Sept. 14, 1937. C. F. DAVIS 2,093,108

DECK

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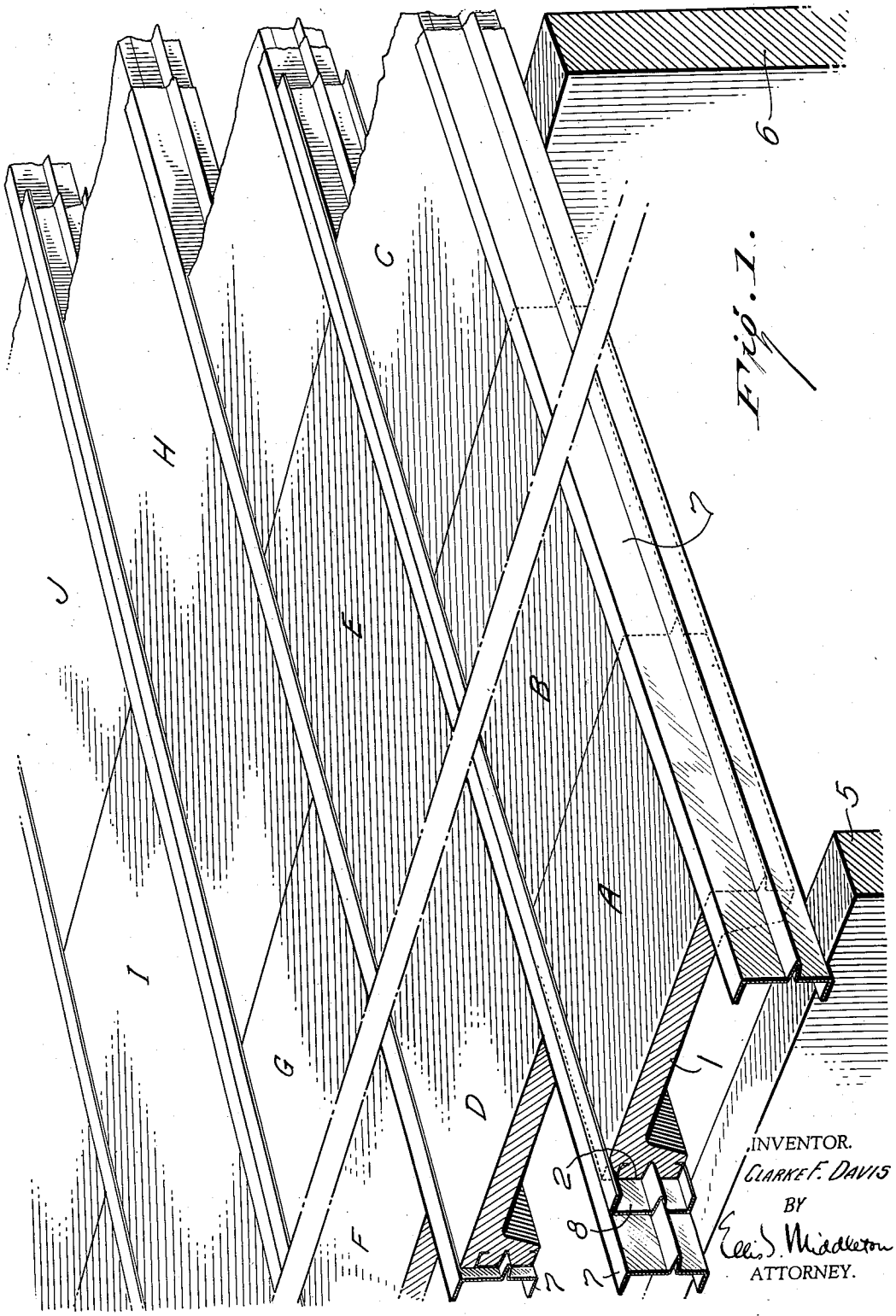


Fig. 1.

INVENTOR.
CLARKE F. DAVIS
BY
Ellis S. Middleton
ATTORNEY.

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Fig. 2.

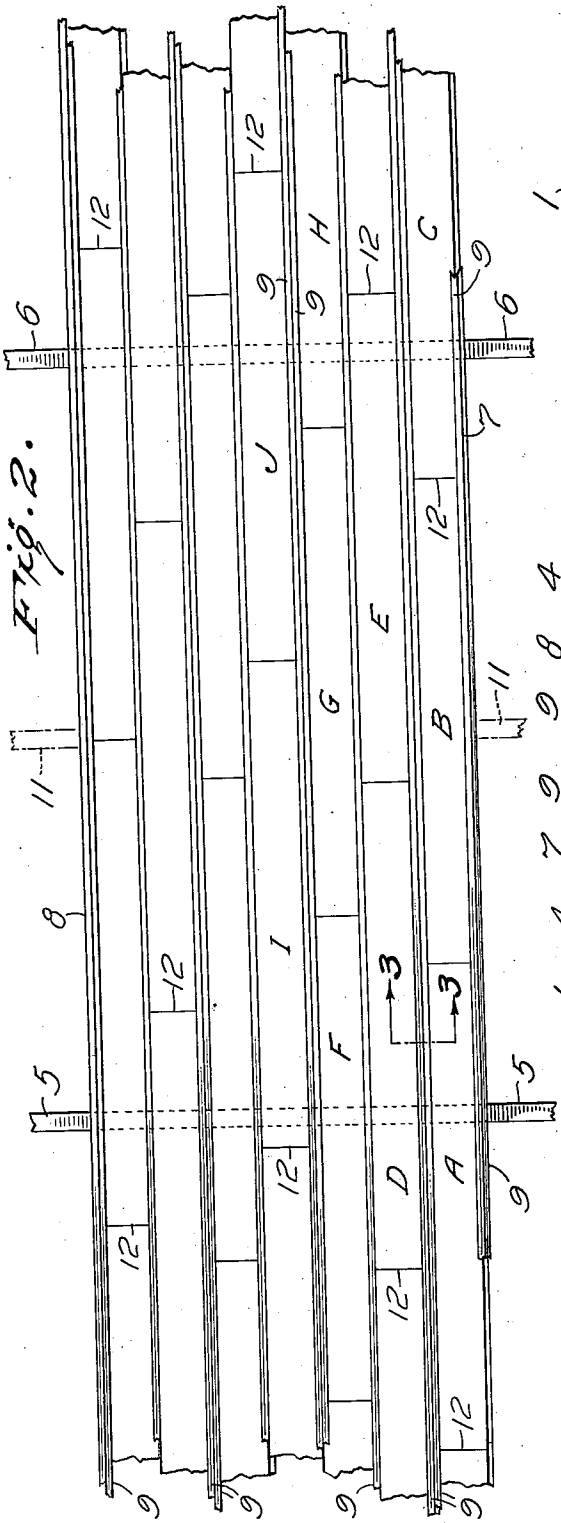
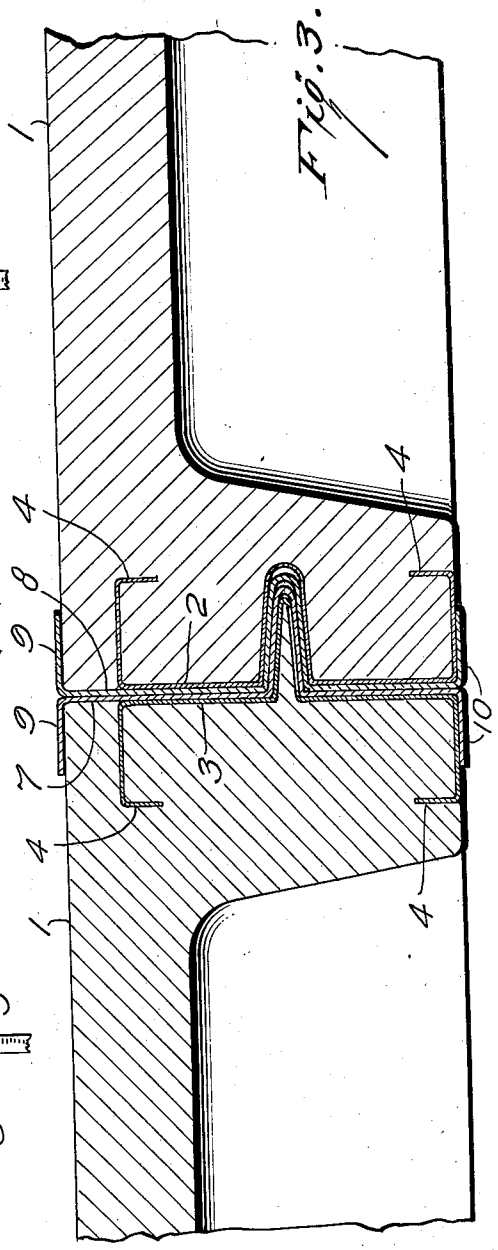


Fig. 3.



INVENTOR.

CLARKE F. DAVIS,

BY Ellis S. Middleton

ATTORNEY.

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UNITED STATES PATENT OFFICE

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DECK

Clarke F. Davis, Short Hills, N. J., assignor to American Cyanamid & Chemical Corporation, New York, N. Y., a corporation of Delaware

Application July 9, 1935, Serial No. 30,431

4 Claims. (Cl. 72—68)

The present application is directed to a portion of the subject matter of my co-pending application Serial No. 655,591 filed February 7, 1933.

The present invention relates to a building construction involving the use of precast units or slabs of relatively weak cementitious material such as gypsum or the like.

Building constructions of the above type are now well known in which elongated precast slabs of gypsum are provided on their opposite longitudinal edges with strengthening metal members, opposite members being complementarily tongued and grooved. When two such slabs are erected adjacent each other, the tongues and grooves of the adjacent metallic members interengage, thus forming a very rigid construction with high load sustaining value in spite of the fact that the body of the slab may be of such relatively weak material as gypsum. These constructions have come into wide use for floor and roof decks.

The present invention is directed to an extension of such idea where the total length of a slab may be less than the distance between supports, that is, where a single unit or slab may float between supports.

The principal object of the present invention is to so support the floating slab or slabs in a rigid manner between supports without increasing the frequency of the supports or decreasing the support spacing.

To this end, the invention contemplates a stiffening member, preferably of metal, which will itself extend across the end joint of two slabs and may extend between supports and in most cases at right angles thereto. This stiffening member may be a single element or it may be a double element, that is, of two parts arranged back to back, the parts interengaging with each other so as to constitute in effect a single member. Whether the stiffening member is a single or double element, the invention contemplates that it will lie between the longitudinal edges of adjacent precast slabs and the slab edges will interlock with such element or elements. Where tongued and grooved metal edged slabs are used, this system reaches its highest degree of efficiency by reason of the fact that in such cases the stiffening element or elements may be likewise tongued and grooved to each other and to each of the adjacent slabs.

Experience has demonstrated that for floor decks where concentrated loads are to be experienced, it is desirable to make such precast units comprising the deck of increased depth. If the slab thickness is increased uniformly without reduction in length or width, the dead load of the slab is so great as to make it difficult to handle in the factory and on the job. For this reason, it has been proposed to bisquette or channel one face of the slab while maintaining an increased depth or thickness at the edges. This permits the use of a deeper and longer slab without a corresponding increase in slab weight. With such bisquetted slabs, a stiffening element or elements as above described to extend as a splice plate over the end joint of two slabs is of particular value although the present invention is not to be limited to a bisquetted slab as obviously one of uniform thickness is contemplated.

Circumstances in the field will determine whether or not a single stiffening element or a double element is advisable. As a matter of fact, a combination thereof has been found to be particularly valuable in that the use of double stiffening elements provides for increased live loads wherever desired.

The invention further consists in the novel arrangement, construction and combination of parts more fully hereinafter described and shown in the accompanying drawings.

In the drawings—

Fig. 1 is a perspective view of a floor or roof deck showing the application of the invention thereto;

Fig. 2 is a plan view of a deck showing the arrangement of the slabs and stiffening members;

Fig. 3 is a partial sectional view along the line 3—3 of Fig. 2.

Referring now to the embodiment illustrated, the individual slabs going to make up the building construction consist of a cast body 1 of any cementitious material capable of taking a set, although preferably of gypsum or the like with or without admixtures such as wood chips or other fillers and suitably reinforced where desired. The body 1 may be bisquetted as shown in Figs. 1 and 3, that is, provided with a longitudinal channel on one face thereof, although this may be omitted where desired and the body made of uniform thickness.

It is preferred that each longitudinal edge of these slabs be provided with metal elements 2 and 3 complementarily tongued and grooved, each of which is provided with top and bottom flanges having their ends 4 turned back and embedded in the body 1. It will be noted that when these edges are meshed together, the metal elements 2 and 3 form effective I-beams which are capable

of carrying loads of which the slabs themselves are not otherwise capable. This is particularly true where the slab body is of such material as gypsum or the like.

Fig. 2 illustrates a decking system using slabs of the above type of which slabs lettered A, B, C, D, E, F, G, H, I and J are indicated specifically. Permanent supports 5 and 6 may be walls, floor beams, roof purlins or any typical supports used in a deck construction. It is to be noted that the individual slabs are of a length less than the distance between these supports. Where the slabs themselves are of comparatively short length and where the distance between support spacing is not excessively great, the edge interlock of the metal elements on adjacent slabs may be relied upon to carry the floating slabs of which B and G are typical and to transmit the load from these slabs to the adjacent slabs which are themselves carried by the supports.

Under conditions of excessive support spacing or slabs of desirable greater depth or length, additional means must be provided. One form of these additional supporting members is shown in detail in Fig. 1 and in section in Fig. 3.

They may consist of metal members 7 and 8 complementarily tongued and grooved, each of which extends between supports 5 and 6. By forming the tongues and grooves on these elements of a shape similar to those of the tongues and grooves of the metal members 2 and 3, they may be made to interlock therewith in a most efficient manner. This configuration likewise permits of the use either of a single element 7 or 8 or a double element 7 and 8 wherever desired.

Figs. 1 and 2 show the alternative use of single element 7 and double elements 7 and 8. Obviously these stiffening elements may be either all single or all double as the case may be and the live load to be sustained will determine this situation.

It is to be noted that the elements 7 and 8 are each provided with oppositely extending upper and lower flanges 9 and 10 respectively arranged to over and underly the slabs proper. This makes for a particularly strong construction in that the stiffening members 7 and 8 effectively constitute an I-beam particularly when tongued and grooved together at their web portions. It is not essential, however, that the flanges 9 and 10 be provided because by suitably proportioning the webs of the members 7 and 8, the flanges may be eliminated, reliance being had upon the thickness of the web and/or their tongued and grooved portions to give the required strength and stiffness. As a matter of fact, due to the circumstance that these stiffening members are interlocked or pinched between closely abutting slabs, the slabs themselves have a tendency to prevent tipping or buckling of the stiffening members and, hence, themselves contribute to the strength thereof.

In erection, a temporary shore 11 is built up between the supports 5 and 6 to support the floating slabs as the individual slabs and the stiffening members are placed in position row by row. As soon as a stiffening member has been laid in position between supports and in interengaging relation with a row of slabs, the temporary shore 11 may be then removed as the deck becomes self-sustaining.

When a stiffening element extends between supports 5 and 6, in interengaging relationship with a row of slabs and past the end joints 12 of abutting slabs, it not only strengthens that broken joint but effectively overcomes the weakness which would otherwise exist because of the slab length being less than the support spacing.

Even when such stiffening element is shorter than the support spacing and in the nature of a splice plate, its usefulness is quite apparent. For instance, load tests have been conducted on a deck made of precast units where those units consisted of gypsum bisquetted slabs 10 feet long, 15 inches wide and 6 inches deep, the opposite longitudinal edges of which were provided with tongued and grooved metal elements as shown in the drawings. The support spacing was 12 feet and the deck was arranged so that at least one slab floated between the supports, that is, it did not extend over a support. Short tongued and grooved splice plates about 4 feet long and without top and bottom flanges were pinched or interlocked between the abutting tongued and grooved metal edges of adjacent slabs and extended over the end joint of each two slabs. The metal of the splice plates and the metal on the slabs themselves was of 18 gauge. This deck was loaded to the extent of 500 pounds per square foot without failure and with no substantial damage to any of the slabs. The total deflection on the load was ⅞ inch with a permanent deflection of only ¼ inch. This test demonstrated the practical value of the invention herein described.

Experience has demonstrated that the desired degree of reinforcement may be given to a deck of the above type where the stiffening members are of comparatively light material. Even cold rolled sheet metal has been found under the circumstances of this construction to be eminently satisfactory. This is particularly desirable in that the provision of such comparatively light stiffening members is a much cheaper construction than one requiring additional beams between supports 5 and 6 to make the spacing less than the length of the slab for in such cases, the additional beams are usually of the hot rolled and relatively expensive type.

I claim:

1. A building construction comprising two spaced apart supports, a deck of precast slabs supported thereon, each slab comprising a body of set cementitious material, opposite longitudinal edges of which carry metallic members complementarily tongued and grooved, two of said slabs having their ends abutting between said supports, and a stiffening member interlocked between the tongued and grooved metal members of adjacent slabs, said stiffening member bridging the joint of the abutting ends of the said two slabs in which the stiffening member extends between the supports.

2. The building construction of claim 1 in which the stiffening member is provided with top and bottom flanges, overlying and underlying a slab.

3. The building construction of claim 1 in which the stiffening member comprises two complementary elements, tongued and grooved together.

4. The building construction of claim 1 in which the stiffening member comprises two complementary elements, tongued and grooved together and having oppositely extending top and bottom flanges, said two elements together constituting an I-beam.

CLARKE F. DAVIS.