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2,742,374

SOUND DEADENING SHEET MATERIAL AND BONDING MATERIALS THEREFOR

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My invention relates to improvements in sound deadening sheet material and bonding emulsive mixtures thereof of the type disclosed in my application, Serial No. 137,477, filed January 7, 1950, now U. S. Letters Patent No. 2,636,543, granted April 28, 1953, of which this application forms a continuation-in-part.

It is the object of my invention to improve the properties of the sound deadening sheet material by increasing the percentage of mineral matter and decreasing the percentage of moisture and asphalt in the bonding layer between the plies of felt. The improvements consist in the provision of a sheet of sound deadening material which is more efficient in sound deadening properties, less expensive and better adapted to high speed production die cutting operations.

Broadly, like the product of my application Serial No. 137,477, filed January 7, 1950, the product of my improved technique has improved characteristics in ease of cutting and punching, pliability and plasticity, so that the sheet will more easily conform to the shape of metal parts. My improved technique further provides a sheet which has greater toughness, mass effect, stability against flow under heat and freedom from brittleness at low temperatures.

In some applications of the sound deadening sheet material of my copending application Serial No. 137,477, filed January 7, 1950, now Patent No. 2,636,543, granted April 28, 1953, it was found that in high speed die cutting operations there was a tendency for the sheet to stick to the die cutting press.

To improve the properties of the material it was my first effort to reduce the water content in the internal bonding layer but this was not entirely satisfactory because, the increase in solids to above ninety per cent resulted in a product which was too thick to be flowable between the felted sheets.

I have discovered that by changing the character of the asphalt emulsion composing the fluid emulsion deadener composition I have been able to make it more free flowing and thus capable of carrying a larger per cent of solids with less water present. In changing the character of the emulsion I have used a combination of two different types of emulsion, each having a distinctly different set of properties. I achieved a surprising result. I have found that by forming part of the mix with a clay type emulsion formed by interfacial trituration and having a diameter of globules from 20 to 100 microns and the other part by a colloid mill soap type emulsion formed by interfacial surface tension, and having a globular size of from 1 to 10 microns, I could load this emulsion with a decidedly increased solids content and maintain a sufficiently fluid consistency to introduce the material between two layers of felt. This permitted a reduction both in the per cent of moisture and the per cent of bitumen in the mix and at the same time permitted the emulsion to carry a much higher percentage of sand or other mass producing ingredients.

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In order to give a specific example of my improved sound deadening sheet I might first state that the method of manufacture is substantially similar to the method disclosed in my copending application of which this is a continuation-in-part and the felt layers are partially saturated with bituminous saturant which leaves the felts moisture permeable.

THE EMULSION MIXTURES

Emulsion A

Into a heavy duty mixer I continuously pump 1650 to 1800 lbs. of asphalt having a melting point of from 100 to 130° F. (less than 150° F.). With this asphalt I simultaneously pump a slurry of from 57 to 100 lbs. of bentonite or other suitable emulsifying clay suspended in from 1040 to 1350 lbs. of water. This I thoroughly mix until the globules in the emulsion have a diameter size of from 20 to 100 microns. This is an emulsion formed by interfacial trituration of the asphalt in the water.

Emulsion B

Through a colloid mill I pump continuously from 650 to 700 lbs. of asphalt having a melting point below 150° F. and from 20 to 30 lbs. of soft soap such as potassium oleate, potassium stearate, potassium palmitate or other suitable lathering wetting agent such as potassium vinsol resin dissolved in from 300 to 350 lbs. of water containing 1 lb. potassium hydroxide and 1 lb. tripotassium phosphate. The colloid mill produces an emulsion from the above combination wherein the globules have a diameter of from 1 to 10 microns.

The emulsions A and B are then mixed together. The A emulsion constitutes a substantially greater part of the final mix than the emulsion B, and generally is 70 per cent by weight compared to 30 per cent by weight for emulsion B. A 2600 gallon mixer will contain 9200 lbs. of emulsion in the above proportions, 3400 lbs. of kaolin clay and 22,300 lbs. of fine glass sand (not coarser than 20 mesh) which averages between 35 and 200 mesh.

By weight the bituminous emulsion composition of the above specific example, used as the bonding layer will contain about 9.8 per cent clay, about 64.0 per cent sand, about 16.7 per cent asphalt and the balance will be water (slightly over nine per cent). The total solids will vary from 90.0 to 90.50 per cent by weight. The composition of the mixture comprises preferably about 75 per cent finely divided mineral matter, about 15 per cent bituminous material and about 10 per cent water, by weight.

The fluidity of the mix is such that it may be readily applied in a suitable laminating or combining machine such as is diagrammatically shown in my copending parent application of which this is a continuation-in-part.

Using two webs of felt each having a thickness of about .060 inch, I am able to incorporate a layer of bonding material of about .070 inch in thickness so that the caliper of the sound deadening material is from 170 to 200 points (i. e., .170 to .200 inch).

Since the felt webs are only partially saturated with bitumen (containing about 45% to 75% bitumen based on the dry weight of the desaturated felt), they are moisture absorbent and as the moisture from the coating layer is absorbed by the felt the emulsion inverts and becomes stabilized and bonded to the felt.

Normally, I not only find it unnecessary to air dry the sheet material but I find it desirable to ship a roll or a series of sheets cut to desired size and piled on skids and containing the limited amount of moisture absorbed from the emulsion combining layer as this moisture flexibilizes and strengthens the felt. During shipment the closely packed sheets maintain substantially the per-

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centage of water present as the web is discharged from the combining machine.

While I have outlined within rather narrow limits a fairly definite percentage of ingredients these may, of course, be varied to suit the varied requirements of use. My improvements as set forth herein involve mixing different types of emulsions to maintain workable fluidity of the emulsions with increased percentages of solids avoiding the use of drying equipment and imparting added flexibility and strength to the felt by adding a controlled amount of moisture to the felt by allowing the moisture which is absorbed from the emulsion to be retained in the felt.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A filled asphaltic emulsive mix for incorporation in sound deadening sheet material composed of about 75 per cent by weight of finely divided mineral matter, about 15 per cent of bitumen and about 10 per cent of water.

2. A filled asphaltic emulsive mix as set forth in claim 1

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wherein the percentage of solids by weight is from 90 to 90.5 per cent.

3. A filled asphaltic emulsive mix as set forth in claim 1 wherein the emulsified bituminous material is composed of a mixture of a clay emulsion formed by interfacial trituration and a colloid mill soap emulsion formed by interfacial surface tension.

4. A filled asphaltic emulsion mix as set forth in claim 1 wherein the emulsified bituminous material is composed of a mixture of about 70 per cent of a clay emulsion and about 30 per cent of a colloid mill soap emulsion.

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