

UNITED STATES PATENT OFFICE.

BENJAMIN F. LATTA, OF ST. PAUL, MINNESOTA.

BRIQUET AND BINDER.

1,033,910.

Specification of Letters Patent.

Patented July 30, 1912.

No Drawing.

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To all whom it may concern:

Be it known that I, BENJAMIN F. LATTA, a citizen of the United States, residing at St. Paul, in the county of Ramsey and State of Minnesota, have invented certain new and useful Improvements in Briquets and Binders; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention has for its object to provide an improved briquet and is particularly directed to the provision of an improved binder for making the briquets from culm.

Hitherto, culm or hard coal, soft coal, coke, lignite, and so forth, have been formed into briquets by the use of a binder and a press. The common defects found in these briquets, as hitherto constructed, may be summed up as follows: When discharged from the press, they are not self-sustaining or set and, hence, must be handled with great care until they are thoroughly dried. Even after they are dried, they will crumble when roughly handled and rapidly disintegrate when subjected to water or to the elements of the air. In the handling of such briquets, a large amount of dust disintegrated from the briquets, becomes mixed with the mass and this, of course, very greatly reduces the quality and value of the fuel.

My invention provides a binder which, when incorporated with the culm and pressed, will produce a very hard, resistant and self-sustaining or permanent body that will not disintegrate in water and will stand for a very great length of time the effects of exposure to the elements. Furthermore, the briquets formed in accordance with my invention, set immediately so that they may be discharged from the press in a pile and handled with the ordinary roughness which is necessary in rapid and economical handling of the fuel.

The nature of the binder will be made clear from the following illustration of the manner in which it may be made: Take 1,000 pounds of a suitable hydrocarbon, such as pitch, coal tar, gas tar, or rock asphaltum, and after having melted the same, mix therewith, one and one-fourth pounds of Epsom salts (magnesium sulfate); 1 pound of powdered alum (aluminum potassium

sulfate); two and one-half pounds of plaster of Paris (exsiccated calcium sulfate); and three-fourths of a pound of magnesium carbonate.

The proportions of the ingredients of the binder may, of course, be varied to some extent and the amount of binder used with the different kinds of culm may also be varied. The proportions above given are those which I have found to be highly satisfactory in making briquets from the culm of bituminous or soft coal. These ingredients, when thoroughly commingled, make a highly efficient binder possessing the desirable characteristics above indicated, which render it very valuable for the purposes for which it is intended.

In forming the briquets about five to seven parts of the binder, above described, are mixed with one hundred parts of any kind of culm, anthracite, bituminous or lignite coal in dried and finely divided or powdered condition, each being heated to a temperature of about 400 degrees F. and then thoroughly commingled, and while in this heated and commingled condition, the briquet forming material is subjected to a heavy press in molds suitable to impart the desired briquet form.

In actual practice, I have demonstrated that briquets formed as above described, will produce a fuel briquet of very superior quality and one that becomes almost instantly hard and resistant so that immediately after it is formed, it may be discharged from the press in a pile and handled like ordinary coal; that these briquets will maintain their hardness and resistant qualities under rough handling, when subjected to moisture and to the elements in the air, even for a long time, and, hence, they may be safely and economically transported and handled, and that they will not appreciably shed dust or disintegrate.

The exact chemical action which takes place in the use of the binder is somewhat uncertain, but the following is believed to be a substantially correct statement thereof: The alum unites with the plaster of Paris, and the other sulfates with the magnesia (or magnesia carbonate). The plaster of Paris, as a binder, will hold up after the other ingredients are melted or burned. The sulfates keep down the smoke and the magnesia carbonate, during ignition, becomes the oxid,

and, as such, exerts some catalytic action, thus also serving to assist in keeping down the smoke. Furthermore, the magnesia and plaster of Paris absorb any present moisture in the briquet and keep it more firm and transportable. The salts and alum render the combustion of the coal and added coal tar more complete and reduce the amount of smoke, and render the products of combustion odorless, or nearly so.

What I claim is:

1. A briquet binder consisting of a suitable hydrocarbon such as pitch, coal tar, gas tar or rock asphaltum, to which have been added Epsom salts, powdered alum, plaster of Paris and magnesium carbonate.

2. A briquet made from culm, united by a binder made up of a suitable hydrocarbon such as pitch, coal tar, gas tar, or rock asphaltum, to which have been added Ep-

som salts, powdered alum, plaster of Paris, and magnesium carbonate.

3. A briquet made from culm and united by a binder made from the following ingredients in approximately the proportions named, to-wit: a suitable hydrocarbon, such as pitch, coal tar, gas tar or rock asphaltum, 1000 pounds; to which have been added Epsom salts (magnesium sulfate), $1\frac{1}{4}$ pounds; powdered alum (aluminum potassium sulfate), 1 pound; plaster of Paris (exsiccated calcium sulfate), $2\frac{1}{2}$ pounds; magnesium carbonate $\frac{3}{4}$ of a pound.

In testimony whereof I affix my signature in presence of two witnesses.

BENJAMIN F. LATTA.

Witnesses:

HARRY D. KILGORE,
F. D. MERCHANT.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."