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FIRE KINDLER

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5 Claims. (Cl. 44—41)

This invention relates to fire kindlers; and it comprises a readily ignitable, fiercely burning fire kindler adapted for quick and certain ignition of anthracite, said kindler having a core composed of comminuted coal in admixture with a binder of rosin and an igniter for the core, integrally united thereto, adapted to be lit directly with a match and being formed of a layer of rosin stiffened by an admixed stiffening agent such as starch or flour and in commixture with dry fragmentary woody matter, said kindler being adapted to burn without dripping; all as more fully hereinafter set forth and as claimed.

A fuel bed of anthracite, and to a less extent one of coke, is difficult to ignite. Other fuel must always be used in starting. The reason for this in the case of anthracite is that the grains or lumps are heat conductive and the surface layer must be raised to a full red heat before combustion begins. When this happens the anthracite burns as usual. It is necessary to apply a rather fierce heat locally to start anthracite to burn. Many made-up kindlers for this purpose have been proposed but those which produce the necessary temperature for the necessary time are disadvantageous in one way or another.

It has been proposed to use rosin in fire kindlers for anthracite as well as for other fuel, the rosin usually being used in conjunction with chips or shavings of woody material. The rosin serves to bind the woody material together and to start the wood burning. In use, the kindler is placed in the fuel bed and is lit by means of a match. The burning rosin ignites the woody material, which is relied on to kindle the fuel. Kindlers of this sort have proved useful in starting wood fires, but have not been found satisfactory for starting coal or coke fires. Woody matter, with or without rosin, in contact with lump anthracite of furnace sizes, does not furnish a sufficiently hot flame, for a sufficiently long time to cause the surface temperature of a lump to reach the full red heat which is necessary to initiate combustion. It has been proposed to incorporate coal fragments in this type of kindler to secure a hotter flame, but practice has shown that it is as difficult to kindle incorporated coal as the coal of the fuel bed. With lumps of coal simply coated with rosin, not only is the kindler hard to light but the rosin quickly melts and drips off. Increasing the amount of rosin does not help. Moreover, coal coated with rosin is sticky and inconvenient to handle, even when the rosin is finally dusted with charcoal as is sometimes done.

In the present invention I provide a kindler in the form of a dense, compact unit, having an inner core composed of ground cannel coal or other quick burning coal having a high content of volatile combustibles, bonded with just enough binder to make a dense solid mass. Whatever the kind of coal used, it should be used in sufficient amount to furnish the heat required to bring adjacent lumps of coal or coke, whatever their size or heat conductivity, to a superficial red heat. With this core I use an igniter shell comprising rosin stiffened with enough starch, flour or the like to keep it from being free running when molten and hot. To the stiffened rosin I add fragmentary vegetable matter, such as comminuted corn cobs, cotton seed hulls or the like. This not only aids in keeping the shell in place when the kindler heats up but gives a better type of burning.

In most embodiments of this invention the igniter shell covers the core and is integral therewith. The shell layer may readily be lit with a match, and upon being ignited, it starts a fierce combustion of the whole unit. It is not necessary that the stiffened rosin actually enclose the bonded coal, that is, that it be a shell on a core; but a shell-and-core assemblage I regard as best.

In making the rosin-starch igniter for my kindler, I can use any commercial grade of starch or starchy flour and any commercial grade of rosin. Rosin has no very definite melting point but most of the commercial grades soften before they reach 90° C. and are quite liquid at 115° C. With these grades of rosin, one part of starch will give adequate stiffening of two parts of rosin. In practice I melt the rosin at 115° C. or higher and stir in the starch, keeping the mixture hot long enough to get rid of the water of condition of the starch; which may go as high as 20 per cent. With this mixture I next incorporate ground corn cobs, coarse sawdust, or the like, to make a sort of batter. This also is heated during incorporation, thereby removing the water of condition of the corn cobs. The water of condition of the starch and of the corn cobs is not taken up again when the kindler is exposed to the air; the rosin sealing in the vegetable matter.

With the water of condition removed, both starch and vegetable matter are much more freely combustible and give a hotter combustion; there being an exothermic breaking down in charring

under the influence of heat which materially quickens combustion and adds to the thermal units produced.

The starch is somewhat altered in composition by the heating, being possibly dextrinized, but its fuel value is, as stated, enhanced.

In making the core composition I grind any freely burning bituminous coal, finding best those types known on the market as "cannel coal". The ground coal is mixed with about 25 per cent molten rosin in a power driven mixer forming a fluent mass which is extruded or otherwise shaped, giving lumps or symmetrical shapes, as the case may be. Some starch or flour, say 25 per cent of the total, is an advantageous addition to the binder rosin. With extrusion molding the product is a rod which is broken into suitable lengths. The shell is provided by simultaneous extrusion of an annular layer of the hot plastic composition of rosin with starch and fragmentary vegetable matter made as previously described.

I ordinarily employ for any size of core a facing layer or shell about half inch in thickness. A typical igniting composition will carry two parts by weight of fragmentary vegetable matter and 0.5 parts by weight of cornstarch for each part by weight of rosin.

The finished kindler is ordinarily a compact, solid cylindrical unit with broken end faces. It may be placed in a laid coal or coke fire and ignited by a match. The shell ignites and burns with a hot flame, without disintegrating or dripping, and ignites the rosin-bonded coal of the core. The core burns with a hot flame for a considerable time; long enough to light large anthracite coal and coke fires.

While I have described the present invention as a kindler, it is capable of independent use because of its free burning and hot combustion. It may for example be used as a log substitute in a fireplace or the like. For use in such relations, I mold the central coal core in log shape, making it as large as may be desired. An artificial fuel "log" made according to the present invention is readily lit with a match, and burns uniformly with a bright, hot flame until completely consumed. There is no tendency to drip or disintegrate. It is of course possible to use kindler lumps made as previously described as fuel for a grate fire.

The fine ground core composition may form one side of a compound slab, the other side being the igniter, or a slab of the core may be coated with the igniter on both sides. The invention is not to be limited to the exact shape of the article, it being sufficient that the igniter and bonded coal be closely associated to compose a compound article.

What I claim is:

1. A fire kindler adapted for heating anthracite and the like to an igniting temperature and having an inner long burning body and a thick outer igniter shell adapted for ignition with a match, said body comprising ground coal bonded with rosin and being dense and hard and requiring a high temperature and prolonged heating to bring about its ignition, said outer igniter shell being integrally united with the body and extending over a surface thereof and composed of rosin, coarse vegetable matter and a substantially dry starchy stiffening agent for the rosin, the vegetable matter and the stiffening agent being disseminated through the rosin, the stiffening agent being in a proportion of about 1 part by weight for each 2 parts by weight of rosin.

2. The article of claim 1 wherein the thickness of the igniter shell is of the order of half an inch.

3. The article of claim 1 wherein the stiffening agent for the rosin of the igniter is flour.

4. The article of claim 1 wherein the coal is bonded with rosin and flour.

5. The article of claim 1 wherein the coal is bonded with rosin and starch.

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