

UNITED STATES PATENT OFFICE.

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FUEL.

958,920.

Specification of Letters Patent.

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No Drawing.

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To all whom it may concern:

Be it known that I, ARNOLD B. HILL, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Fuels, of which the following is a specification.

This invention relates to improvements in fuel and more particularly to an improved binder for uniting finely divided particles of coal.

The object of the invention is to provide an effective binder by means of which anthracite slack or culm, and also bituminous coal and lignite, may be made into briquets which will be water-proof, which will be hard enough to stand rough handling without breaking, and which will not crumble in the fire but on the contrary will hold their shape until burned to fine ashes.

My improved binder consists of maix oil, black rosin and lime water, which ingredients after being mixed and heated, are thoroughly mixed with finely divided coal such as anthracite coal dust or culm, fine coke powder, fine bituminous coal, etc. This mixture is then molded into briquets of suitable size and shaped in a press which must have about 2000 lbs. pressure to the square inch.

The above named ingredients are preferably combined in substantially the following proportions, viz:

Finely divided coal	1 ton (2000 lbs.)
Maix oil	2½ gallons.
Black rosin	12 lbs.
Lime water	2 lbs.

The said maix oil (also spelled mix) is a straight mineral oil which is produced from crude petroleum obtained in the State of Pennsylvania. Maix oil is a local term for this product of crude petroleum which is obtained by distilling from crude petroleum the gasolene, naphtha, kerosene, or the burning oils, and also lubricating oil. It is a waste oil obtained from crude petroleum, being what is left after the light ends have been distilled off; and owing to its peculiar nature I have found that it is admirably adapted for use in making briquets. Owing to its viscosity or sticky qualities, it effectively binds together the finely divided par-

ticles of coal, which result can not be obtained by the use of crude petroleum because the latter is too thin and renders the briquets of too soft a consistency. I use black rosin because it can be obtained much cheaper than the light colored rosin, and because it has greater adhesive qualities. I have also found that the use of lime in the composition has the effect of making the briquets hold together better, and also causing them to harden quicker.

In making the composition the maix oil, black rosin and lime water are mixed and heated to make a liquid solution, the latter being then thoroughly mixed with coal by agitation. As above stated I may use any kind of finely divided coal but preferably employ 60% of fine culm or anthracite coal dust, and 40% of coarser culm or otherwise known as "rice coal." After the mixture has been thoroughly commingled it is placed in a press in the usual manner and molded into briquets. I have found in practice that when the latter leave the press they will be hard enough to stand rough handling and will not break if allowed to fall twenty feet. When these briquets are handled they produce no dirt or dust and will not soil the hands. They last in the fire fully as long as ordinary anthracite coal and they produce no bad odor and very little smoke. After being burned there is no increase in the ash by reason of the binder.

Having thus described my invention, what I claim is:

1. The herein described fuel consisting of finely divided coal, 1 ton; maix oil obtained from crude petroleum by distilling off the light ends, 2½ gallons; black rosin, 12 pounds, and lime, substantially as and for the purposes set forth.

2. The herein described binder for coal dust consisting of maix oil obtained from crude petroleum by distilling off the light ends 2½ gallons, black rosin 12 pounds, and lime water, 2 pounds, substantially as described.

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

ARNOLD B. HILL.

Witnesses:

THOS. W. YOUNG,
SAML. POWELL.