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METHOD OF FORMING FUEL BRIQUETTES

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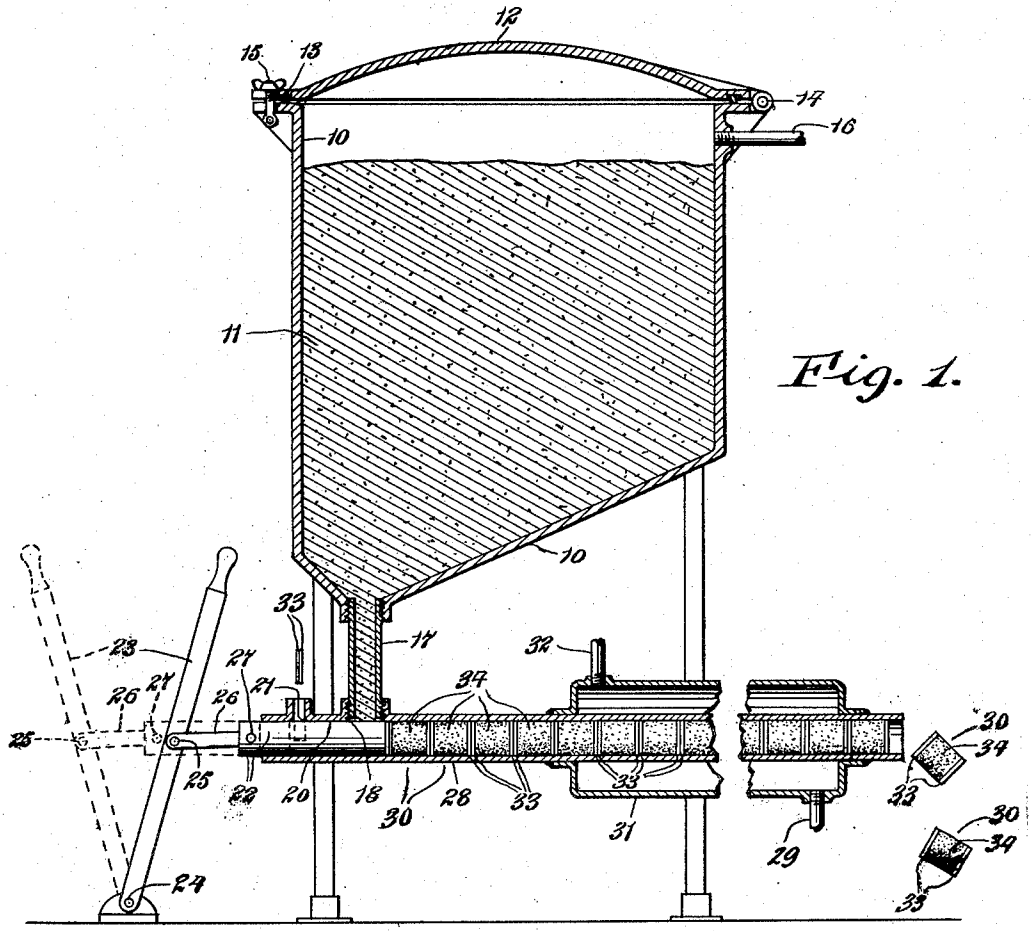


Fig. 1.

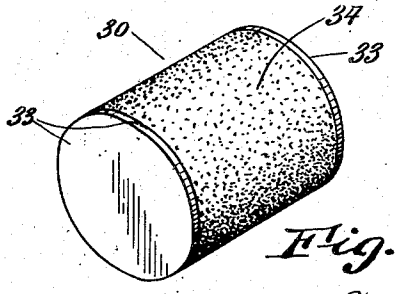


Fig. 2.

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METHOD OF FORMING FUEL BRIQUETTES

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1 Claim. (Cl. 44—10)

This invention relates to a novel form of briquette and to a method for making the same, said briquette being of such geometric proportions and color contrast as to enable the same to be identifyingly distinguishable when added in small proportions to coal or other like, raw, solid fuel, so as to identify the brand of said fuel.

The principal object of the invention is to provide such a briquette and method for making same, as will enable the briquettes to be turned out in small quantities at very low cost, with the resulting product attractive in appearance and strong and of artistic contrast when added to the raw fuel. Numerous other objects of the invention and practical solutions thereof are disclosed in detail in the herein patent specification, wherein:

In the accompany drawing:

Fig. 1 is a vertical, medial section through the apparatus for making the briquettes, and

Fig. 2 is an enlarged perspective of one of the briquettes constituting the product of said apparatus.

Similar characters of reference indicate like parts in the several figures of the drawing.

The numeral 10 indicates a reservoir or supply tank which is adapted to be filled with a water moistened mixture 11 of coal or coke breeze or screenings carrying a small proportion of Portland cement or other binder or bond, and constituting what may be termed a briquette paste. This briquette paste is introduced into the upper part of said supply tank through a hinged cover or door 12 which is provided with a soft gasket 13 and is hinged at one side at 14 and is adapted to be tightly clamped against the upper horizontal flange of said supply tank by a wing-nutted clamping screw 15. The discharge of briquette paste 11 from said supply tank 10 may be effected merely and solely by the force of gravity (in which case said door 12 may be omitted) but is preferably accomplished by means of air pressure introduced into the upper part of said supply tank through an air pressure pipe 16.

The briquette paste 11 in said supply tank 10 descends through a feed pipe 17 and passes through a feed port 18 into a horizontal, longitudinal cylinder 20. Rearwardly (to the left as seen in Fig. 1) of said feed port 18, said cylinder is provided with an upwardly opening insertion port 21. Slidably arranged in said cylinder 20 is a piston 22 which is adapted to be longitudinally reciprocated, manually or otherwise, through the instrumentality of a hand lever 23 fulcrumed at its lower end at 24 and centrally pivoted at 25 to the rear end of a link 26. The forward end of said link 26 is pivoted at 27 to the rear end of aforesaid piston 22.

The rear end (right end as seen in Fig. 1) of said cylinder 20 is integrally and coaxially connected to a briquette-harding pipe 28, the latter being adapted to receive a plurality of briquettes 30 as the latter are successively discharged from the cylinder 20. Surrounding said hardening pipe 28 is a steam or other heating jacket 31, supplied with steam or other heating fluid through a steam supply pipe 32, the cooled steam (together with a certain portion of condensate) being discharged through a discharge pipe 29.

Operation

A supply of briquette paste 11 having been put into the supply tank 10 through the door 12, the operator retracts (toward the left as seen in Fig. 1) the hand lever 23. This moves the front (right end) face of the piston 22 rearwardly and uncovers the feed port 18 and also the insertion port 21. This movement of said piston 22 allows the plastic briquette paste 11, under the influence of the air pressure supplied through the air pressure pipe 16, to flow downwardly into the cylinder 20. However, before this briquette paste 11 is able to quite flow as far, horizontally and forwardly, as the insertion port 21, the operator inserts a pair of paper disks 33 into the cylinder 20 through aforesaid insertion port 21, these disks 33 having a diameter the same as the diameter of the cylinder 20. Thereupon the operator pushes rearwardly (toward the right) the hand lever 23. This moves the piston 22 forwardly, covering the feed port 18 and causing the rearward of the disks 33 to be tightly pressed against the briquette paste situated immediately to the rear of said disk. The operator again retracts (toward the left) the hand lever 23 and again, in a similar manner, inserts a pair of paper disks 33 through the insertion port 21. It is obvious that a certain portion of briquette paste has now been imprisoned between the first and second pairs of paper disks 33, this portion constituting what may be termed the core 34 of the final briquette.

This process being repeated, causes the hardening pipe 28 to be filled with a plurality of such briquette cores 34 each of which is separated from its adjacent briquette core by a pair of paper disks 33. Each of said cores 34, to-

gether with a single disk 33 at each of its ends constitutes a briquette 30.

The core 34 of each of said briquettes 30 as it enters the hardening pipe 28, consists of a mixture of coal or coke slack with a very small percentage of Portland cement and a sufficient quantity of water to render the mass viscous. Such a mixture, if it were merely subjected to air to be hardened, would require about two days to accomplish its initial "set". Such a slow rate of set would obviously be disadvantageous. It is for this reason that, in the present invention, the hardening pipe 28 is artificially heated through the instrumentality of the steam jacket 31. This heating very markedly accelerates the hardening of the Portland cement, so that, when the finished briquettes 30 are discharged from the rear end of said hardening pipe 28, said briquettes are of sufficient hardness to not only ensure that the core 34 thereof is hard and strong enough to stand handling but also that the adhesive (cement) bond between said core 34 and its paper disk 33 at each of its opposite ends is strong and firmly attached to said core.

The paper disks 33 at opposite ends of each briquette 30 constitute more than merely a means of preventing chipping of the sharp annular corners of the briquette. They also act as separators while the briquettes are being formed, not only by physically separating each briquette from the immediately adjacent briquette while in the cylinder 20 and hardening pipe 28, but also by preventing the briquette paste 11 from bonding or cementing adjacent briquettes. Hence, as the briquettes 30, when hardened, are discharged from the tail end of the hardening pipe 28, they do not have to be broken apart from each other, but naturally fall apart under the influence of gravity.

It is to be understood that the Portland cement or other binder in the briquette paste 11 not only acts as a bond to hold together the briquette core 34 but also acts as an adhesive agent between said core 34 and its pair of paper disks 33.

The actual percentage of Portland cement in the briquette paste 11 is very small, the strength of the finished briquette being obtained by reason of the fact that the heat treatment it receives while passing through the hardening pipe 28 is equivalent approximately to two years of ordinary cement "aging".

It is obvious that when a relatively small quantity of these identifying briquettes are sprinkled in a large quantity of coal or other raw fuel, they must, to be of any value in identifying the brand of the fuel, be clearly distinguishable as to both shape and color. As to the matter of shape, both the core 34 and the end paper disks 33 are of the same diameter, and the whole briquette is of sharp lined, straight lined shape. As to the matter of color, the core 34 is, of course, similar to the color of the raw fuel which it is intended to clearly identify, being made chiefly of coal or coke slack. Hence it is highly desirable that there be a sharp color differentiation between the paper disks 33 and the briquette core 34. The sharpest contrast is, of course, obtained when the paper disks 33 are of white color so as to most sharply contrast with the black cores 34, but, obviously such a contrast is not pleasing in that it totally lacks liveliness (black and white being relatively inert and dead colors) and hence the present invention relates primarily to a briquette 30 having such a color combination of core 34 and disks 33 as is sufficiently contrasting to both definitely and pleasingly identify the raw fuel to which it is added.

Although not illustrated in the present invention, it is to be presumed that the outer or exposed faces of the paper disks 33 may be suitably printed so as to definitely identify the brand of the raw fuel, of which they form a part, not only by the color and shape of the briquettes, but also by an actual trade-mark or other printed statement of their commercial source.

In the drawing the briquette is illustrated as having a straight cylindrical shape of circular cross section, but it is obvious that other "cylindrical" shapes may be produced from any one machine of the character described by suitably changing the piston, hardening pipe, etc. For instance, said briquettes may be oval, square, or other rectangular, triangular, hexagonal, irregular or star-shaped in cross section, in each of which cases, the paper end disks have a shape corresponding to the cross section of the core of the briquette. By permitting briquettes of different cross section to be made from the same machine, different dealers handling the same grade of fuel may use distinguishingly identifying briquettes for their respective products. For instance, the one dealer may identify his product with briquettes of square cross section, while his co-dealer handling the same fuel may identify his particular product with briquettes of oval cross section.

The term "cylinder" as used in this specification is the broad term "cylindrical" as used in geometry to indicate any three dimensional body formed by the generation of a moving straight line which is at all times parallel to a fixed, straight line.

In the foregoing specification the word "cement" has been used as applying more particularly to Portland cement, but it is obvious that other cements, binders or bonds may be used in the machine and process described, including a number whose hardening may be accelerated other than by the application of heat.

I claim as my invention:

The method of forming fuel briquettes comprising: the charging of fuel briquette paste into a cylinder; inserting successive pairs of paper disks into said cylinder perpendicularly of its axis so as to separate said briquette paste into a plurality of cylindrical masses; compressing the paper disks and masses of briquette paste to form formed cylindrical briquettes; and discharging said formed cylindrical briquettes with each of the briquettes having a paper disk adhering to each of its ends.

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