Oct. 6, 1925. 1,555,914

A. C. DENNING

FLOOR AND PROCESS OF LAYING FLOORS

Filed June 18, 1921

Fig 1

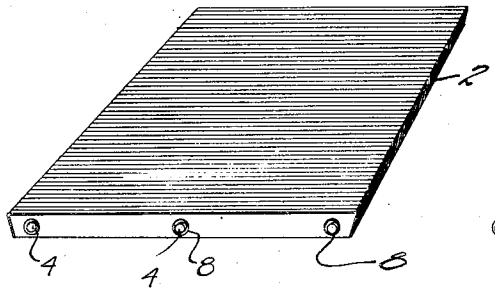


Fig 2

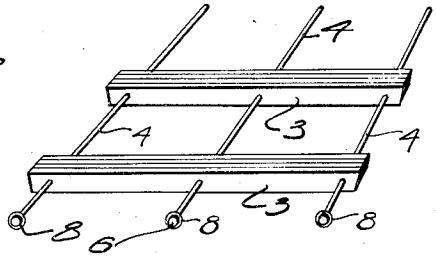


Fig 5

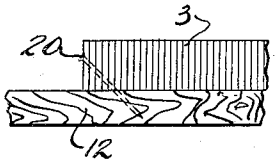


Fig 4

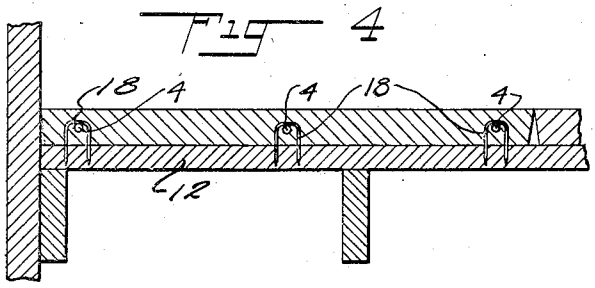


Fig 6

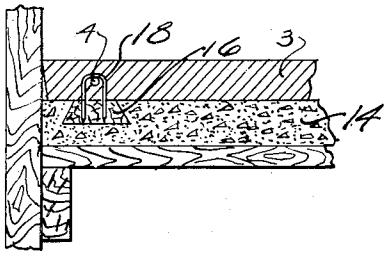


Fig 3

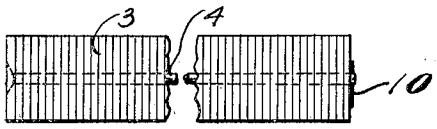


Fig 7

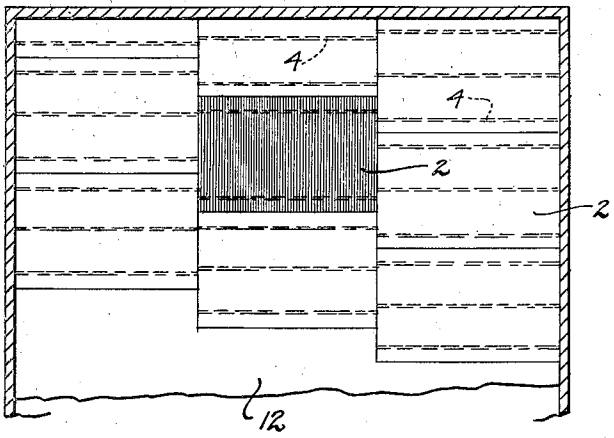
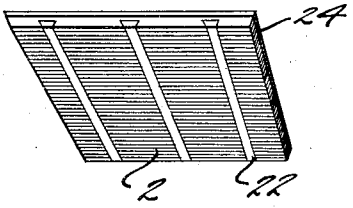


Fig 8



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By his Attorneys

Newell and Spencer

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UNITED STATES PATENT OFFICE.

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FLOOR AND PROCESS OF LAYING FLOOR.

Application filed June 18, 1921. Serial No. 478,623.

To all whom it may concern:

Be it known that I, ANSEL C. DENNING, a citizen of the United States, residing at Johnson City, New York, have invented certain new and useful Improvements in Floors and Processes of Laying Floors, of which the following is a clear, full, and exact description.

This invention relates to floors or pavements and has for its general object to effect improvements both in floor or pavement construction, in materials employed in floor and pavement construction and in processes of assembling and laying floors or pavements. The invention is herein shown as embodied in a building floor, but it will be understood that in many of its aspects the invention is applicable to pavements as well as to floors and that the invention is not restricted to the embodiment or uses herein specifically illustrated and described.

A particular object of the invention is a floor construction which will permit the convenient use of compositions of vegetable or animal fibre or mixtures of such fibres in such manner as to obtain the greatest benefit from the peculiar characteristics of such compositions with respect to durability, elasticity, non-conductivity of heat and electricity, sound-deadening qualities, etc.

An important feature of the invention is the construction of a fibre floor from fibrous sheet material in such manner that the fibres are substantially on end. Another important feature is the simple means for assembling and holding the strips of sheet material in assembled relation to facilitate the laying of the floor and the maintenance of the strips in proper abutting relation to each other. Still other important features of the invention are the novel means and the novel process by which the improved floor is laid with the lateral pressure throughout its area substantially uniform. Other objects and advantages of the invention will appear from the following description and claims when considered in connection with the accompanying drawings in which—

Fig. 1 is a perspective view of one form of block or section which may be employed in constructing the novel floor of the present invention;

Fig. 2 is a detail view showing the mode of assembling the fibre sections to form a block such as is shown in Fig. 1;

Fig. 3 is a side elevation of a block with the fibre strips held together under predetermined pressure;

Fig. 4 is a sectional view through a portion of a floor having a wooden under floor for supporting the fibre floor, showing the mode of stapling the fibre floor sections to the floor support;

Fig. 5 is a view illustrating the manner of toe-nailing the exposed end of a block or section before releasing the strips from the action of the means by which the predetermined pressure has been bottled up in the block or section;

Fig. 6 is a view similar to Fig. 4 showing the mode of attaching the blocks or sections when a concrete under-floor or support is used;

Fig. 7 is a plan view of a floor embodying the present invention; and

Fig. 8 is a view of another form of block or section made substantially in accordance with the disclosure in my co-pending application Serial Number 414,461, filed October 4th, 1920, of which application the present application is in part a continuation.

As hereinabove suggested, the floor or pavement of the present invention is formed of fibrous material, preferably of artificial compositions or mixtures of animal or vegetable fibres or of both, and to provide a construction having high-wear-resisting qualities the fibres are preferably arranged, so far as possible, on end. According to the present invention, this arrangement of the fibres is obtained by forming the floor of strips of fibrous sheet material, such, for example, as sheet material formed upon a cylinder wet machine after the manner of paper making, the strips being cut from the sheet transversely to the run of the original sheet and being arranged in the floor in abutting relation, edge up. Inasmuch as a fibre sheet formed in this manner has the great majority of its fibres arranged lengthwise of the sheet, it will be obvious that in the resultant floor most of the fibres will be on end.

In the illustrated embodiment of the in-

vention, the floor blocks or sections 2, one of which is shown in perspective in Fig. 1 of the drawings, are preferably composed of strips 3 of fibrous sheet material, which are punched or died out in the form shown in Figs. 1 and 2, from a sheet of fibre board of suitable composition, each of these strips being provided with transverse openings to receive rods 4, upon which they are threaded, each of the illustrated strips 3 having three openings and each of the sections 2 being provided with three of the rods 4. In order to confine the strips 3 upon the rods 4, each rod is preferably provided at one end with a head 6 which may, in itself, be large enough to serve as an abutment for the endmost strip at one end of the block or section 2, or which may confine a washer 8 in position to retain the endmost section 3 upon the rod.

The desired number of strips to form a block or section 2 having been strung upon the rods 4, the strips are pressed together lengthwise of the rods by any suitable means for imparting thereto a predetermined pressure, and while subjected to this predetermined pressure, cotter pins 10 are passed through holes in the rods 4, so located with respect to the endmost strip at the end of the block or section remote from the head 6 of the rod as to lock the strips together under the predetermined pressure; in other words, to bottle up the compression put upon the block. Suitable dimensions for a block of the construction described may vary considerably, but very successful results have been obtained with blocks 28″ long by 16″ wide and 7/8″ thick held together by three rods, each of $\frac{3}{16}$″ diameter and spaced substantially as shown in the drawings.

The blocks or sections formed in the manner herein shown and the above described are laid on a suitable supporting under-floor in the manner now to be described. In Fig. 4 is shown a floor made in accordance with the present invention laid upon a wooden under-floor 12, in which case no especial provision need be made for attaching the floor of the present invention to the under-floor. In Fig. 6 is shown a concrete under-floor 14 having inserted therein wooden strips 16 so located that they will be beneath the rods 4 of the blocks or sections 2, whereby the staples 18 or other means used to secure the blocks or sections 2 to the under-floor may be driven into these strips 16.

In laying the floor, it is important to secure substantially uniform lateral pressure throughout the floor and particularly pressure lengthwise of the rods 4, and to this end the bottling up of the predetermined pressure imparted to the strips 3 by the insertion of the cotter pins 10 through the rods 4 contributes. It is also important to provide for possible expansion or shrinkage, particularly the latter, of the strips 3 in the planes of the strips to prevent warping or buckling of the floor. As above suggested, the cotter pins 10 are so located as to confine the strips 3 upon the rods 4 under predetermined pressure and when a block or section is laid in position on the under-floor, it is toe-nailed in the manner shown in Fig. 5 of the drawings, the nails 20 used in toe-nailing the block or section being driven into that end of the block adjacent to the cotter pins 10, the strips 3 being thus held together by the toe nails 20 either under the same predetermined pressure as that imparted to them before the insertion of the cotter pins 10 or, if desired, under a slightly increased pressure produced by the toe-nailing operation. The end of the block having been toe-nailed in the manner described, the staples 18 are preferably then driven in position between the strips 3 so as to straddle the rods 4, a suitable number of staples in a block of the dimensions hereinabove set forth being three to each rod. To provide for the shrinkage or expansion of the strips 3 hereinabove referred to, the staples 18 are preferably of a width somewhat greater than the diameter of the rods 4, for example, a 5/8″ staple may be used with a $\frac{3}{16}$″ rod, thus providing a movement of the rod of substantially $\frac{3}{16}$″ in either direction. The rods thus being held at a predetermined distance from the under-floor and being free to move slightly to either side with the shrinkage or expansion of the strips, liability to buckling, or warping of the blocks after laying, is substantially eliminated.

The block or section 2 having been toe-nailed and stapled in the manner described, the ends of the rods 4 having the cotter pins 10 therein may be clipped off, thus permitting the next block or section 2 to abut closely against the end of the block already laid. The projection of the head 6 and washer 8 beyond the other end of the block is so slight that it is covered in the slight overhang of the adjacent strips 3 of the abutting blocks.

In the form of the invention shown in Fig. 8 of the drawings, which is the form illustrated and specifically claimed in my co-pending application hereinabove identified, the sections 3 are threaded upon wooden strips or splines 22 of dove-tail shape in cross section and fitting into correspondingly shaped openings notched into the lower edges of the strips 3. In this form of the invention the predetermined pressure is bottled up in the blocks or sections by binding the strips together by means of a wire 24 wrapped around the section or block 2 after it has been subjected to the predetermined pressure. This wire 24 may be cut after the block or section 2 has been laid in its proper position on the under-floor and the strips 22

have been nailed or otherwise attached to the under-floor. It will be noted that both the block or section shown in Fig. 8 and those shown in Figs. 1, 2, 3, 4 and 6 are formed of strips, each of which has the upper corner at each end slightly overhanging from the lower corner, thus permitting such abutting of the sides of the blocks as will insure a continuous floor surface.

A suitable block for carrying out the invention in a somewhat modified form may be made as follows. The sheet of fibrous material from which the strips 3 to form the block are to be died or punched is first coated on one side with a suitable binder, for example, Minwax, which is thermoplastic, the binder, if thermoplastic, being applied hot and the strips 3 being preferably punched out while the binder is in its plastic condition. The press used in punching or dieing out the strips 3 is preferably so arranged that each strip is pressed against the section previously died out with sufficient pressure to cause the plastic binder to hold the sections tightly together and in this manner a block may be formed which may be trimmed to the desired size and used without strips or rods for holding the fibre strips together.

If a more even penetration of the thermoplastic binder through the strips 3 is desired, the block formed in the manner above set forth may be subjected to further pressure in the presence of heat. Moreover, the blocks thus formed may be laid without nailing to the under-floor, if desired, a particularly effective floor construction having desirable waterproof qualities being obtained by using some of the same thermoplastic binder for cementing the blocks to the under floor.

It will be understood, of course, that the composition of the fibre sheet from which the strips 3 are formed may vary considerably according to the requirements of the floor to be constructed therefrom, and that the dimensions of the blocks, particularly the thickness of the floor, may also vary from those above given. A suitable fibre composition from which floors of the type herein described have been made for factory use and which have successfully met the conditions of such use, is one in which about 20% of chrome leather has been combined with mixed papers and treated in a beating engine and formed into a sheet upon a cylinder wet machine after the manner of papermaking.

What I claim as new is:

1. Flooring comprising strips of fibrous material standing in abutting relation, edge up but unattached to each other, rods passing freely through said strips and substantially confining them against displacement in the strip plane, said flooring being substantially free to expand lengthwise of said rods and transverse to the strip plane when laid.

2. A floor block or section formed of individual strips of sheet material standing in abutting relation edge up and bound together under predetermined pressure but otherwise unconnected with each other.

3. A floor block or section, comprising individual strips of sheet material standing in abutting relation, edge up, rods passing through said strips and upon which said strips are confined against movement transverse to the plane of the block, but upon which they are movable transverse to their own planes, said strips being otherwise unconnected with each other, and means on said rods for confining said strips thereon under predetermined pressure.

4. A floor block comprising individual strips of sheet material arranged on edge in abutting relation but not directly connected to each other, and transverse strips confining said first mentioned strips against relative movement in the strip plane but upon which said first mentioned strips are slidable in a direction normal to the strip plane.

5. A floor block or section comprising individual strips of sheet material standing on edge in abutting relation but not directly connected to each other, transverse strips confining said first mentioned strips against movement in the strip plane, but upon which said first mentioned strips are slidable in a direction normal to the strip plane, and means binding said strips of sheet material together under a predetermined pressure normal to the strip plane.

6. A flooring block comprising strips of fibrous sheet material assembled in abutting relation, edge up, under pressure, and means for confining said strips in such assembled condition comprising rods passing through said strips and having provision at their ends for retaining thereon the endmost strips, said confining means being adapted to be freed at one end when laying the floor, thereby permitting expansion of the assemblage by the stored-up pressure and producing a tight joint between succeeding blocks in the direction in which the rods extend, while the alinement of the sections is maintained by said rods.

7. A floor formed of strips of sheet material standing in abutting relation edge up and having transverse connecting strips with which said first mentioned strips are interlocked against relative movement in the strip plane, said first mentioned strips being otherwise unconnected with each other, and a support for said floor to which said transverse strips are connected.

8. A floor formed of strips of sheet material standing in abutting relation, edge up, rods passing through said strips and by which said strips are held against movement

in the strip plane and staples straddling said rods and serving to attach said floor to its support.

9. A floor formed of strips of sheet material standing in abutting relation, edge up, rods passing through said strips and by which said strips are held against movement in the strip plane, and means for attaching said rods to the support for the floor, said means providing for a limited transverse movement of said rods to provide for expansion and contraction of the floor in a direction transverse to the rods.

10. The process of preparing and laying a floor of the character described, which consists in binding under uniform pressure normal to the strip plane blocks formed of strips of sheet material standing in abutting relation edge up, laying these blocks to form a section of floor and then releasing the strips from the action of the binding means.

11. The process of preparing and laying a floor of the character described which consists in binding, under uniform pressure normal to the strip plane, blocks formed of strips of sheet material standing in abutting relation, edge up, laying the block thus formed to form a section of the floor, toenailing the exposed end of the block thus laid to maintain the predetermined pressure and then releasing the strips from the action of the binding means.

12. The process of making a floor, which consists in forming units by assembling narrow strips of sheet material face to face edge up under pressure transverse to the strip plane, temporarily confining the assembled units, assembling a plurality of such units to cover the floor area and then releasing the confining means to permit the pressure to equalize itself among the units.

13. The process of making a floor, which consists in assembling strips upon a transverse rod or rods, confining the assemblage under pressure by means of the rods to form a floor unit, associating other units therewith and finally relieving the confined pressure after the associated units are assembled to allow partial expansion for closing the joints between adjacent units.

Signed at Johnson City, N. Y. this 16 day of June 1921.

ANSEL C. DENNING.