Patented Jan. 31, 1933 1,895,956

UNITED STATES PATENT OFFICE

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SOLID FUEL AND METHOD OF MAKING SAME

No Drawing. Application filed April 8, 1930. Serial No. 442,687.

This application is related to my co-pending application for patent for solid fuel and process of making the same, filed September 20, 1928, Serial No. 307,337.

The invention relates to fuel and has for its general object the provision of a solid fuel formed as a compressed cake of hexamethylentetramine.

It is well known that hexamethylentetramine has certain qualities which recommend it for use as a fuel. However, in its ordinary state it is crystalline and therefore inconvenient to handle. Another objection is that when ignited, though it burns freely, its combustion is accompanied by severe sputtering or mild explosions.

It is with the above facts in view that I have developed the present invention which has for a more specific object the provision of a novel method of compacting the hexamethylentetramine into cake form convenient to use, and so changing its nature that it will burn quietly and with a total absence of any sputtering or explosive action. I am aware that it has been proposed to make compressed tablets of hexamethylentetramine for fuel purposes. However, during the course of a long series of experiments I have found that a compressed tablet is not necessarily free from the exploding action, a feature which renders the substance unsuitable for fuel as the explosions, though mild, do cause burning fragments to be thrown off in all directions and this is quite naturally rather dangerous. I have found from tests extending over a long period that if the hexamethylentetramine be compressed to a certain degree the tendency to sputter or explode during combustion is entirely overcome so that it may be used safely.

In the carrying out of my invention I take hexamethylentetramine crystals and subject them to a pressure of several thousand pounds per square inch, the exact pressure and the duration thereof being variable to a certain extent. This acts to crush the crystals to a certain extent and to force them together in such manner that cohesion is effected, the material being converted into a solid cake which is not friable and which may be handled readily without danger of breaking, cracking or chipping. A microscopic examination of such a cake discloses the fact that the crystalline nature is not entirely destroyed though it is quite probable, and in fact almost certain, that some small portion is crushed into more or less of a powder which fills the interstices between the larger fragments. The application of pressure seems to break up the crystals along their natural lines of cleavage. After the cakes are formed in any suitable press, not shown, it is preferable that they be permitted to season. This seasoning action does not require any special apparatus as it seems that when the cakes are permitted to stand in the atmosphere or even in a closed container they harden. When first formed they are slightly translucent and after they have seasoned they become still more translucent. The exact reason for this is uncertain though a reasonable hypothesis is that the crushed particles may absorb from the air some slight amount of moisture and thus recrystallize such of the material as was crushed possibly to powder during compression, this crystallization of the powdery matter causing a greater cohesion on account of the species of cementing action which may be considered as at least somewhat analogous to the setting of hydraulic cement. Then again it is believed that the increase in the hardness may be the result of a sort of molecular welding throughout the mass. Regardless of the explanation, the fact remains that the hardness of the compressed cake materially increases when it is permitted to stand and season.

The degree of pressure and the duration thereof, while capable of being varied within certain limits, are important matters as I

have found that for a compressed cake to be free from any sputtering and exploding tendency during burning it should have a density ranging between 1.05 and 1.20. Tests have conclusively proved that if the cake be compressed to an excessive degree it will regain the explosive tendency and be unsuited for fuel purposes.

Cakes formed in this manner are highly suited for use whenever and wherever heat is desired for a short time and when such cakes are used in a suitable holder they are highly advantageous for heating water for shaving purposes, for cooking on camping trips, picnics, etc. and for a wide variety of other purposes which will readily suggest themselves to the imagination. The compressed cakes are clean and easy to handle as the material neither chips nor rubs off and as it is not subject to deterioration under any and all varying atmospheric conditions. In addition they are non-poisonous and when burning give off no smoke and no odor. The substance is easily ignited by contact with the flame of a match and burns without melting and without leaving any residue.

If it is desired to make the cake ignite more readily it is clear that it might be provided with a coating of some material more highly inflammable. For instance I might use some liquid to form a coating or it is possible to provide a more or less thin layer of metaldehyde, the only objection to which is a rather offensive odor when burning. Other variations will probably suggest themselves to one skilled in the art without further explanation.

It should be understood that the invention is not limited to the use of hexamethylentetramine crystals as it is conceivable that this substance may be used in powered form and subjected to pressure for the purpose of compacting it into a cake having the desired density as above explained. The right is reserved to make all such changes in the method steps and details as will not depart from the spirit of the invention or the scope of the claims hereunto appended.

Having thus described the invention, I claim:

1. The method of making a solid fuel cake comprising subjecting hexamethylentetramine crystals to pressure to effect partial crushing thereof into a coherent mass having a density ranging between 1.05 and 1.20.

2. The method of making a solid fuel cake comprising subjecting hexamethylentetramine crystals alone to a high pressure to compact the same into a coherent mass having a density ranging between 1.05 and 1.20 and providing it with a coating of more readily ignitable material.

3. The method of making a solid fuel comprising subjecting hexamethylentetramine crystals free from admixture with any other substance to a high pressure to compact the same into a solid cake having a density ranging between 1.05 and 1.20, and providing it with an outer layer of metaldehyde.

4. A solid fuel cake comprising hexamethylentetramine compressed to a density ranging between 1.05 and 1.20.

5. A compressed cake of hexamethylentetramine having a density ranging between 1.05 and 1.20.

In testimony whereof I affix my signature.

LEON WYGODSKY.