Feb. 7, 1928. 1,658,178

C. N. WENRICH

LAYING LINOLEUM AND SIMILAR FLOOR COVERINGS

Filed June 3, 1927

FIG. 1.

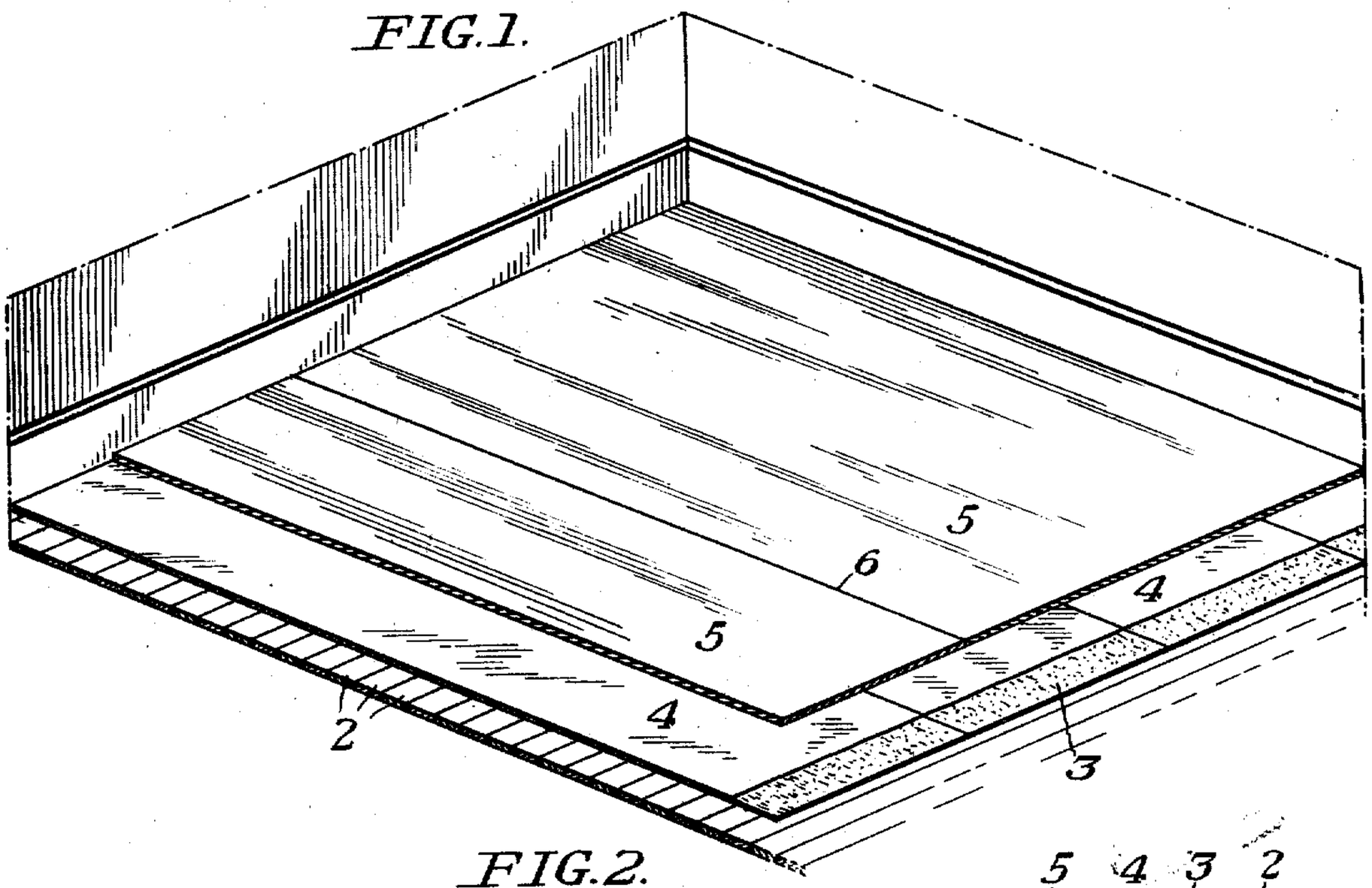


FIG. 2.

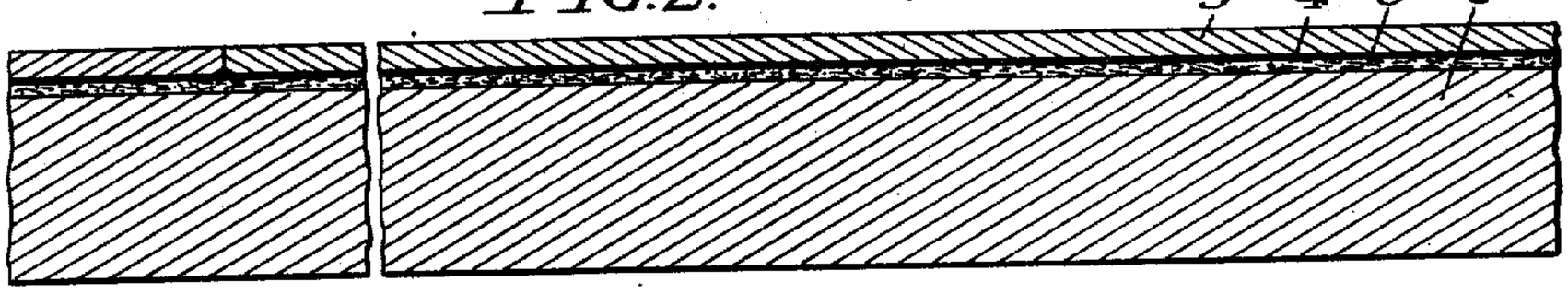


FIG. 3.

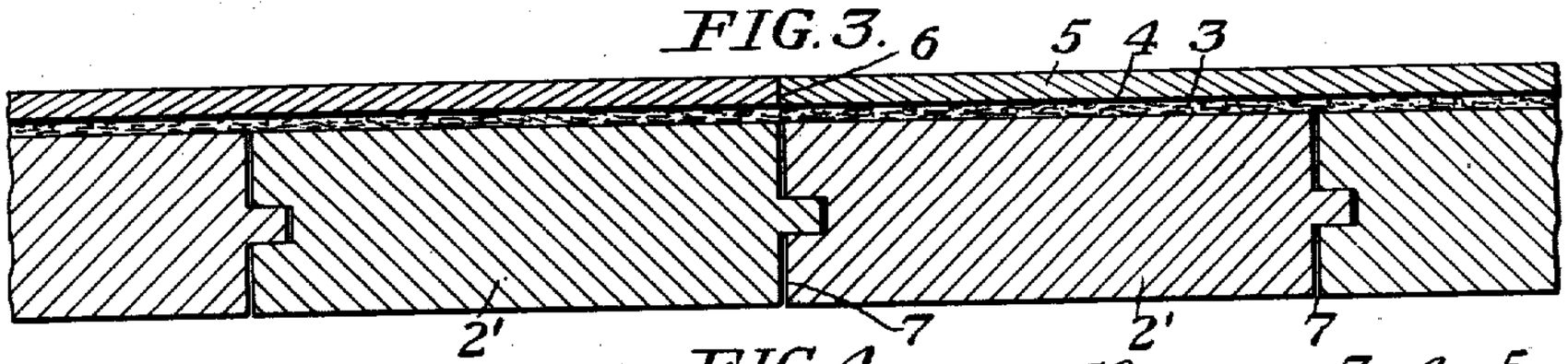


FIG. 4.

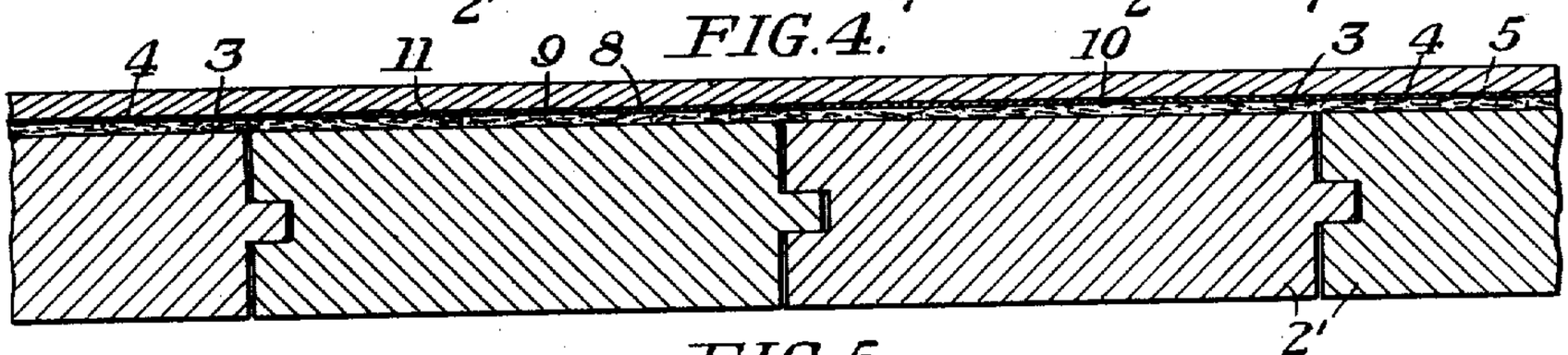
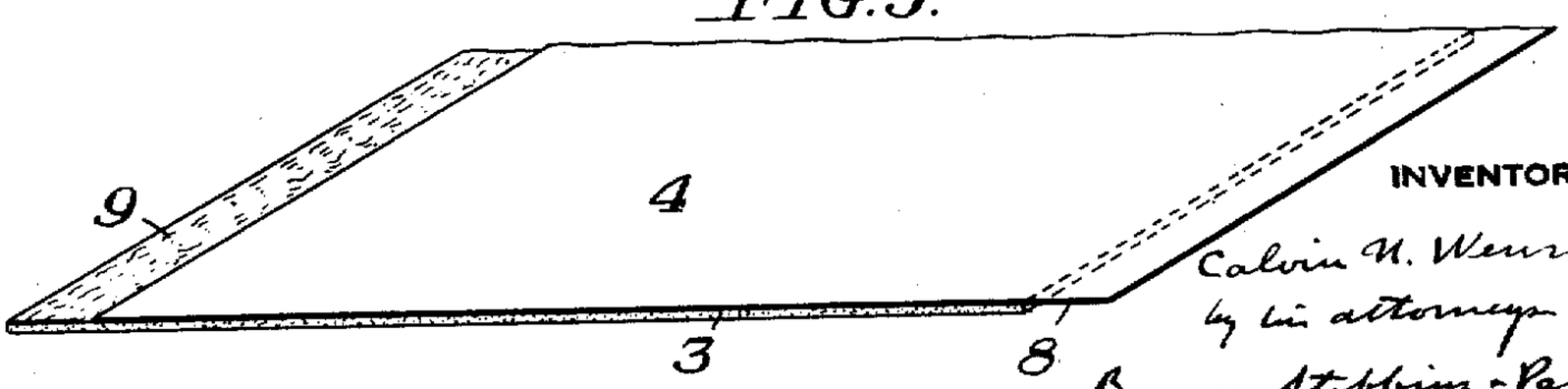


FIG. 5.



INVENTOR

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UNITED STATES PATENT OFFICE.

CALVIN N. WENRICH, OF LANCASTER, PENNSYLVANIA, ASSIGNOR TO ARMSTRONG CORK COMPANY, OF LANCASTER, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

LAYING LINOLEUM AND SIMILAR FLOOR COVERINGS.

Application filed June 3, 1927. Serial No. 196,203.

This invention relates to laying linoleum or similar hard surfaced floor coverings, and more particularly to the laying of such a floor covering with an improved lining between it and the floor.

The boards of wooden floors are subject to contraction or expansion due to atmospheric conditions which tend to open or close the joints between the boards. It has been found that when linoleum is cemented directly to a wooden floor the shrinkage of the floor boards may cause the linoleum to open at the joints and may even rupture the linoleum over a joint between floor boards. Also, irregularities in the floor boards appear as irregularities in the surface of the linoleum.

In order to relieve the linoleum from direct application of strains caused by shrinking floor boards and to smooth out the surface irregularities, it has been the usual practice, when a linoleum is to be cemented in place, to first apply a lining of heavy felt to the floor. A cement or suitable adhesive is first applied to the floor, then the felt is laid, and then the linoleum is cemented to the upper surface of the felt. The felt is structurally weak and allows the cracks between floor boards to open and close without transmitting a rupturing strain to the linoleum. This freedom of relative motion between the lower surface of the felt which is cemented to the boards and the upper surface of the felt which is cemented to the linoleum is due to its physical structure. The felt is made of fiber, such as rag or cotton fiber or paper stock or a mixture of them, which is felted together in a felting or paper making machine to form a layer of felt or fibrous material having a generally laminar structure. Examination of a piece of builders' felt shows that it can be readily pulled apart, splitting along the laminar planes between the layers or laminæ of the felted material. Moreover, the material of the felt is yielding, so that there can be a relative movement between the top surface of the felt and the bottom surface of the felt, either due to a slight yielding of the felted fibers or even for larger movements to an actual slippage between the laminæ of the felt. It is this ability of the felt to permit the movement of the floor boards untransmitted to the linoleum which particularly adapts it as a lining for laying linoleum on a wooden floor.

It has been found, however, that there are certain difficulties encountered in the use of the felt lining for linoleum. There is often a tendency for the strips of linoleum at their edges to curl upwardly. This tendency to curl is resisted by the cement which sticks the linoleum to the felt. However, since the felt is structurally weak and is made up of a more or less layer-like arrangement of felted fibers, the upward strain of the edge of linoleum may cause the felt to split in a horizontal plane through the felt and between its laminæ. An examination of a curled seam between two pieces of linoleum shows usually that the bottom surface of the felt is cemented to the floor and the upper surface is cemented to the linoleum, but that the felt has split along a horizontal plane and therefore does not hold the linoleum down, allowing the edges to curl up away from the floor.

The felt is not only structurally weak along a direction normal to the plane of the felt, but is relatively weak in resisting strains longitudinally of the felt. It is therefore found that if a joint between two strips of linoleum coincides or lies near an expanding crack between floor boards, that the expanding crack between the boards will transmit sufficient force to the linoleum to open the joint between the two strips, stretching or tearing the felt apart along the line of the joint.

I have found that the advantages in the use of a felt lining for laying linoleum may be obtained and the foregoing difficulties overcome by interposing a sheet of paper or similar thin inextensible material between the felt and the linoleum. In laying the linoleum according to my method, the felt is cemented to the floor, a layer of strong paper is cemented to the felt, and the linoleum is cemented to the paper. The felt allows the cracks between the floor boards to open and close due to atmospheric or seasonal conditions, but the paper serves to prevent the adjacent edges of the strips of linoleum from curling up and prevents the joints between the two pieces of linoleum from opening due to shrinkage of the floor boards. The lining is preferably made at

the factory by cementing the paper to the felt so that the man who lays the linoleum simply cements the lower felt face of the composite lining to the floor and cements the linoleum to the top or paper face.

In the drawings, which illustrate the preferred embodiment of my invention,—

Figure 1 is a perspective view of a portion of a floor upon which the linoleum is laid;

Figure 2 is an enlarged sectional view through the floor, the linoleum and lining, showing the floor boards running at right angles to the strips of lining and linoleum, as shown in Figure 1;

Figure 3 is a view similar to Figure 2 showing the floor boards running parallel to the strips of linoleum and lining;

Figure 4 is a view similar to Figure 3 showing a modified form of lining; and

Figure 5 is a perspective view showing the modified form of lining employed in Figure 4.

Referring to the illustrated embodiment of the invention, there is shown in Figure 1 a wooden floor made up of floor boards 2, a layer of felt 3 cemented to the floor, a layer of paper 4 cemented to the top of the felt, and a linoleum 5 cemented to the top of the paper. The linoleum and felt are laid in the usual ways using the usual pastes or cements employed for such purpose. Usually the lining is cemented to the floor with what is known as linoleum layer's paste, and the linoleum is cemented to the lining with a similar paste except for a few inches each side of the joints between the linoleum, along which a weatherproof cement is used.

The felt which I employ is the usual unsaturated grey lining felt made of rags and cotton employed as a lining for laying linoleum. The standard felt used for this purpose is approximately one-tenth of an inch thick and weighs about 1½ pounds per square yard. Felt of the standard weight may be used, although I prefer to use a somewhat lighter felt, say of a weight about one pound per square yard, particularly where the composite lining consisting of the felt and paper is made up at the factory. When the felt is cemented to the floor and the linoleum is cemented to the felt, the upper and lower surfaces of the felt become somewhat impregnated with the cements or pastes applied by the men who lay the linoleum. The felt therefore has to be thick enough so as to leave a core or center of unimpregnated fibers to allow the relative movement or slippage required. It has been found that felt of a weight of about 1½ pounds per square yard has been sufficient. When the paper is cemented to the felt at the factory the adhesive can be spread on thinner and more evenly, so that the upper surface of the felt will be less impregnated and stiffened by the adhesive. For this reason, it is possible to use a somewhat thinner felt than is feasible when the men who lay the linoleum apply the adhesive by hand to the upper surface of the felt. The thinner layer of felt reduces the cost of the lining. Also the thinner layer of felt minimizes the depressions made by casters and the legs of heavy furniture resting on the linoleum. While I prefer to use the usual felt employed in laying linoleum, other similar materials which would allow for the relative movement of the floor boards might be employed, such, for example, as batting of soft fibrous materials.

The sheet material which is applied to the top of the felt between it and the linoleum is preferably paper. Paper is structurally strong and has practically no stretch and is therefore peculiarly adapted for this purpose. The paper should be sufficiently strong so as to resist the rupturing strains which may be imposed on the lining by the shrinking floor boards. As a specific example, I have found a paper known as a heavy jute fiber container board about .02″ thick and withstanding 95 pounds Mullen test to be satisfactory. Other strong papers might be used, such as the heavy kraft papers. The paper should be strong enough so that under the most unfavorable conditions usually encountered in wooden floors, the slippage will occur between the upper and lower layers of the felt without rupture of the paper. This balance of strength in favor of the paper as against the felt, insures that the joints between the adjacent strips of linoleum will not open up under even the most unfavorable conditions usually encountered in wooden floors.

Moreover, the paper will prevent the edges of linoleum from curling up and opening the seam between the strips of linoleum, which experience has shown that the felt alone will not prevent. The edges of the linoleum will of course be cemented securely to the top surface of the paper. The paper is strong and substantially inextensible or non-stretchable, so that if the adjacent edges of two strips of linoleum tend to curl up and thereby separate, they will be held together by the paper. The paper lies beneath the linoleum in a flat horizontal plane, and if the paper were to be raised it would mean that the paper would have to be stretched from a flat into a bowed condition, which could not occur since the paper will not stretch. Also, the paper itself does not have the tendency of splitting along any cleavage planes, and the lifting tendency which is localized on the top of the paper along the line of the seam will be distributed by the paper over a considerably larger area on the top of the felt in the neighborhood of the seam.

While it is preferred to use paper because

it is cheap, readily obtainable in the desired weights and strength, and pliable so that it can be rolled up, other materials which have the desired characteristics of substantial inextensibility and strength to resist rupture might be employed, such, for example, as very thin metal, or possibly a hard woven suitably reinforced or impregnated textile fabric, or a wire cloth.

Referring particularly to the drawings, Figure 1 shows the strips of lining material and linoleum laid at right angles to the floor board, which is preferred if the laying conditions are convenient. However, the strips of lining and linoleum may be laid parallel to the floor boards. The strips of lining material may be laid either parallel or at right angles to the strips of linoleum. Usually for convenience the strips of lining material are laid lengthwise of the room in the same direction as the strips of linoleum. When this is done the linoleum and lining material should be laid so that the joints between the strips of lining material do not coincide with or too closely approach the joints between the strips of linoleum.

In Figure 2 there is shown a fragmentary cross-section illustrating the materials as laid in Figure 1 with the lining material and linoleum laid at right angles to the floor boards.

In Figure 3 there is illustrated the laying of the strips of linoleum parallel to the floor boards. Figure 3 illustrates the most severe condition encountered, namely, the coincidence of the joint 6 between adjacent strips of linoleum immediately above a joint 7 between floor boards. In this case the longitudinal stress due to shrinking of the floor boards will be localized along the line in the paper immediately below the joint between the two strips of linoleum. The paper should be strong enough so that if the floor boards 2′ separate to open up a crack at 6 between the boards, the paper will not be torn but instead the felt will yield, or if the movement is great enough the felt will actually rupture along its cleavage planes to permit slippage between its upper and lower layers.

Figures 4 and 5 illustrate a modification. Instead of having the edges of the paper coincide with the edges of the felt, the strip of paper 4 is offset somewhat to one side of the strip of felt 3, so that when laid the extending flap 8 of the paper will overlie the extending flap 9 of the felt. In this way the joint 10 between the edges of the paper will be offset from the joint 11 between the edges of the felt.

While it is preferred to make up the composite lining by securing the paper to the felt at the factory, the felt may be laid first on the floor and the paper thereafter cemented to the laid felt. Also, while it is preferred to use a cement to secure the paper to the felt, it might be otherwise secured, as by stitching.

While I have described my invention with particular reference to the laying of linoleum, it will be understood that it may be applied in the laying of other hard surfaced floor coverings, such as felt base goods, oil cloths, cork or composition tiling, and so forth.

I have illustrated and described certain preferred embodiments of my invention, but it will be understood that the invention is not limited thereto but may be otherwise practiced and embodied within the scope of the following claims.

I claim:

1. The method of laying linoleum or similar floor covering, which comprises laying on the floor a lining having a layer of felt and a superposed layer of paper, and cementing the linoleum to the top of the lining.

2. The method of laying linoleum or similar floor covering, which comprises cementing to the floor a lining formed of a layer of felt and a superposed layer of paper cemented to the felt, and thereafter cementing the linoleum to the lining.

3. The method of laying linoleum or similar floor covering, which comprises laying on the floor a lining comprising a layer of structurally weak yielding material and a superposed layer of a strong substantially inextensible thin sheet material, and securing the linoleum to the top of the lining.

4. The method of laying linoleum or similar floor covering, which comprises cementing to the floor a lining consisting of a sheet of felt and a thin sheet of strong substantially inextensible material cemented to the top of the felt, and thereafter cementing the linoleum on top of the lining.

5. A lining for laying linoleum or similar floor covering, comprising a layer of felt and a layer of paper secured thereto.

6. A lining for laying linoleum or similar floor covering, comprising a layer of felt and a layer of paper cemented thereto.

7. A lining for linoleum or similar floor covering, comprising a layer of relatively weak yieldable material and a layer of thin strong substantially extensible material secured thereto.

8. The combination of a floor, a lining consisting of a sheet of felt cemented to the floor and a sheet of paper cemented to the top of the felt, and a hard-surfaced floor covering cemented to the top of the lining.

9. The combination of a floor, a lining laid over the floor and comprising a layer of felt and a superposed layer of paper, and a hard-surfaced floor covering cemented to the top of the lining.

10. The combination of a floor, a lining

laid on the floor and comprising a layer of felt and a superposed layer of paper, and a hard-surfaced floor covering cemented to the lining, there being a balance of strength in favor of the paper sufficient to permit slippage between the layers of the felt before tearing of the paper will occur at seams between the pieces of the floor covering.

11. The combination of a wooden floor, a lining cemented to the floor comprising a layer of felt and a superposed layer of paper cemented to the felt, and a hard-surfaced floor covering cemented to the paper, the paper being of sufficient strength so that slippage will occur between the layers of the felt before the paper will be torn along seams between pieces of the floor covering by movements of the floor boards.

In testimony whereof I have hereunto set my hand.

CALVIN N. WENRICH.

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11. The combination of a wooden floor, a lining cemented to the floor comprising a layer of felt and a superposed layer of paper cemented to the felt, and a hard-surfaced floor covering cemented to the paper, the paper being of sufficient strength so that slippage will occur between the layers of the felt before the paper will be torn along seams between pieces of the floor covering by movements of the floor boards.

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CERTIFICATE OF CORRECTION.

Patent No. 1,658,178. Granted February 7, 1928, to

CALVIN N. WENRICH.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 3, line 118, claim 7, for the word "extensible" read "inextensible"; 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 6th day of March, A. D. 1928.

Seal.

M. J. Moore,
Acting Commissioner of Patents.

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