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ALCOHOL FUEL OF THE NITROCELLULOSE-GEL TYPE

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3 Claims. (Cl. 44—7)

This invention relates to solidified, or semi-solidified, alcohol fuels of the nitrocellulose-gel type, that is to say the kind of solidified burning alcohol in which the alcohol is held in a gel or structural coagulum resulting from the action of a non-solvent such as water on alcoholic collodion. In the manufacture of this type of fuel an alcohol-nitrocellulose sol is usually gelled by the injection of water or of alcohol carrying a sufficiency of water, or the result may be accomplished by treating collodion with the vapors of water or other non-solvent.

The nitrocellulose-gel type of solidified burning alcohol, because of its general superiority, superseded the soap gel type, but it has long been recognized that the nitrocellulose gels have a defect, namely that the burning of the nitrocellulose with the alcohol produces sputtering and crackling. This causes hot particles to be thrown from the mass, and occasionally the action is violent enough to eject burning pieces of the gel. When the fuel is burned in a can, there is usually pronounced flaring toward the end.

After experimenting with various addition materials, I have found that this troublesome and sometimes dangerous effect can be suppressed or materially reduced by incorporating in the nitrocellulose-alcohol gel a slight amount of finely-divided asbestos well distributed throughout the mass of the fuel.

With asbestos in fine fibrous form, practically perfect results have been obtained, that is to say, sputtering and crackling were virtually eliminated, the flame was much steadier, thereby giving better heating value, flaring toward the end of the burning of the fuel in a can was not noticeable, and there was no tendency to throw off burning fragments of the gel; also the gel was firm. The results were equally good when the fuel was burned in a can and when the fuel was spooned and burned outside the can as is sometimes done in the heating of chafing dishes. The completeness, or the degree, of improvement of the burning quality of these fuels depends principally on the form of the asbestos. The amount, small in any case, may be greater or less according to the particular asbestos material that is used. Powdered asbestos gives some improvement, but scarcely comparable to that obtained with fibrous asbestos.

For purpose of illustration it may be stated that when laboratory Gooch crucible asbestos, reduced to individual fine fibers, was used, 0.01% of this material, based on the collodion, was sufficient to give almost perfect results. In that material the fibers were of various lengths, ranging from 2/100 mm. to 3 mm., and the diameters were not more than 2/1000 mm. Asbestos of this grade is not a commercial product at the present time. Among commercial grades, Johns Manville #47 Arizona asbestos serves admirably, though more of it is necessary (about 2 grams per gallon of collodion). This grade may be screened through an 8 mesh screen to break any bundles apart and to shorten any fibers that might be long enough to clog a can-filling nozzle.

The improved fuel is made by preparing a collodion in the usual way. While the collodion is actively agitated the minor amount of asbestos is added, and the agitation is continued until the fibers are uniformly distributed in the sol. The collodion with the asbestos fibers suspended therein may then be filled into cans, after which the collodion may be gelled in known manner. The asbestos fibers should be fine enough to remain in suspension while the gel is setting. Some settling is likely to occur, but the fact that there may be somewhat more asbestos toward the bottom of the contents of a can than at the top is an advantage rather than a disadvantage in fuel to be burned in the can. For fuel which is to be spooned, it may be desirable to incorporate a little more asbestos, in order to insure that portions removed from the top of the container will have enough of the asbestos fibers. An advantageous step in the manufacture of the fuel product is a washing of the asbestos with alcohol before mixing it with the collodion. This makes for more effectual dispersion.

It will be understood by those skilled in the art that the alcohol used in the fuel may be ethyl or methyl alcohol, or both.

It will also be understood that the asbestos present in the improved fuel of this invention does not constitute a filler.

I claim:

1. Alcohol fuel of the nitrocellulose-gel type, having distributed therein a slight amount of asbestos in the form of individual fine fibers, sufficient to eliminate or materially reduce the pronounced irregularity of burning which would otherwise result from the presence of the nitrocellulose.

2. The method of making an alcohol fuel, which comprises preparing an alcoholic collodion, thoroughly distributing and suspending therein a slight amount of asbestos in the form of individual fine fibers, sufficient to eliminate or materially reduce the pronounced irregularity of burning of the fuel which would otherwise result from the presence of the nitrocellulose, and gelling the collodion while the fibers remain in suspension.

3. In the method set forth in claim 2, the step of treating the asbestos fibers with alcohol before adding them to the collodion.

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