

# UNITED STATES PATENT OFFICE.

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## BINDER FOR COMPRESSING FUEL.

No. 889,518.

Specification of Letters Patent.

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*To all whom it may concern:*

Be it known that I, WILLIAM F. GILES, a citizen of the United States of America, and a resident of Chester, Pennsylvania, have invented certain new and useful Improvements in Binders for Compressing Fuel, of which the following is a specification.

This invention has reference to improvements in binders for compressing fuel and the process of compounding same.

It pertains particularly to binders used in the art of producing blocks, bricks and briquets to be used as fuel.

The principal object of this invention is to produce a binder for compressing fuel out of various kinds of fuel material such as for instance bituminous coal, lignite, peat or anthracite.

The coal to be compressed is the coal dust or coal powder always resulting in coal fields during the mining of the coal. This coal dust, powder and small particles of coal are considered waste and consequently have little commercial value. The coal dust may naturally contain or be commingled with small pieces of coal, the size of grains, or what is termed buckwheat coal, or even pea coal, according to the blocks, bricks or briquets to be made therefrom. The new binder is applicable to coal dust alone as well as to masses of coal dust and small pieces of coal.

The coal blocks, bricks or briquets manufactured with my novel binder, have a hard surface and are free from coal dust usually adhering to such briquets and the like. The briquets do not throw up dust when shoveled or handled and do not even soil the fingers.

My novel binder consists of an organic substance which finally is combustible with an addition of a mineral salt together with a certain quantity of water necessary for producing a semi-liquid, creamy mass of such consistency as to render same adapted to incorporate the coal dust therein whereby the coal dust is brought into a condition which permits of easy and convenient compression.

The novel binder consists of flour of the inferior and cheaper grades, water, and some sulfate of iron or copperas as it is commonly called which is the ferrous sulfate,  $\text{SO}_4\text{Fe} + 7\text{H}_2\text{O}$ . The quantities of the ingredients of which my novel binder is composed may vary within reasonable limits in accordance to the kind of coal dust employed as a

raw material. Anthracite coal dust which contains a relatively small quantity of volatile matter requires a little more of the binder than semi-bituminous or bituminous coal powder which are relatively rich in volatile matter, but in all cases the novel binder produces a smooth hard commercial product which is free from dust. For producing, say for instance, briquets from the general grades of bituminous coal powder I prefer to use a binder composed of 8 lbs. of common flour, 72 lbs. of water, and 1 lb. of ferrous sulfate dissolved in 16 lbs. of water. The variations in this composition to suit special requirements when other than bituminous coal powder is worked up are easily made by the mixer after he has acquired some practice.

In preparing the binder I substantially proceed as follows:—About 8 lbs. of flour are stirred into a small quantity of water of ordinary temperature, just enough water is taken to produce a semi-liquid paste of about the consistency of cream. Meanwhile the balance of the 72 lbs. of water has been heated to the boiling point. The hot water is now added to the paste and the mixture well agitated. About 1 lb. of ferrous sulfate is dissolved separately in about 16 lbs. of water and heated to about  $190^\circ\text{F}$ . The hot solution of the ferrous sulfate is added to the hot mixture of flour and water and the whole composition well agitated and finally heated to the boiling point when the binder is ready for use.

The substances forming the components of my novel binder are very cheap, and the process of compounding same is so simple that the resulting binder is produced at a very low cost.

Having thus described my invention I claim as new and desire to secure by Letters Patent:

1. As a novel binder for compressing fuel a composition consisting of a hot paste prepared from common flour and water, and a hot aqueous solution of sulfate of iron.

2. As a novel binder for compressing fuel a composition consisting of a paste prepared from substantially 8 lbs. of common flour and 72 lbs. of water, and 1 lb. of sulfate of iron dissolved in about 16 lbs. of water.

3. The process of producing a binder composition for compressing fuel consisting in stirring common flour into a small quantity of water of ordinary temperature, then add-

ing a larger quantity of hot water, preparing  
separately a hot solution of sulfate of iron,  
adding same to the mixture of flour and  
water, and raising the temperature of the  
5 whole mixture to the boiling point.

4. The process of producing a binder com-  
position for compressing fuel consisting in  
preparing a paste from substantially 8 lbs. of  
common flour and 72 lbs. of water by stirring  
10 the flour into a small quantity of water of or-  
dinary temperature, adding the balance of  
the water in a boiling condition, preparing

separately a solution of about 1 lb. of ferrous  
sulfate in about 16 lbs. of water while heating  
same to about 190° F., adding the hot solu- 15  
tion of ferrous sulfate to the hot paste, and  
raising the temperature of the whole mixture  
to the boiling point.

Signed at New York, N. Y., this 10th day  
of October, 1907.

WILLIAM F. GILES.

Witnesses:

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