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FLOOR OR WALL COVERING AND METHOD OF MAKING THE SAME

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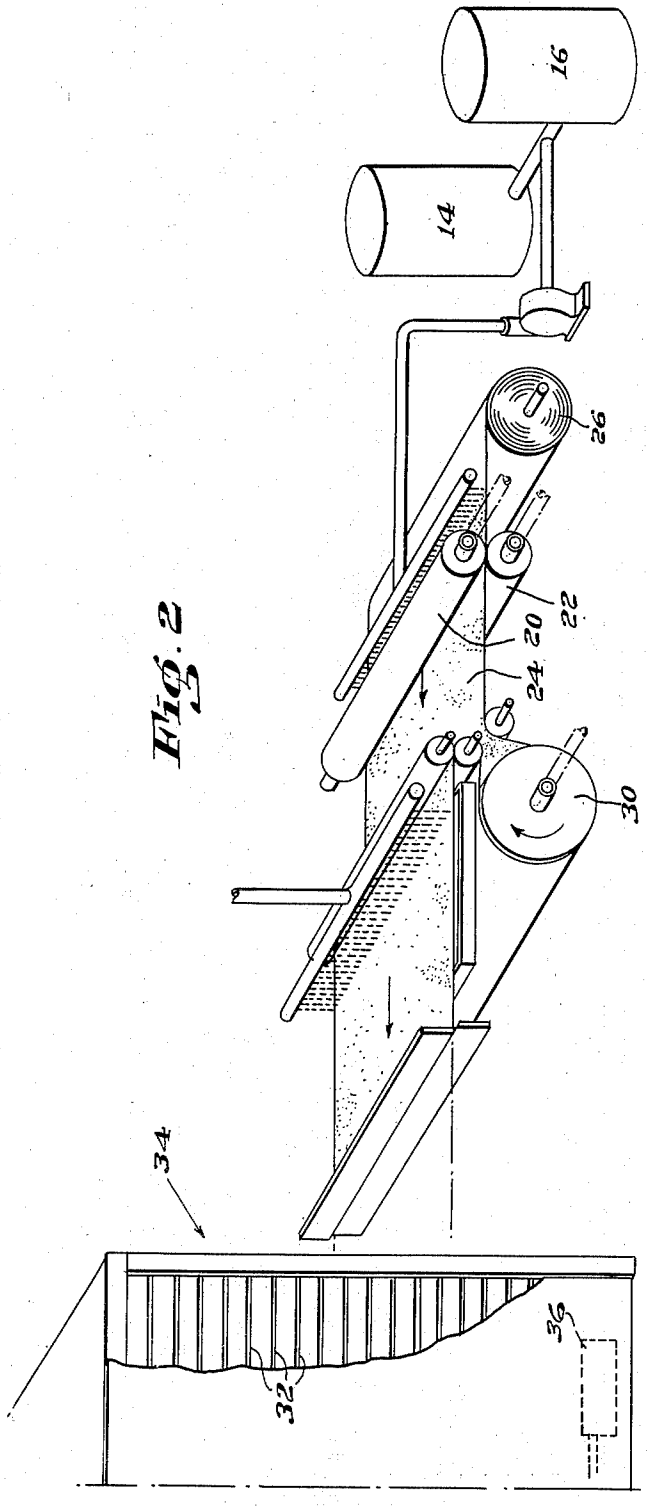


Fig. 2

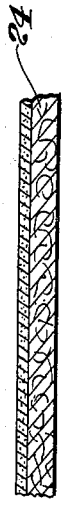


Fig. 1

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FLOOR OR WALL COVERING AND METHOD OF MAKING THE SAME

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7 Claims. (Cl. 117—167)

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This invention relates to a floor or wall covering and to the method of making the same.

One object of the invention is to produce a novel and superior coated sheet which finds particular use as a wall or floor covering and for desk and sink tops, possessing superior resistance to alkali, oil and grease, which is durable and water resistant, and which may be produced in a wide variety of colors in a simple, economical and practical manner.

Another object of the invention is to provide a novel and efficient method for the economical manufacture of the present coated sheet.

With these general objects in view, and such others as may hereinafter appear, the invention consists in the coated sheet and in the method of making the same hereinafter described and particularly defined in the claims at the end of this specification.

In the drawing, Fig. 1 is a vertical sectional view of a coated sheet embodying the invention; and Fig. 2 is a diagrammatic view in side elevation of the preferred apparatus, which may be employed in practicing the present method of making the improved coated sheet.

Coated sheets suitable for wall and floor coverings utilizing vegetable oils and various saponifiable pitches, such as cottonseed pitch together with other resinous materials and suitable fillers and pigments, have been heretofore manufactured and sold. These coated sheet materials have been produced by processes which include first the blending of the saponifiable pitches with natural or synthetic resins utilizing temperatures varying from 300° F. to 500° F. in order to secure the proper blending. Because of the relatively high temperatures required for the blending operation, the range of pigments available which were able to withstand such relatively high temperatures is relatively narrow, limiting to some extent the variety of color effects obtainable in the coated sheet material. In producing the prior art coated saturated felt strips of a width of about three feet were coated with these pitch-resin compositions and lengths of approximately fifty to one hundred feet were loosely rolled and stored upon end in warehouses to cure at room temperature for several weeks to several months. This method of manufacture placed certain limits upon the coatings and their hardness in order that the contact between the surface and back of the rolled coated felt should result in minimum damage and marking of the surface of the coating. In commercial practice it was found that the pitch-resin compositions were required to

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have relatively high melting points, usually from 180° F. (B & R) to 230° F. (B & R) and a penetration of from five to twenty (A. S. T. M.) in order to permit the goods to be handled without excessive marring during the curing operation.

From the foregoing brief description of prior practice, it will be observed that the prior art operations have been time consuming and that the product because of its saponifiable nature did not possess the desired resistance to alkali and oil.

I have discovered that a superior coated sheet may be produced by coating a base sheet such as a saturated felt sheet with a coating composition having as its principal ingredients a drying pitch of vegetable, animal or marine origin, or combinations thereof, and which may and preferably will comprise linseed or cottonseed pitch, together with and preferably blended with a viscous petroleum product consisting principally of polymerized olifinic hydrocarbons characterized by a high degree of unsaturation, an iodine number of at least 80 (Wijs) and being substantially non-acidic and non-saponifiable in nature. This blended coating composition may and preferably will have embodied therein suitable pigments and filling material to impart color and body thereto. The coating composition may be applied to the base sheet at a temperature of from 200° to 300° F. by suitable means such as by doctor blades or rolls, and after application may be subsequently cured in heated racks in a relatively short period of time, as for example from two to five days at a moderate temperature of from 150° to 200° F. The low temperature at which blending may be carried out enables a wide range of pigments to be used including those which otherwise would be unable to stand the high temperatures heretofore employed in producing comparable coating compositions. The present method of manufacturing the coated sheets enables substantially greater width of material to be coated and handled than has heretofore been possible becuse of the ease with which the coated sheets may be cured.

The coated sheets have been found particularly resistant to acids, alkalies, mineral oil, and household fats, whereas all of the comparable prior products of which I am aware comprising coated sheets utilizing the drying pitch as an ingredient of the coating composition offer little resistance when exposed to alkali or mineral oil. The present product also offers remarkable resistance to wear, particularly under heavy traffic.

Referring now to the drawing, the present

coated sheet may comprise any suitable base material such as a fabric either woven or felted, and in practice for the production of commercial wall and floor coverings I prefer to utilize a saturated felt of the type now used in the production of commercial roofing or floor covering sheets and which is usually saturated with asphalt or bituminous material to impart water and weather resistance thereto. The base **10** is provided with a surface coating produced by blending a drying pitch or drying oil with an unsaturated petroleum product of the type above referred to and comprising polymerized olifinic hydrocarbons. Sufficient finely divided filler material and pigment are preferably incorporated to impart the requisite body and color to the coating composition for the production of the commercial coated sheet.

In producing the present coating composition for application to the coated sheet I prefer to blend the drying oil or pitch and the unsaturated petroleum resinous product in mixing tanks **14, 16** provided with the usual heating and mixing facilities and have found that a temperature in the neighborhood of 200° F. to 300° F. is sufficient to effect the complete blending of the pitch and the petroleum polymer. The filler and coloring material are introduced into the mixing tanks after the pitch and polymer have been thus blended, and from the mixing tank the hot mix is pumped through a pipe line to be delivered in front of doctor rolls **20, 22** and upon the upper surface of the saturated felt strip **24** that is unwound from the supply roll **26** thereof and conducted through the doctor rolls **20, 22.** The upper doctor roll is preferably heated and the lower roll is at a temperature somewhat lower than the upper roll and the sheet is drawn through the rolls by and around a driven cooling drum **30** where water is preferably sprayed directly upon the upper surface of the sheet to reduce the temperature thereof to a point where the sheet is ready to be introduced to drying racks **32** of a drying chamber **34.** The latter is maintained by suitable heating apparatus indicated generally at **36** at from 150° to 200° F. and it has been found that a period of two to five days is sufficient to completely cure the coated sheet.

The present coating composition embodying the drying pitch and the compatible unsaturated petroleum polymer above described possesses the superior characteristics above referred to which render it particularly suitable for use in the production of a coated sheet for use as a wall or floor covering. The unsaturated petroleum polymer which is relatively viscous in nature possesses a molecular weight in the range of from 200 to 600. It has a specific gravity of approximately 1.0, the polymers from some commercial oil refineries having a specific gravity slightly exceeding 1.0, and those from other sources having specific gravities slightly less than 1.0. The saponification and acid values of these unsaturated petroleum polymers of the character described are relatively low, the saponification numbers of many being in the neighborhood of 1.0, and on the average never exceeding 5, while the average acid numbers of the many samples tested did not exceed 1.0. The iodine numbers of these polymers varied from 80 up and in general ranged between 100 and 200.

These unsaturated olifinic hydrocarbon polymers may be obtained upon the open market from all of the major oil companies, some being produced by processes which have been kept secret and others being sold under various trade names.

The following examples indicate the characteristics of a petroleum polymer which may be used in producing the present coated sheet. A polymer obtained on the open market from Enjay Co. Inc., New York, New York, is represented by the producer to be a heat reactive aromatic-type olifinic hydrocarbon polymer which is produced during refining of petroleum and is highly unsaturated and dries by both oxidation and polymerization. Its physical properties include

Specific gravity 60°/60° F	1.00–1.02
Iodine No. (Wijs)—(minimum)	190
Saponification No	1–2
Diene No. (maleic anhydride value) (approximately)	10
Acid No—(approximately)	0.2

The polymer may be considered a short oil length resin, and it will be observed that the saponification value and the acid number of each are extremely low so that upon subsequent dispersion with the pigments which may be used to color the coating composition no reaction takes place between the polymer and the pigments.

Example 2.—The Advance Solvents Chemical Corporation, New York, manufactures and markets a polymer of the type which may be successfully used in producing the present coating composition and coated sheet and which is derived from selectively extracted petroleum products and is of an unsaturated heat reactive nature. The specific gravity at 60° F. was 1.028 and the bromine value from 65 to 85. The sample tested had no saponification or acid value.

Example 3.—The Shell Oil Company, San Francisco, California, markets a number of complex dark amber colored hydrocarbons which are unsaturated and of a predominantly aromatic structure. These hydrocarbons at ordinary temperatures range from viscous liquids to low softening point resins and the unsaturated nature of the hydrocarbons permits oxidation and the formulation of non-volatile films. A typical analysis of such hydrocarbons is as follows:

	Polymer 1	Polymer 2	Polymer 3	Polymer 4	Polymer 5
SP Gravity 20°/C./4°	1.010	1.012	1.041	1.051	1.072
Iodine No. (Wijs)	96	84	107	105	113
Acid No	0.48	0.0	0.34	0.62	0.0
Saponification No	3.4	0.4	1.1	4.7	4.2
Av. Molecular Weight	271	322	322	349	444

Example 4.—The Pure Oil Company, of Chicago, Illinois, markets an unsaturated viscous liquid of petroleum origin possessing drying properties similar to so-called drying oils and classified chemically as being composed principally of polymerized olifinic hydrocarbons. It has the following approximate specifications:

Specific gravity 60°/60° F	0.993
Iodine No. (Wijs modified)—(minimum)	200
Saponification No.—(maximum)	1.0
Molecular weight—(approximately)	300

The above examples are illustrative of the various commercially obtainable unsaturated olifinic hydrocarbon polymers suitable for use in accord-

ance with the present invention, it being understood that such polymers may be obtained from any of the larger oil refining companies.

For producing a coating composition which may be applied in the manner above described to a base such as a saturated felt, in order to produce the present coated sheet I prefer to utilize a major proportion of a drying pitch such as cottonseed pitch and a minor but substantial proportion of the unsaturated petroleum hydrocarbon polymer of the character above set forth. The ratio of pitch to polymer in the vehicle may be varied over a large range. For example, the polymer may comprise from 10 to 50% of the vehicle by weight. The ratio of vehicle to combined filler and pigment may also be varied over a wide range. Particularly satisfactory results have been experienced with compositions in which the ratios of vehicle to filler (filler and pigment) vary between 1 to 1 and 1 to 3.

In blending the pitch and polymer, it is preferred to utilize a greater proportion of polymer with those pitches having smaller drying characteristics. While it is preferred to utilize cottonseed and linseed pitches, other pitches may be used, such as tall oil pitch, and also in many instances mixtures of various known and commercially available vegetable and/or marine pitches may be used. If required, plasticizers may be incorporated in any of the foregoing compositions to control the plasticity thereof and such plasticizers as the non-drying, semi or drying oils (for example—castor oil, soya bean oil, dehydrated castor oil) and other known and commercially available chemical plasticizers may be used.

One of the advantages of the present invention resides in the fact that the blending or compounding of the pitch and polymer may be accomplished at substantially lower temperatures than have been heretofore required, and accordingly this differential in required temperature enables various pigments to be incorporated in the composition without liability of their decomposing and losing their color holding capacity. Among those pigments may be mentioned synthetic or natural iron oxides, red, yellow, black; carbon black, chrome yellow, chrome orange, Molybdate orange, zinc yellow, iron blue, Ultramarine blue, Phthalocyanine blue and green, Indanthrine blue, chrome green, chrome oxide, Toluidine red, Phospho-Tungstic acid blue and green, organic yellows consisting of the Benzidine and Hansa types.

The effect of the unsaturated polymer in modifying the drying characteristics of the drying pitch as compared to prior comparable coating compositions can best be appreciated by consideration of the fact that heretofore other products have required several weeks to several months at room temperature, whereas the present product may be cured in from 2 to 5 days in a heated rack or oven at a temperature varying from 150 to 200° F.

Having thus described the invention, what is claimed is:

1. A coated sheet comprising a base sheet covered with a coating composition comprising the blended product resulting from heating at a temperature not exceeding 300° F. a drying oil pitch and a viscous petroleum polymer having a molecular weight between 200 and 600 and consisting principally of polymerized olifinic hydrocarbons characterized by a high degree of unsaturation, and an iodine number of between 80 and 200 and being substantially non-acid and non-saponifiable, said blended product being substantially free from vulcanizing agents and being capable of curing with more rapidity than the drying pitch, and being highly resistant to moisture, acids, alkalies and mineral oils.

2. A coated sheet comprising a base sheet covered with a coating composition comprising the blended product resulting from heating at a temperature not exceeding 300° F. a drying oil pitch and a viscous petroleum polymer having a molecular weight between 200 and 600 and consisting principally of polymerized olifinic hydrocarbons characterized by a high degree of unsaturation, and an iodine number of between 80 and 200 and being substantially non-acid and non-saponifiable, said blended product being substantially free from vulcanizing agents and having incorporated therein a substantial amount of filler and being capable of curing with more rapidity and at lower temperatures than the drying pitch and being highly resistant to moisture, acids, alkalies and mineral oils.

3. A coated sheet comprising a base sheet covered with a coating composition comprising the blended product resulting from heating at a temperature not exceeding 300° F. a drying oil pitch of vegetable origin and a viscous petroleum polymer having a molecular weight between 200 and 600 and consisting principally of polymerized olifinic hydrocarbons characterized by a high degree of unsaturation, and an iodine number of between 80 and 200 and being substantially non-acid and non-saponifiable, said blended product being substantially free from vulcanizing agents and being capable of curing with more rapidity than the drying pitch, and being highly resistant to moisture, acids, alkalies and mineral oils.

4. A coated sheet comprising a base sheet covered with a coating composition comprising the blended product resulting from heating at a temperature not exceeding 300° F. a drying oil pitch and a viscous petroleum polymer having a molecular weight between 200 and 600 and in the ratio of polymer to pitch of from 10 to 50%, said polymer consisting principally of polymerized olifinic hydrocarbons characterized by a high degree of unsaturation, and an iodine number of between 80 and 200 and being substantially non-acid and non-saponifiable, said blended product being substantially free from vulcanizing agents and being capable of curing with more rapidity than the drying pitch, and being highly resistant to moisture, acids, alkalies and mineral oils.

5. A coated sheet comprising a base sheet covered with a coating composition comprising the blended product resulting from heating at a temperature not exceeding 300° F. a drying oil pitch and a viscous petroleum polymer having a molecular weight between 200 and 600 and consisting principally of polymerized olifinic hydrocarbons characterized by a high degree of unsaturation, and an iodine number of between 80 and 200 and being substantially non-acid and non-saponifiable, said blended product being substantially free from vulcanizing agents and being capable of curing with more rapidity than the drying pitch, and being highly resistant to moisture, acids, alkalies and mineral oils, and a sufficient proportion of filler to impart the desired stiffness to the blended product, the ratio of polymer to pitch being within the range of from 10 to 50% by weight and the ratio of ve-

hicle to filler being within the range of from 1 to 1 and 1 to 3.

6. A coated sheet comprising a base sheet covered with a coating composition comprising the blended product resulting from heating at a temperature not exceeding 300° F. a drying oil pitch and a viscous petroleum polymer having a molecular weight between 200 and 600 and consisting principally of polymerized olifinic hydrocarbons characterized by a high degree of unsaturation, and an iodine number of between 80 and 200 and being substantially non-acid and non-saponifiable, and having a substantial quantity of filler incorporated therein, said blended product being substantially free from vulcanizing agents and being capable of curing with more rapidity than the drying pitch, and being highly resistant to moisture, acids, alkalies and mineral oils, the ratio of polymer to pitch being within the range of from 10 to 50% by weight and the ratio of vehicle to filler being within the range of from 1 to 1 and 1 to 3.

7. The method of making a coated sheet which comprises applying to a base sheet a coating composition substantially free from vulcanizing agents comprising a blend of a drying oil pitch and a viscous petroleum polymer having a molecular weight between 200 and 600 and consisting principally of unsaturated polymerized olifinic hydrocarbons and having an iodine number of between 80 and 200, then cooling the sheet and introducing the sheet into a heated chamber maintained at a temperature between 150 and 200° F. for a period of from 2 to 5 days.

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