June 5, 1934. A. S. MACDONALD 1,961,230

LIBRARY FLOORING

Filed March 3, 1932

Fig: 1.

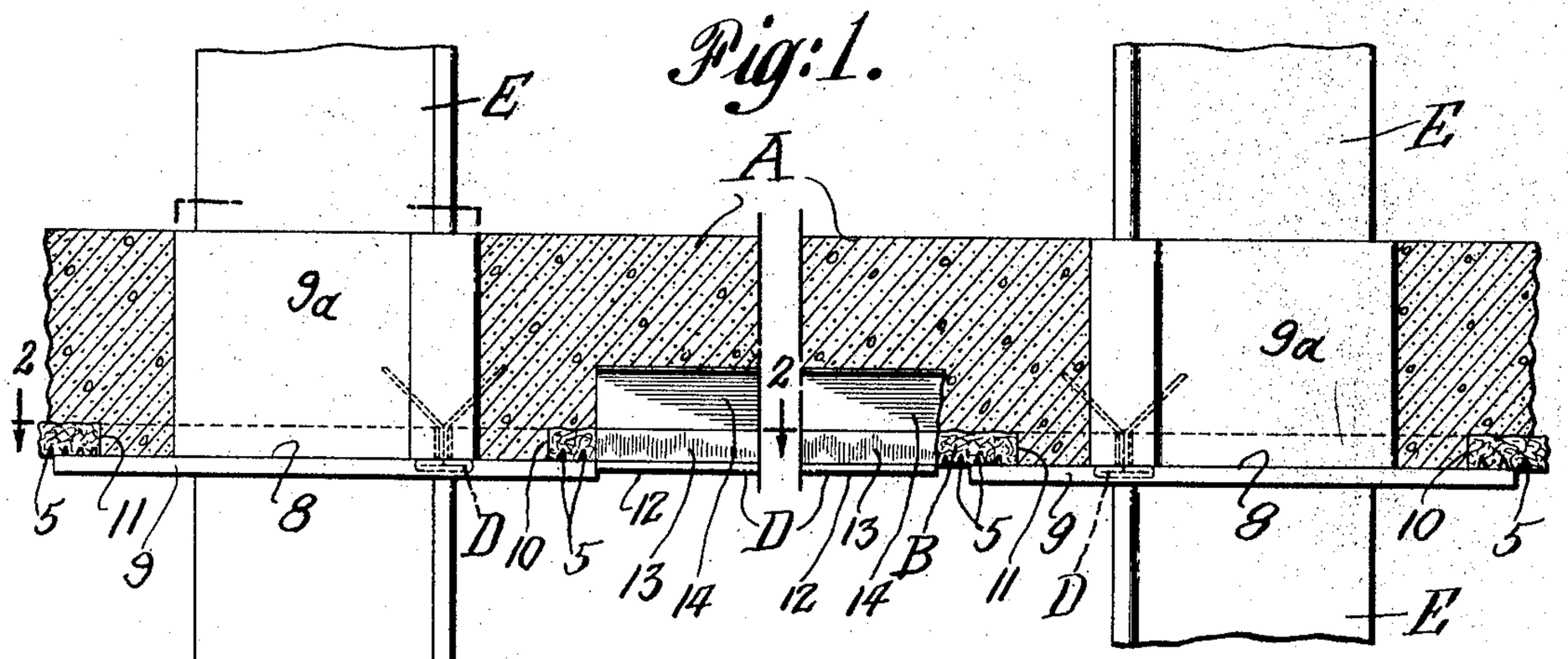


Fig: 2.

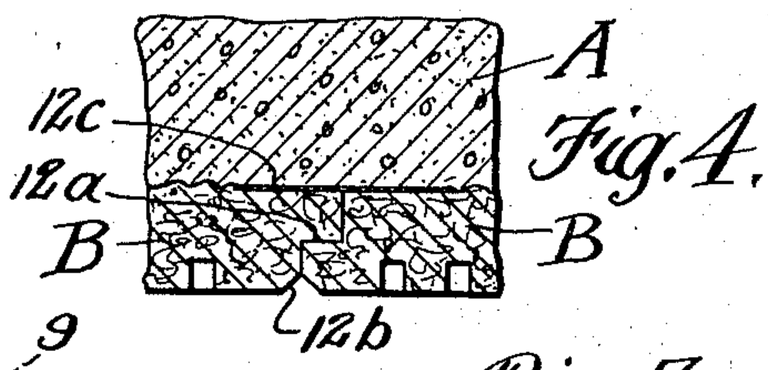


Fig: 4.

Fig: 3.

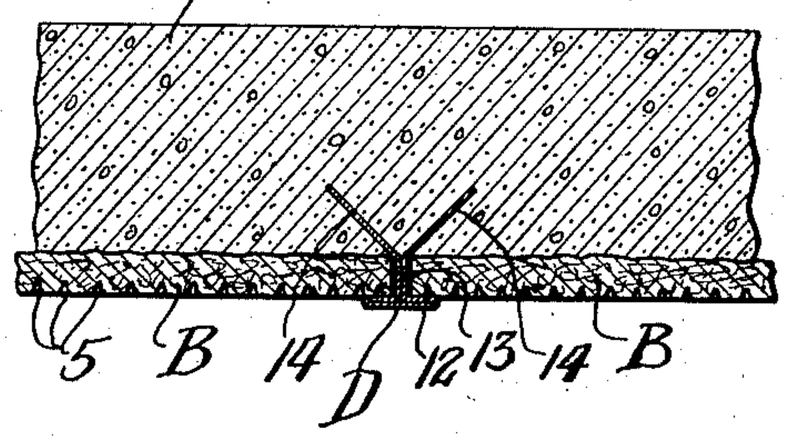


Fig: 5.

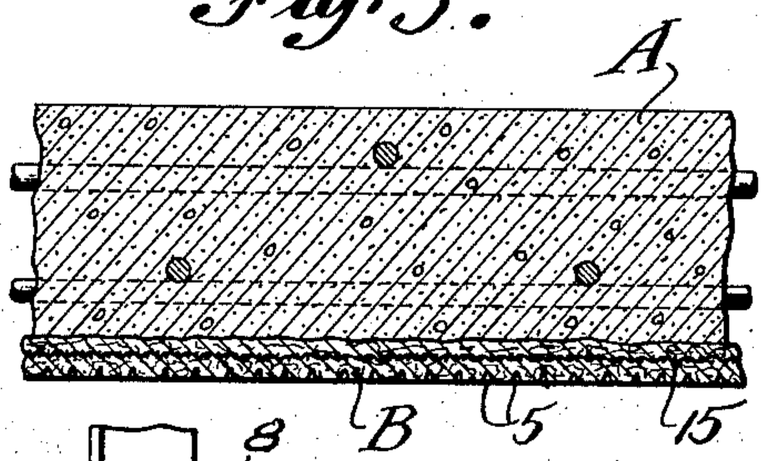
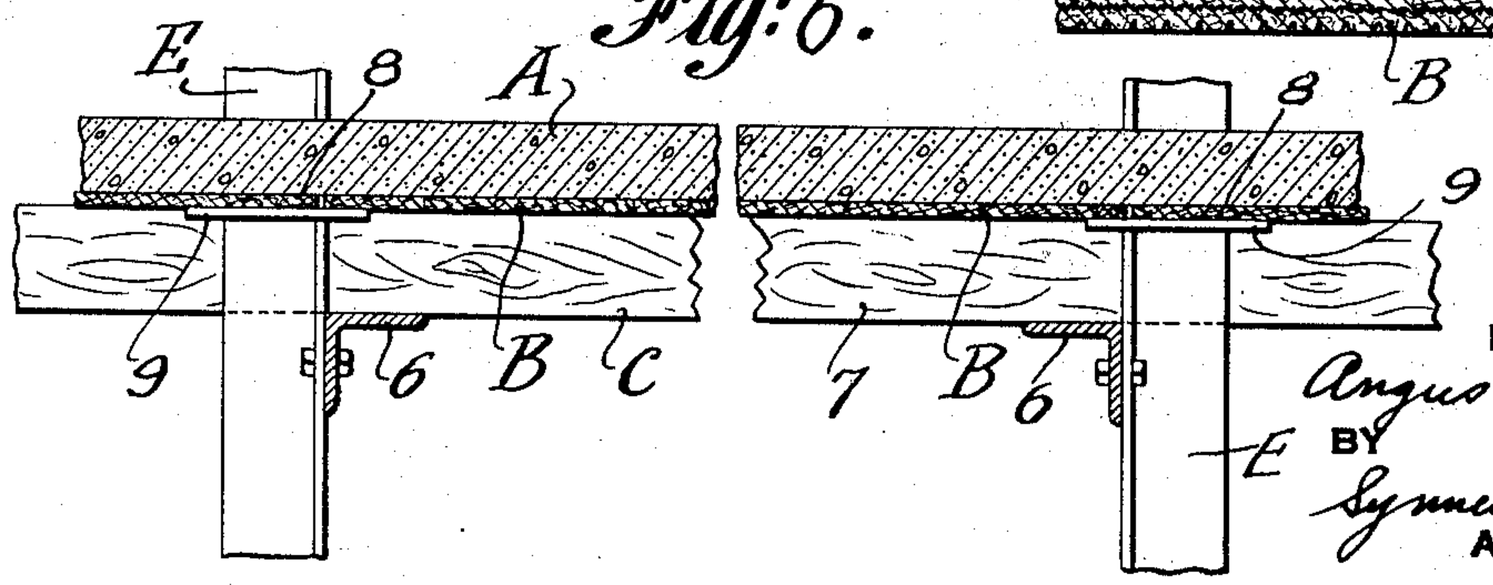


Fig: 6.



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UNITED STATES PATENT OFFICE

1,961,230

LIBRARY FLOORING

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Application March 3, 1932, Serial No. 596,451

7 Claims. (Cl. 72—70)

This invention relates to improvements in flooring and in particular to continuous deck floors for libraries and the like.

The primary object of my invention is the provision of a deck floor for libraries and the like so constructed that usual floor noises are largely eliminated.

Another object of my invention resides in the provision of an insulated floor in which the insulation material is of such arrangement as to cooperate with simple, inexpensive, and readily removable false work as a form for laying the floor.

More specifically my invention is an improvement on the library structure of my copending application Serial No. 465,321, filed July 2nd, 1930, the essential principles and arrangement of which it embodies.

How the foregoing, together with such other objects and advantages as may hereinafter appear, or are incident to my invention, are realized, is illustrated in preferred form in the accompanying drawing, wherein—

Figure 1 is a fragmentary sectional view thru a floor constructed in accordance with my invention and illustrating its association with structural uprights or columns of a building, the columns being shown in elevation and the section being taken substantially on the line 1—1 of Figure 2;

Figure 2 is a fragmentary plan section taken substantially on the line 2—2 of Figure 1;

Figure 3 is a fragmentary cross section thru the floor taken on the line 3—3 of Figure 2;

Figure 4 is an enlarged fragmentary sectional view illustrating a modification of the invention;

Figure 5 is a fragmentary sectional view illustrating another modification of the invention, and

Figure 6 is a fragmentary view similar to Figure 1 and illustrating the application of structural framework employed in laying the floor.

The floor A illustrated is particularly useful in libraries and is what may be termed a continuous bookstack deck floor of flat slab construction. The under side of the floor or slab is covered with insulating or acoustical material B, such as celotex, for the purpose of subduing noises within the stack room and for preventing the transmission of sound through the floor from one tier to the next.

In this connection it is pointed out that libraries are being used more and more as working laboratories where hundreds of students study at tables in close proximity to the bookstacks. Quietness, therefore, is important and I propose thru my invention to materially cut down or largely eliminate noise from footfalls and other causes.

The acoustical material B is preferably in the form of flat sheets having a multiplicity of closely spaced small hollows or recesses 5 in their bottom surfaces for the purpose of breaking up the sound waves. The top surfaces of the sheets may be similarly formed, or made rough in some other manner, so that the sheets will be securely keyed in with the concrete or similar material of which the floor A is made. I prefer to waterproof the top surfaces of the sheets which come in contact with the wet concrete with any suitable waterproofing compound.

In forming the floor the sheets B are used as form surfaces on which the concrete is poured and to the accomplishment of this end I shore up the sheets at fairly close intervals as by means of falsework, such as illustrated at C in Figure 6. Thus the sheets will well withstand the weight of the concrete as well as the weight of the man walking thereon before the concrete is poured. The framework C may comprise angle irons 6, secured to the columns for supporting a plurality of suitably spaced beams 7, the upper surfaces of which are level with the top surfaces 8 of column plates 9 carried by the columns for supporting the floor. Thus simple falsework is provided since it is only necessary to employ an open framework to support the sheets at reasonably close intervals and depend entirely on the sheets to keep the wet concrete from leaking thru. The falsework may be taken down and used over and over again with much greater facility than is possible when using ordinary tight wooden forms.

It is to be understood that rows of regularly arranged columns E are employed which support floors at various levels and which in turn are supported by the floors. The superimposed columns bear one on the other and the plates 9 are provided with upstanding portions which surround the columns to give additional support to the plates.

The column plates 9 are located at the level at which the floor is to come and it is to be noted that the sheets B are supported thereon at their corner portions. I prefer to arrange the sheets so that the joints will extend from the columns in four ways, as illustrated in Figure 2, so that the corners of four sheets rest on the column plates. These corner portions are cut away, as illustrated at 10 and 11, where they lap over the column plates 9, for the purpose of allowing the concrete to come into direct contact with the plates over a considerable area. Thru this arrangement the floor load does not pass down through the acoustical material to the plates and the columns below and therefore there will be no settlement of the deck floors due to compression of the sheets at these points.

In order to form a finish at the edges or joints of the sheets B, and to still more firmly lock the sheets to the concrete, I prefer to employ metallic

strips D. These strips have portions 12 for covering the joints between sheets, upwardly extending web portions 13 fitting in the space between the edges of adjacent sheets, and flared portions 14, 14 adapted to be embedded in the mass of the concrete serving as means for locking or anchoring the sheets firmly at their edges. These strips run from column to column and give a neat appearance to the under side of the flooring which is exposed as a ceiling for the floor below.

In Figure 4, I have illustrated a modified construction of the joints of the sheets B in which the edges of the sheets are constructed to form either shiplaps or tongue and groove joints as indicated at 12*a*. The lower edges of the sheets may be slightly chamfered as shown at 12*b* so as to form a V joint of attractive appearance. The upper edge of the joint is preferably covered with sealing means such as a paper sealing strip 12*c* so as to prevent wet concrete from seeping through the joint.

Referring now to the modification illustrated in Figure 5, it will be seen that a layer of reinforcing material 15, such as wire mesh, is embedded in the sheets, thus giving them greater structural strength. I have thus provided a tough substantial structural acoustical material which will greatly facilitate the work of building the supporting framework employed in laying the floor of sufficient strength to stand the weight of the wet concrete and the handling of materials overhead.

By employing a floor having acoustical material on the under side thereof, it will be unnecessary to provide plastered or painted surfaces or to take other means of finishing off the under side of the concrete slab since the acoustical material constitutes the ceiling of the floor below. Thus a considerable item of expense is eliminated.

However, the material may be readily painted if desired and in this connection it is pointed out that by employing the small recesses or holes 5 in the exposed surface of the material B to absorb sound, it will be possible to paint and repaint the exposed surface for the sake of cleanliness and fireproofness without eliminating the sound deadening qualities.

It is also pointed out that since the acoustical material has considerable elasticity, any cracks which may form in the concrete will not show up at the ceiling surface.

In libraries constructed in accordance with my invention it is customary to employ rolling or movable bookstacks and cases and it is customary to arrange them in rows extending from column to column with the backs falling substantially on the center line between columns. It will thus be seen that the stacks or cases must be of a height such that they will clear the bottom faces of the column plates 9 in order to enable arranging them in the manner just mentioned. Since the lower surface of the acoustical material falls in the same plane as the upper surface of the plates 9 it will be seen, therefore, that there will be no danger of the stacks or cases marring the acoustical material when they are moved from place to place. Neither will the acoustical material occupy any head room in the aisles since it is set in the floor.

I claim:—

1. In a deck floor for libraries and the like the combination of a flat slab of cementitious material, acoustical material on the under side thereof exposed as a ceiling for the floor below, and columns supporting said floor including plates on which the floor rests, said acoustical material being cut away at said plates but overlapping the plates and the cementitious material resting directly on the plates.

2. In a deck floor for libraries and the like the combination of a flat slab of cementitious material, acoustical material on the under side thereof exposed as a ceiling for the floor below, structural columns, and floor supporting plates carried by said columns, said acoustical material overlapping said plates but being cut away thereat so as to expose a considerable area of the plates to the cementitious material.

3. In library construction, a plurality of rows of spaced columns, supporting plates carried by the columns at various deck levels adapted to support deck floors and constituting part of a form for the casting of such floors, and sheets of acoustical material extending between and resting upon the plates to be carried thereby and together with said plates providing a substantially continuous form on which the floor may be poured.

4. In library construction, a plurality of rows of spaced columns, supporting plates carried by the columns at various deck levels adapted to support deck floors and constituting part of a form for the casting of such floors, sheets of acoustical material extending between and resting upon the plates to be carried thereby and together with said plates providing a substantially continuous form on which the floor may be poured, and means temporarily held by the sheets and permanently held by the concrete to cover the joints between adjacent sheets.

5. In a deck floor for libraries and the like the combination of a flat slab of cementitious material, sheets of acoustical material on the under side thereof exposed as a ceiling for the floor below, and columns supporting said floor including supporting plates for the floor, said sheets having cut-away portions and being arranged so that they overlap and are supported by said plates, and the cut-away portions providing substantial openings around the columns adapted to receive cementitious material whereby both the sheets of acoustical material and the slab of cementitious material receive direct support from the plates.

6. In a deck floor for libraries and the like the combination of a flat slab of cementitious material, sheets of acoustical material on the under side thereof exposed as a ceiling for the floor below, and columns supporting said floor including supporting plates for the floor, said sheets being cut away at their corners and being arranged so that they overlap and are supported by said plates at their corners, and the cut-away portions providing substantial openings around the columns adapted to receive cementitious material whereby both the sheets of acoustical material and the slab of cementitious material receive direct support from the plates.

7. In library construction a plurality of rows of spaced columns, members directly secured to the columns at various deck levels adapted to support deck floors, sheets of acoustical material extending between and supported solely by said floor supporting members so as to constitute with said members a form on which cementitious material may be poured to provide a concrete floor with acoustical material bonded thereto.

ANGUS S. MACDONALD.