

UNITED STATES PATENT OFFICE

2,293,249

ASPHALT DRUM LINING

Herbert G. M. Fischer, Westfield, N. J., assignor
to Standard Oil Development Company, a corporation of Delaware

No Drawing. Application August 27, 1941,
Serial No. 408,454

5 Claims. (Cl. 226—19)

This invention relates to a method of treating the interior surface of containers for asphalt for the purpose of preventing the asphalt from adhering to the surface. Metal containers such as steel drums and barrels are generally used in shipping natural or artificial asphalt, pitch or other solid or semi-solid plastic bituminous materials. The plastic bituminous material, such as asphalt, is first heated until it is found to be in a molten condition and then poured into the container and allowed to cool and solidify before shipping. The plastic bituminous material is generally removed from the steel barrel or drum by splitting the drum along the sides and ends and peeling the metal from the asphalt.

In the past, great difficulty has been experienced in removing the solidified plastic bituminous materials such as asphalt from the containers due to the adhesion of the material to the walls of the container. In addition to the loss of time due to the difficulty of separating the asphalt from the metal drum, there is sometimes a substantial loss of the asphalt material which is not readily removed from the metal portions of the drum. This is true when the steel drum has been subjected to elevated temperatures for prolonged periods of time during storage or shipping, especially if it is shipped into the tropical climates or allowed to lay along the road during the summer months when most of the paving or road treating is done.

Attempts have been made in the past to overcome these difficulties by lining the inside of a separable barrel-like mold with a tough paper, which paper is coated with a high melting pitch. The molten asphalt is then poured in and on solidifying, the entire package is removed from the mold and shipped. An objection to this method of packaging the asphalt was that it was only practical with very high softening point asphalt and also that it was almost impossible to separate the top paper from the asphalt without the loss of substantial portions of the asphalt with the paper that is removed.

Another method that has been used to overcome this difficulty in shipping is by pouring molten asphalt into a barrel-shape mold comprising a circular bottom or head, a plurality of resilient staves permanently attached at their lower ends to the circular bottom or head and flaring outwardly at the upper ends to permit the removal of the material. A removable hoop or ring holds the upper ends of the tapering staves in tight edge to edge engagement while the material solidifies. When solid, the asphalt is

removed and shipped without a container. The mold may be coated first with talc, fuller's earth, etc. The objectionable feature of this attempt to ship asphalt in blocks was that if two blocks come in contact they would naturally adhere to each other and it is obvious that a low softening point asphalt could not be handled in this manner, especially in the summer months of the year.

Another method of handling asphalt was by using cartons coated with a paste made of lamp black, iron oxide, clay or lime and water. These paper cartons were never found to be practical when large amounts of asphalts are to be shipped due to the fact that the paper could not readily be removed and that if low softening point asphalt was shipped, there was danger of the asphalt seeping out of the package.

Another method of shipping asphalt was in molding it into cubical blocks weighing about 90 pounds each, into molds which had been coated with a lubricant such as clay slurry and packed with the adhering clay in fiber containers snugly fitting each block. This method of shipping asphalt was only applicable for the high melting point asphalt and even then some difficulty was found in preventing the adhesion of the cubical blocks when they came in contact, especially where a number of blocks are placed one upon the other and the lower blocks are subjected to a substantial pressure.

Another method was by coating the inside of a barrel or drum with a water suspension of powdered mineral substances, such as bentonite. The difficulty here encountered was that as the molten asphalt was poured into the drums, there was a tendency of foaming and it was difficult to fill the drums with a solid mass of asphalt. Other attempts have been made by applying to the surface of a drum a coating of a metal oxide with a liquid or semi-liquid reagent which loosens the film of the oxide. A great difficulty found in the use of this particular method was if a low softening point asphalt was shipped in the drum, the coating would naturally disappear and amalgamate with the asphalt.

Another method used was in treating the inner surface of the drums with aqueous solutions of salts, such as chlorides, nitrates, sulfates, bisulfates, thiosulfates, etc. of alkali metals and ammonium, the chlorides or nitrates of the alkaline earth metals or the chlorides, nitrates, or sulfates of iron, aluminum, zinc, manganese or magnesium, potassium soaps, or the alkaline salts of the fatty acids mixed with polyhydric alcohols such as glycerol. The disadvantage found in us-

ing these particular substances was that if a low softening point asphalt was introduced into the container, there would be an amalgamation of the coating material with the asphalt itself. It was found that if these particular substances were used that it was advisable to have them on the corrosive side, that is, to corrode the inside of the drum and thereby prevent the adhesion of the drum surface and the asphalt. Therefore this method can not be used in handling low softening point asphalts that are being stored or retained in the container for any considerable period of time due to the fact that the walls would corrode easily and allow a leakage of the low softening point asphalt. In the case of low softening point asphalt if it is not used within a reasonable time after introduction into the drum, the asphalt when used, would be found to contain particles of the corroded metallic substances used in the construction of the drum.

An object of this invention is to treat the inner surface of the container by coating it with a composition which prevents the adhesion of the asphalt and makes an easy removal of the asphalt possible.

Another object of the invention is to provide such a coating for the inner surfaces of the containers that even though the asphalt be of a low softening point and subjected to temperatures around 100° F., so that it becomes molten it will not unite with the coating used for the inner surfaces of the steel drum.

According to this invention it was found that the various lining materials used were not satisfactory as pointed out above for it is necessary that the lining material be kept in a more or less flexible condition, that is, if the material is too dry it may crack and dislodge during handling thereby allowing the asphalt to adhere to the metal surface of the drum. In case the material is too wet, foaming occurs when the hot asphalt is filled into the drum or due to lack of mechanical strength the lining may be actually removed from the metal during the filling period. Some of these compositions pointed out above have proved effective for a short period of time. This is particularly true when harder grades of asphalt are employed, however, under the following adverse conditions none of these linings have been proven satisfactory:

1. Asphalts of greater than 50 penetration at 77° F.
2. When stored for long periods of time and/or at high temperature.
3. Oil coating inside the metal drum.

It has been found that the satisfactory drum lining suitable for extremely adverse conditions consists of a mixture of approximately 4 parts of clay, 4 parts of water, and 1 part of calcium chloride. The clay used in this composition may be bentonite, fuller's earth, fire clay, etc., potter's clay being a particularly desirable type. In applying this composition the mixture is made up in the form of a slurry and sprayed on the inside of the drum. The drum is then thoroughly

dried and stored until it is required for filling. This storage period may be as much as several days. Some modifications are required in the above formula under certain climatic conditions, that is, in extremely humid weather the amount of calcium chloride should be cut down and in extremely dry weather it should be increased. Under these conditions as little as ½ of 1 part to two parts of calcium chloride may be used. This amount of calcium chloride is regulated by the amount of moisture which will be absorbed by the lining during the storage period between drying and filling, so that it is not brittle and the moisture is not in sufficient amount to cause foaming when the asphalt is introduced into the vessel. The temperature used in drying the drum after applying this composition is of about 400° F. Drums lined with this clay-calcium chloride mixture in the manner specified above have been found especially suitable for shipping asphalt of 100 to 120 penetration at 77° F. and 115° F. to 120° F. softening point to foreign countries where adverse climatic conditions and substantially long periods of time are required in the shipping. These drums were subjected to elevated temperatures but little or no adhesion of the asphalt to the steel drum occurred and the drum may be readily stripped from the asphalt when desired.

I claim:

1. The method of treating the interior surface of a container for solid or semi-solid bitumen to prevent the adhesion thereof to the said surface which comprises coating the surface with a slurry consisting of about 4 parts of clay, 4 parts of water and ½ to 2 parts of calcium chloride.

2. The method of treating the interior surface of a container for solid or semi-solid bitumen to prevent the adhesion thereof to the said surface which comprises coating the surface with a slurry consisting of about 4 parts of clay, 4 parts of water and 1 part of calcium chloride.

3. A method of treating the interior surface of a container for solid or semi-solid bitumen to prevent the adhesion thereof to the said surface which comprises coating the surface by spraying with a slurry of 4 parts of clay, 4 parts of water and ½ to 2 parts of calcium chloride, and subjecting the drum with the said coating to a temperature of about 400° F.

4. An improvement in the shipping of bituminous materials which consists of introducing the bituminous materials in a metal container whose interior surface has been treated with a slurry of 4 parts of clay, 4 parts of water and ½ to 2 parts of calcium chloride and dried before introducing the bituminous materials in a molten condition into the container.

5. A method according to claim 4 in which the metal container coated with the slurry of clay, water and calcium chloride is subjected to a temperature of 400° F. before the introduction of the bituminous material.

HERBERT G. M. FISCHER.