Feb. 28, 1939. J. F. McBRIDE 2,149,026

WOOD FLOORING

Filed Dec. 1, 1937

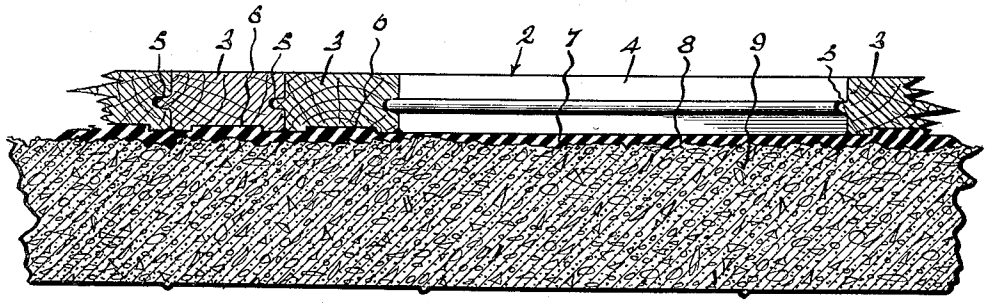


Fig. 1

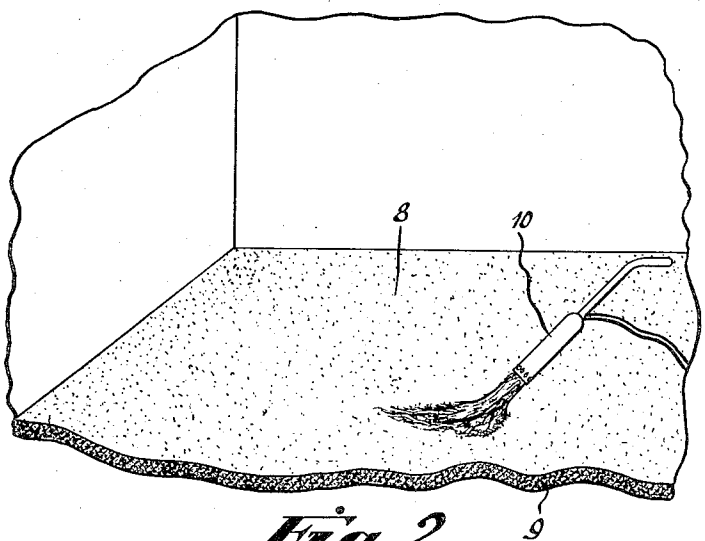


Fig. 2

INVENTOR.

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Wood & Wood ATTORNEYS.

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## WOOD FLOORING

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6 Claims. (Cl. 20—7)

This invention relates to wood flooring and to method for laying it. The invention more particularly is directed to the art of laying parquetry, strip, plank, block, square flooring and the like upon concrete and composition sub-floors and the like.

While it is convenient and economical to lay wooden flooring upon concrete sub-floors without using screeds or sleepers, and while block and parquetry laid in designs in this manner present an unusual and pleasing appearance, this type of flooring construction never has found the extensive uses expected of it because of the great tendency of the flooring to warp, buckle, and become loosened after relatively short periods of usage. For instance, it is typical for such flooring to remain intact for several months or perhaps a year or more, but thereafter the pieces of flooring either become loose and unjointed during the winter months when the atmosphere in the room is hot and dry, or become warped and buckled during the spring and fall of the year when the humidity is high and the wood has opportunity to become moist. The flooring then presents an unsightly appearance and must either be refinished by scraping and sanding or must be relaid entirely.

The objective of the present invention has been to provide a method for laying wood block, strip, square, and parquetry flooring over concrete sub-floors and the like which will provide an installation remaining intact, tight, and unwarped or buckled during the most adverse moisture conditions and, also, under adverse conditions of usage. More particularly, an objective of the invention has been to provide a better and more satisfactory method for laying such flooring than any of the methods which have been available in the past.

In modern methods of building construction a steel framework encased in concrete is provided for the building, and sub-floors between the framing elements are provided also of concrete. In the present specification the concrete floors are termed "sub-floors" and the wooden flooring which is laid above them is called "finished flooring". The term concrete sub-floors is intended to designate sub-floors of concrete, per se, floors of composition agglomerate, including gypsum and the like, floors of concrete and cinder blocks, and also sub-floors including metal areas. This wood finish flooring may be anywhere from a half an inch to an inch and an eighth or more in thickness, and it may be constituted of long strips laid parallel to one another, termed strip flooring, or of short strips of equal length and so configurated that a plurality of them may be assembled into the form of a square or geometric figure. Usually the edges and ends of the pieces are provided with respective matching tongues and grooves for joining. In some cases, squares of the flooring may be fabricated and glued at the woodworking plant and then laid on the job in the form of blocks. By varying the directions of grain of such blocks or squares, pleasing effects in the finished flooring are obtained. These effects may be of checker-board design or otherwise, depending upon the type of flooring laid up on the job to suit individual taste.

In the past the wood blocks or pieces have been coated, before laying, with a thin coating of tarry substance termed "mastic". This mastic is somewhat tacky and adhesive when at room temperature and fluidifies when heated. This mastic, of which there are a number of kinds sold under different trade names, has been used primarily as an adhesive or glue to position the blocks or pieces in the flooring. When mastic is used at the present time, the usual procedure is to trowel the mastic by hand onto a small section of floor, then lay some flooring, trowel additional mastic, and so on until the area finally is covered. In some instances the mastic is heated to a degree and the individual blocks or pieces of wood are dipped into a shallow pan of the heated substance to provide the coating on the wood. It has been impossible to coat long strips of flooring in this manner, and, in actual practice, it has been found that the method is not satisfactory even for squares and short lengths, because the workmen always have great reluctance to dip the blocks properly into the pan in view of the danger of burning their fingers with the mastic while holding the blocks.

These methods of laying floors do not provide the type of bond required to obtain the desired permanency and stability of installation. After short periods of usage of the floor the bond by which the flooring is held in place is broken, the wood shrinks, warps, or contracts and becomes so loose that it must be relaid. It is not unusual, as an example, for an entire floor to become so loosened that individual blocks can either be picked up by hand at the points adjacent the walls, or easily knocked loose from the sub-floor.

I have discovered that a primary factor influencing failure of the finish flooring lies in the nature of the surface of the concrete sub-floor. The surface of this concrete base is of the nature of a lithographic surface. It is receptive to

water, but it tends to repel oil and, likewise, to repel oleaginous, mastic substances. The concept of the present invention is to convert this surface of the concrete into a non-lithographic surface receptive to, and penetrable by, mastic applied thereto in suitable condition for penetration and reception.

When a mastic is disposed on the natural surface of a concrete sub-floor it sets and congeals but does not bond evenly and uniformly. Instead, upon occasion, it actually may be picked up as an intact layer just as may be a piece of tar that has dropped to a sidewalk surface. Briefly, I have discovered that the lithographic, repellent nature of the surface of the concrete is overcome if the surface portion is heated to a relatively high degree over a relatively short period of time. Under such treatment the pores of the concrete adjacent the surface are opened and relieved and the surface is in condition to receive and firmly bond with a mastic layer subsequently applied thereto. Moreover, this characteristic of receptivity to oil and oleaginous mediums is retained by the surface for a substantial period of time after the actual heating operation.

The method of the present invention resides briefly in the treatment of the surface of the sub-floor of concrete or the like with heat to destroy its lithographic nature, and in the establishment of a mastic pad or sheet of substantial thickness over the concrete and bonded to it by virtue of the original treatment.

More specifically, the method of the present invention resides in treating the concrete sub-floor to destroy the lithographic nature of its surface, and in then pouring or applying hot, fluid, mastic on this receptive surface. The fluid mastic next is permitted to seek its own level, at least in local areas over the floor, and to cool to tacky consistency. Finally the finished floor is laid upon this tacky, mastic pad which thus has been established.

In the practice of the invention, I have found that the most convenient and economical way of treating the surface of concrete or composition sub-floor is to heat it by means of flame from a torch until it exhibits an average temperature, after treatment, of about 70° to 90° F. more or less, depending upon climatic conditions existing at the time of the installation.

The usual concrete sub-floor is not troweled or smoothed to a fine finish during laying, and, consequently, it usually is very rough and uneven. In the practice of the invention the surface of such a sub-floor is heated by passing over it a torch of the type conventionally used for heating asphalt in road construction work. If desired, the torch may be shielded or may carry a hood to confine the flames, though it is preferable to use an open flame to permit the workmen to observe the condition of the concrete as it becomes heated. If the weather is very wet and the floor is being laid, for instance, in an apartment building only partly finished, and in which the windows have not yet been hung, it is preferable to heat the concrete floor to a temperature of about 90° or so for a period of time sufficient to dry up all of the wet areas and accumulated pools of water. The flames raise the temperature at the surface portions momentarily to a degree much higher than 70° to 90° F. in a short period of time. During such heating the pores at the surface of the concrete are opened, and the concrete sub-floor is provided with an upper skin, or integument, in relatively dehydrated condition. This skin has lost its lithographic character and provides a firm purchase for the mastic pad next applied to it.

The next feature of the invention resides in the establishment of the mastic pad or sheet on the concrete sub-floor by pouring or applying the mastic when and while it is in liquid condition, for instance, at a temperature of 350° to 400° F. approximately. Sufficient mastic is poured onto the floor to obtain a layer from a sixteenth to three thirty-seconds of an inch or more in thickness. By virtue of the fact that this mastic is in fluid condition when it is applied, it seeks its own level when permitted to stand for a period of time. The top surface thus becomes smooth, even, and uniform, while the mastic at the lower surface has filled in all of the crevices of the rough concrete sub-floor. In this manner the mastic is treated in such a way that it actually penetrates into the dehydrated skin of the concrete, fills in the pores, and becomes firmly united therewith. This mastic pad provides a film and stable bond upon which the wood flooring next is laid. Being of substantial thickness, the pad essentially constitutes a continuous unbroken layer of insulation, preventing migration of moisture from the concrete sub-floor into the wood of the finished floor. At the same time, this pad, when permitted to stand for a period after it has been poured on, seeks its own level and provides a smooth, even, and tacky surface to receive and hold the finished flooring.

Another feature of the invention resides in the use of a pad of substantial thickness. If the floor is very rough and irregular, the fluidity of the mastic, when it is applied, enables the provision of a smooth and level surface upon which the finish floor is laid. This pad, therefore, extends over the entire surface of the room and troweling or smoothing is unnecessary. In ordinary installations it usually is sufficient to pour on a mastic sufficiently fluid to seek its own level in relatively local areas, since gradual variations of level over the entire mastic sheet are relatively unimportant.

The wooden finished flooring is laid upon the mastic pad after it has been permitted to cool and become tacky. The workman laying the floor may start at one point, for instance, at the doorway, and then lay block after block, or strip after strip, working from the finished flooring he has already laid toward the unfinished sections. Each piece is laid preferably with its tongue fitting into the groove of the piece previously laid. By virtue of the tacky nature of the mastic, only relatively slight pressure upon the piece is necessary for it to become bonded firmly to the pad beneath it.

A cross-sectional view of a typical flooring construction provided in accordance with the present invention, is illustrated in the drawing at Figure 1. The finished flooring is indicated generally at 2. The drawing illustrates finished flooring comprised of pieces assembled in the form of squares, some of which pieces, 3, are laid with the grain running in one direction and other of the pieces, 4, with the grain running in an alternate direction. The pieces are tongued and grooved for joining, as at 5. These pieces of flooring, if desired, may be relieved by grooving at the base, as at 6. The mastic pad or layer of substantial thickness is indicated at 7. This mastic pad conforms to the rough and irregular surface 8 of the concrete sub-floor 9.

Figure 2 of the drawing illustrates the con-

venient method for playing a torch flame upon the concrete sub-floor to destroy the lithographic nature of the sub-floor surface. In this figure the torch is indicated at 10. This torch is manipulated by a workman and is kept in motion over the surface until the desired treatment is obtained.

The mastic which I prefer to use in the practice of the invention is asphalt or an asphaltic base composition appropriately fluid and viscous when heated to 350–400° F. If desired the fluidity may be adjusted by the incorporation of volatile oil therewith. The mastic essentially comprises a composition sufficiently fluid when hot to be poured and applied easily and conveniently, and sufficiently tacky when cooled to room temperature to bond firmly with the wood of the finished flooring. By virtue of the tackiness of the mastic, it conforms readily to the irregularities or grooving in the under surface of the finished flooring, so that adhesion takes place over the entire surface of each individual piece of wood. Moreover, grooving the under faces of the flooring pieces, as at 6 of Figure 1, facilitates purchase of the mastic on the wood and prevents creeping movement of the flooring.

A typical mastic adapted to the practice of the invention comprises a prepared asphalt cement having the following specification:

| | Minimum | Maximum |
|---|---|---|
| Specific gravity at 60° F | 1.050 | 1.070 |
| Penetration 77° F. 100/5 sec | 60 | 70 |
| Penetration 32° F. 200/60 sec | 15 | 20 |
| Melting point (ring and ball) | 115° F. | 125° F. |
| Ductility at 77° F | 40 cms. | |
| Flash point (C. O. C.) | 350° F. | 450° F. |
| Loss at 325° F. 50 g., 5 hrs | 0.5% | 1.5% |
| Residue after loss, test-penetration 77° F. 100/5, as compared to original penetration before heating | 60% | |
| Bitumen (soluble in $CS_2$) | 95% | 98% |
| Ash | 1.0% | 3.0% |
| Fixed carbon (ash free) | 11% | 13% |
| Sulphur | 3.0% | 4.5% |
| Paraffine scale (Holde method) | | 0.5% |

The characteristics or specifications, of the mastic may be varied to suit climatic conditions generally existing in the different localities in the country. For example, a mastic intended to be used in the southern localities, where the temperature is relatively high, may have a melting point of about 190° F., while it is preferable that a mastic intended to be used in the northern and eastern seaboard localities have a melting point of about 120° F. In cases where the sub-floor is of a composition high in magnesium chloride, which is deteriorative to asphalt base mastics, it is preferable to use one of the special base commercial mastic compositions with which those skilled in the art are familiar. These, likewise, are applied in heated, fluid condition.

If the weather is very cold when a floor is to be laid, or if the sub-floor has become very wet, as by the bursting of a water pipe or the like during the course of building construction, in some instances it is desirable to apply a priming coat over the concrete sub-floor after it has been heated and opened. A suitable priming coat comprises a mastic, such as that disclosed above, diluted or cut back with an amount of oil sufficient to provide a degree of fluidity in the priming coat, enabling it to penetrate the concrete and prevent migration of moisture into the dehydrated surface before the mastic pad itself can be established.

The typical procedure in laying flooring in accordance with the present invention is as follows:

The rough sub-floor first is swept clean of any loose dirt, plaster, cement, and dust, then the sub-floor is heated as described, the lithographic nature of the concrete surface is destroyed, the surface portion of the sub-floor is rendered penetrable by the hot mastic, and the sub-floor is ready to receive the pad. Next, hot mastic (or fluid priming coat if necessary) is poured onto the sub-floor by means of an ordinary sprinkling can or the like. The workman, after several trials, finds no difficulty in pouring on an amount of mastic suitable to provide a layer of the desired thickness after the mastic has sought its own level. Thereafter the pad is permitted to stand for a period of time until the upper surface of the pad has become smooth and the mastic has set to tacky consistency. This period may be anywhere from two to twelve hours, depending upon climatic conditions. In some circumstance laying the finished flooring may be delayed for a week or so after the pad has been laid. When this occurs, it is desirable to torch lightly over the surface of the pad until it attains the desired tacky consistency. Finally the flooring is laid in the manner described, or otherwise, a light coat of asphalt primer applied a few hours before the laying of the finish floor restores the tacky condition. The finish flooring preferably is sealed, as soon as possible, after it has been laid, to prevent the entrance of moisture from the exposed upper surface.

Strip flooring is laid, according to the method of the invention, in the same manner that block flooring is laid. If the strips are warped or have become badly bent they may be tacked into place until a firm bond is established between the flooring and the mastic, by nailing through the strips at suitable intervals, using the carbon steel nails which are available at the present time. The nails provide temporary fastening of the wood into position until the bond between the flooring and the pad is set, and later are removed.

The flooring laid in accordance with the invention, in a sense, floats upon the pad and the pad, being of substantial thickness, is sufficiently resilient to take up the variations through the expansion and contraction of the wood. Such flooring, laid in accordance with the invention and sealed properly at its exposed surface, does not become warped, buckled, or loose even after the floor has been sloshed and flooded with water and permitted to stand for several days in this wet condition. A relatively perfect bond takes place between the mastic and the wood within a few minutes' time and is so strong that it is relatively impossible to pry the wood loose by hand without splitting it. In this manner parquet, wood block, square, and strip flooring can be laid without encountering the difficulties which have characterized such flooring in the past.

The method of the invention also is useful in laying new flooring over old and worn wooden flooring or wooden sub-flooring. In this instance the mastic is poured over the wooden base floor structure in the same manner as that previously described and the new finish flooring is provided upon the mastic pad thus established. The mastic pad in either instance provides an insulating layer having sound-proofing qualities and also provides a pad sufficiently resilient and plastic to prevent either the old or the new flooring from squeaking during usage

Having described my invention, I claim:

1. As a new art, the method of laying a wooden floor comprised of pieces of wood upon a concrete sub-floor by heating the surface of the sub-floor until the pores at the surface of the concrete are open and receptive to an oleaginous mastic, then pouring an oleaginous mastic over the floor thus treated, in an amount sufficient to provide a mastic pad thereon of substantial thickness, then permitting said mastic to seek its own level over a period of time and provide a smooth, tacky surface, and then laying the pieces of wood flooring upon the mastic while the mastic is of a tacky consistency.

2. A method of providing a wooden finish floor upon a sub-floor structure, which method consists in rendering the upper surface of said sub-floor penetrable by a heated oleaginous mastic, then pouring on said sub-floor a heated mastic possessing the capacity to set to tacky condition, in an amount sufficient to provide a mastic pad of substantial thickness on said floor, permitting said mastic over a period of time to seek its own level, and reach tacky consistency and then positioning and bonding pieces of wooden flooring on said mastic pad.

3. The method of laying flooring upon a concrete base, which comprises, playing a torch flame upon the surface of the base to render the surface portion receptive to an oleaginous mastic, then establishing a continuous layer of substantial thickness of mastic composition upon the receptive surface of the concrete base and permitting the mastic composition to seek its own level over a period of time and bond firmly with the base and set to tacky consistency and then laying wooden flooring upon the mastic layer.

4. The method of laying a wooden floor upon a concrete base, which comprises, heating the surface portion of the concrete base to a substantial temperature over a relatively short period of time to render the surface portion of the base receptive to an oleaginous mastic, then priming said surface portion by the application of a fluid mastic composition, then establishing thereon a mastic pad of substantial thickness on said floor and permitting the mastic over a period of time to seek its own level and present a smooth but tacky surface, then laying wooden flooring upon said mastic pad.

5. The method for laying wooden flooring upon a concrete base, which comprises, elevating the surface portion of the concrete base to a relatively high temperature over a relatively short period of time to render such surface portion receptive to an oleaginous mastic, then priming said surface portion with a fluid oleaginous mastic, next establishing a continuous layer of mastic composition of substantial thickness upon said flooring thus treated, by the application of a mastic composition sufficiently fluid to seek its own level and become tacky when permitted to stand over a period of time and then applying wooden flooring pieces upon said mastic pad after it has become level and tacky.

6. A method of providing a wooden finish floor upon a sub-floor structure, which consists in pouring on the said sub-floor a heated oleaginous mastic possessing the capacity to set to tacky condition, and an amount sufficient to provide a mastic pad of substantial thickness on said floor, permitting said mastic over a period of time to seek its own level, and reach tacky consistency and then positioning and bonding pieces of wooden flooring on said mastic pad.

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CERTIFICATE OF CORRECTION.

Patent No. 2,149,026. February 28, 1939.

JAMES F. McBRIDE.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 4, second column, line 32, claim 6, for the word "and" read in; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 4th day of April, A. D. 1939.

Henry Van Arsdale

(Seal) Acting Commissioner of Patents.