a considerable time to insure the proper causticity, and the magnesium chlorid of commerce may be employed pure or be mixed with salts from the evaporation of seawater or residues from the manufacture of chemical products.

The oxychlorid in the binder has the following formula: $Mg, Cl_2(Mg.O)_5, 17H_2O$, with

magnesia calcined at 400° centigrade and the chlorid in solution concentrated to 32° Baumé.

To overcome the resistance of the oxychlorid to the fire and to break it up or decompose it, 5 the bichromates of potassium and sodium are employed. With the potassium nitrate they furnish the oxygen for replacing that which is absorbed by the breaking up of the oxychlorid, and with the ammonium carbonate 10 they neutralize the hydrochloric acid which is disengaged in the breaking up of the oxychlorid. The oxychlorid with the magnesia and hydrochloric acid (liberated by its decomposition) interfere, on the one hand, with the 15 combustion and are the cause, on the other hand, of the disengagement of a gas which corrodes the metal of the stove or furnace. It is therefore important to reduce these difficulties as far as possible. If a part of the 20 magnesium chlorid remains free, its deliquescence causes it to take up moisture which injures the binder. Hence a greater quantity of the magnesia than is actually necessary to the binder is employed in order to avoid any 25 possibility of free chlorid existing in the mass.

The reaction between the free hydrochloric acid and ammonium carbonate and the formation of ammonium chlorohydrate may be expressed by the formula



Hydrochloric acid, which is very avid of water-vapor, loses by its transformation into 35 a chlorohydrate this characteristic, and thus the gas passes off without retardation. While the oxychlorid will be by preference produced by the combination of the oxid and chlorid of the same metal—magnesium—the 40 magnesium oxid may be substituted by the

oxid of another metal—as zinc, for example—thus producing an oxychlorid of zinc and magnesium.

Having thus described our invention, we claim— 45

1. A fuel-briquet, containing a comminuted fuel, a metallic oxychlorid serving as a binder, and salts to effect the decomposition of the oxychlorid in the burning and to enhance combustion. 50

2. A fuel-briquet, containing comminuted fuel, magnesium oxychlorid serving as a binder, and salts to effect the decomposition of the oxychlorid and to enhance combustion.

3. A fuel-briquet, containing comminuted 55 fuel, magnesium oxychlorid as a binder, ammonium carbonate, sodium bichromate, potassium bichromate and potassium nitrate.

4. The herein-described method of making a fuel-briquet, which consists in first moistening a quantity of comminuted coal, then mixing intimately therewith solutions of sodium and potassium bichromate, potassium nitrate, and ammonium carbonate, in about the proportions specified, then mixing calcined mag- 65 nesia intimately with the mass in about the proportions specified, then sprinkling a solution of magnesium chlorid over and through the mass in about the proportions specified, then forming the mass into briquets, and 70 finally drying the latter.

In witness whereof we have hereunto signed our names in the presence of two subscribing witnesses.

VALENTIN CONTI.
ARMAND LEVY.

Witnesses:

JULES ARMENGAUD, Jeune,
HANSON C. COXE.