Patented Dec. 14, 1926. 1,610,959

UNITED STATES PATENT OFFICE.

EDWIN M. LINES, OF DEDHAM, AND JAMES F. MAGUIRE, OF NORWOOD, MASSACHUSETTS, ASSIGNORS TO BIRD & SON, INC., OF EAST WALPOLE, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

FLEXIBLE FLOOR COVERING AND PROCESS OF MAKING THE SAME.

No Drawing. Application filed October 25, 1926. Serial No. 144,172.

This invention relates to a flexible floor covering of the felt base type and the process of making the same. It principally concerns a floor covering having a felt base saturated with a suitable hydrocarbon or semi-solid bituminous material and having an ornamental wearing surface.

According to present commercial practice, felt base floor covering is manufactured from felt saturated with an asphalt which binds the fibres together, giving the felt base strength and adapting it to resist moisture. The next operation, following a suitable interval for the cooling of the felt, is the application of an undercoat over the saturated base. A necessary function of an undercoat is to form a suitable barrier between the saturated base and the surface coat of the floor covering, the surface coat being applied to the undercoat to make up the wearing surface and design of the floor covering It is necessary that an undercoat have a smooth, non-porous, flexible surface, and be substantially free from discoloration The material commonly used, at present, for an undercoat consists of an ordinary oil paint including pigments, drying oils as a binder, and a thinner which is usually volatile petroleum distillate, or other inflammable medium. There are many disadvantages in the use of an undercoat having such a thinner, among which are,—the softening action of the thinner upon the saturant of the felt base; the slow evaporation of the heavier fractions of the thinner; the cost of such thinners; and the risk of fire and explosion in their application, or in the drying ovens due to their volatile and inflammable characteristics. In the effort to provide asphaltic surfaces with a lighter colored film or layer by applying an ordinary oil paint to the same, the softening action of the thinner above referred to on the asphaltic surface has resulted in a discoloration of the layer of oil paint, and has also rendered the latter permeable so that the second or surface coat (if one is applied) has also been stained.

This invention contemplates, in the manufacture of felt base floor coverings, the employment of a coating or undercoat made up of the usual pigments to give the desired color, a binder consisting of pitch (animal or vegetable), drying oils or combinations of pitch, waxes, resin and/or drying oils, and emulsifying or blending the same in an aqueous thinner, as hereinafter more fully described. The advantages in the manufacture of floor coverings in accordance with this invention are: the coating shows very slight penetration into the saturated base and does not soften the same; an effective barrier or "shut-off" layer able to resist the base saturant is formed between the saturated felt base and the surface coat so that the saturant of the base is thereby isolated and unable to readily penetrate this barrier layer or appreciably stain it or the surface coat; the undercoat forms a smooth, non-porous, flexible surface, or foundation coat of uniform color upon which (if desired) a surface layer may be readily placed; in the manufacture of this floor covering the coating may be applied to the sheet of felt immediately after it comes from the saturating vat in a heated condition without danger as the coating is non-inflammable and non-explosive; a reduction in cost of floor covering because a cheaper base-saturant may be used and because of the elimination of dangerous volatile thinning mediums. The floor covering may be provided with a backing coating of similar character which provides a hard, smooth, water-resistant surface that is able to resist the base saturant, and effectively seal the same in the felt.

In order that the invention may be clearly understood, one set of ingredients in proportions with which excellent results have been obtained, will be given, but it is, of

course, understood that it is not desired to limit the invention to the particular ingredients and proportions recited except as required by the claims. We preferably effect a blending of the oil in the water constituent of the coating by the use of a finely-divided insoluble emulsifying or blending medium, such, for example, as colloidal clay or carbon black, or, a finely-divided insoluble emulsifying agent together with a suitable soluble emulsifying agent such as sodium oleate. We also may use a resinous body, which should preferably be introduced into the mixture other than by means of the oil, or its equivalent, in the mixture, for the reason that if introduced by way of the oil, it is difficult to keep the resinous matter from separating out of the mixture. We preferably introduce a resin by means of a carrying medium which permits the introduction of a considerable amount of free resin. An alkaline resinate has been found to be a practical medium for introducing free resin though it may be introduced in other ways, for example, by means of the blending agent. The alkaline resinate itself, when used, also operates as a blending agent.

As a specific and preferred example of how the invention may be practiced, we give the following: In an ordinary pony mixer or any apparatus capable of giving good agitation, is put warm water at about a temperature of 150° F. This temperature should not be materially exceeded, as to do so causes excessive foaming later in the process. We then add to the water colloidal clay, carbon black, or any material capable of acting as a blending or emulsifying agent for the fatty body in the water,—the aqueous dispersing medium, as distinguished from emulsifying the water in the fatty body. We next add a resin (free or combined), preferably an alkaline resinate and water containing a considerable percentage of free resin. We next slowly add a suitable pitchy or fatty body, for example, stearin, or a heavy bodied drying oil such as linseed oil, chinawood oil, fish oil, or the like, or a combination of these, and allow this to become thoroughly agitated and dispersed in the water, etc., in the mixer. We then add and mix a pigment or combination of pigments, e. g., ochre, oxide of iron, limestone, etc., and the coating composition is ready for application in mobile fluid condition. A table of proportions of the above preferred ingredients is as follows:

	Per cent.
Limestone	36.5
Ochre	20.5
Oil	10.4
Sodium resinate	5.6
Colloidal clay	2.0
Water	25.0

A table of proportions wherein sodium oleate, a soluble emulsifying agent, replaces a portion of the colloidal clay is as follows:

	Per cent.
Limestone	36.5
Ochre	20.5
Oil	10.4
Sodium resinate	5.6
Colloidal clay	1.9
Sodium oleate	.1
Water	25.0

Following the saturation of the base and the removal of the excess of saturant in the manner well known in the art, the saturated web is led over rollers to the device for applying the undercoat and backing. The application may be readily accomplished by means of passing the felt base through rollers, either or both of which are partially immersed in a trough containing a mixture substantially as above set forth. This method of application is so well understood in the art that we do not deem it necessary to describe it in further detail. One striking difference, however, between the application of the above described composition and the undercoat materials in current use today lies in the fact that the coating herein described may be safely applied to the saturated felt base while the base is still hot, and without injury to the coating. The residual heat serves to drive off water and permits the material to set sufficiently so that the sheet may, if desired, be wound up without causing sticking in the roll. In ordinary practice, the material is placed in the drying oven and there hung in loops until fully set as well known in the art. After the undercoat or coats have been applied and the material suitably dried, a surface or wearing coat may be applied, for example, by printing it on as a design as disclosed in the patent to Waldron, No. 1,145,821, or in any other suitable way. If desired, an additional transparent coating of any suitable character may be added, such as varnish or pyroxylin lacquer.

The foregoing specification discloses animal and vegetable pitches, oils or waxes either alone or in combination and the expression "fatty body" as used herein and in the appended claims is used generically to cover all three since they all contain fatty acids or combinations of fatty acids, or both. The specific example, above given, of how the invention may be practiced is regarded, of course, as the preferred form. The oils referred to include combinations of fatty acids and therefore are properly within the term fatty body as used.

For the purpose of simplifying the disclosure of the invention, we have arbitrarily spoken of this coating as an emulsion, and, for practical reasons, disregard in this de-

scription or specification, and claims, the degree or degrees of disperson, and whether the constituents, or any of them, are strictly and chemically speaking in molecular solution, colloidal solution, or in suspension; or, strictly and chemically speaking, soluble or insoluble.

This application is a continuation in part of an earlier application, Serial No. 103,636, filed April 21, 1926, the broad claims for the subject matter common to the two applications being presented in the first application.

We claim:—

1. A flexible floor covering comprising a base saturated with bituminous material, and an imperforate coating applied to one surface of said base, consisting of a major portion of pigment, and including a resin, pigment, a fatty body, and a finely-divided insoluble emulsifying agent, said imperforate coating being adhesive to said base and resistant to the bituminous material of the same.

2. A flexible floor covering comprising a base saturated with bituminous material, an imperforate coating applied to one surface of said base, consisting of a major portion of pigment, and including a resin, pigment, a fatty body, and a finely-divided insoluble emulsifying agent, and an additional coating of paint applied to said imperforate coating, said imperforate coating being adhesive to said base and to said additional coating, and being adapted to form an impermeable flexible barrier between the same.

3. A flexible floor covering comprising a base saturated with bituminous material, and an imperforate coating applied to one surface of said base, consisting of a major portion of pigment, and including an alkaline resinate, pigment, a fatty body, and a finely-divided insoluble emulsifying agent, said imperforate coating being adhesive to said base and resistant to the bituminous material of the same.

4. A flexible floor covering comprising a base saturated with bituminous material, an imperforate coating applied to one surface of said base, consisting of a major portion of pigment, and including an alkaline resinate, pigment, a fatty body, and a finely-divided insoluble emulsifying agent, and an additional coating of paint applied to said imperforate coating, said imperforate coating being adhesive to said base and to said additional coating, and being adapted to form an impermeable flexible barrier between the same.

5. A flexible floor covering comprising a base saturated with bituminous material, an imperforate coating applied to one surface of said base, consisting of a major portion of pigment, and including a resin, pigment, a fatty body, colloidal clay emulsifying agent, and an additional coating of paint applied to said imperforate coating, said imperforate coating being adhesive to said base and to said additional coating, and being adapted to form an impermeable flexible barrier between the same.

6. The process of making a flexible felt base floor covering which consists in saturating the felt forming the base of the floor covering with a semi-solid bituminous material, applying to one surface of said base a non-inflammable, non-viscous, aqueous mixture, including a resin, pigment, a dispersed fatty body, and a finely-divided insoluble emulsifying agent, and drying the same.

7. The process of making a flexible felt base floor covering which consists in saturating the felt forming the base of the floor covering with a semi-solid bituminous material, applying to one surface of said base, a non-inflammable, non-viscous, aqueous mixture, including a resin, pigment, a dispersed fatty body, and a finely-divided insoluble emulsifying agent, and drying the same, and then applying to the dried surface thus formed an additional coating of paint.

8. The process of making a flexible felt base floor covering which consists in saturating the felt forming the base of the floor covering with a heated semi-solid bituminous material applying to one surface of said base while hot a non-inflammable non-viscous aqueous mixture including a resin, pigment, a dispersed fatty body, and a finely-divided insoluble emulsifying agent, and drying the same.

9. The process of making a flexible felt base floor covering which consists in saturating the felt forming the base of the floor covering with a semi-solid bituminous material, applying to one surface of said base an emulsified non-inflammable, non-viscous, aqueous mixture including a resin, a finely-divided insoluble emulsifying agent, pigment 50 to 85%, a dispersed fatty body 5 to 35%, and water at least 10%, and then drying the same, whereby an imperforate coating adhesive to said base is formed.

10. The process of making a flexible felt base floor covering which consists in saturating the felt forming the base of the floor covering with a semi-solid bituminous material, applying to one surface of said base an emulsified non-inflammable non-viscous aqueous mixture, including a finely-divided insoluble emulsifying agent, pigment 50 to 85%, a dispersed fatty body 5 to 35%, and water at least 10%, drying the same whereby an imperforate coating adhesive to said base is formed, and then applying to said coating an additional coating of paint.

11. The process of making a flexible felt base floor covering which consists in saturating the felt forming the base of the floor covering with a semi-solid bituminous material, applying to one surface of said base

an emulsified non-inflammable non-viscous aqueous mixture, including an insoluble emulsifying agent, pigment 50 to 85%, a dispersed fatty body 5 to 35%, and water at least 10%, and then drying the same whereby an imperforate coating adhesive to said base is formed.

12. The process of making a flexible felt base floor covering which consists in saturating the felt forming the base of the floor covering with a semi-solid bituminous material, applying to one surface of said base an emulsified non-inflammable non-viscous aqueous mixture, including soluble and insoluble emulsifying agents, a resin, pigment, a dispersed fatty body, and water, and then drying the same whereby an imperforate coating adhesive to said base is formed.

EDWIN M. LINES.
JAMES F. MAGUIRE.