Oct. 1, 1935. C. F. DAVIS 2,015,744

SNAP LOCKING SLAB

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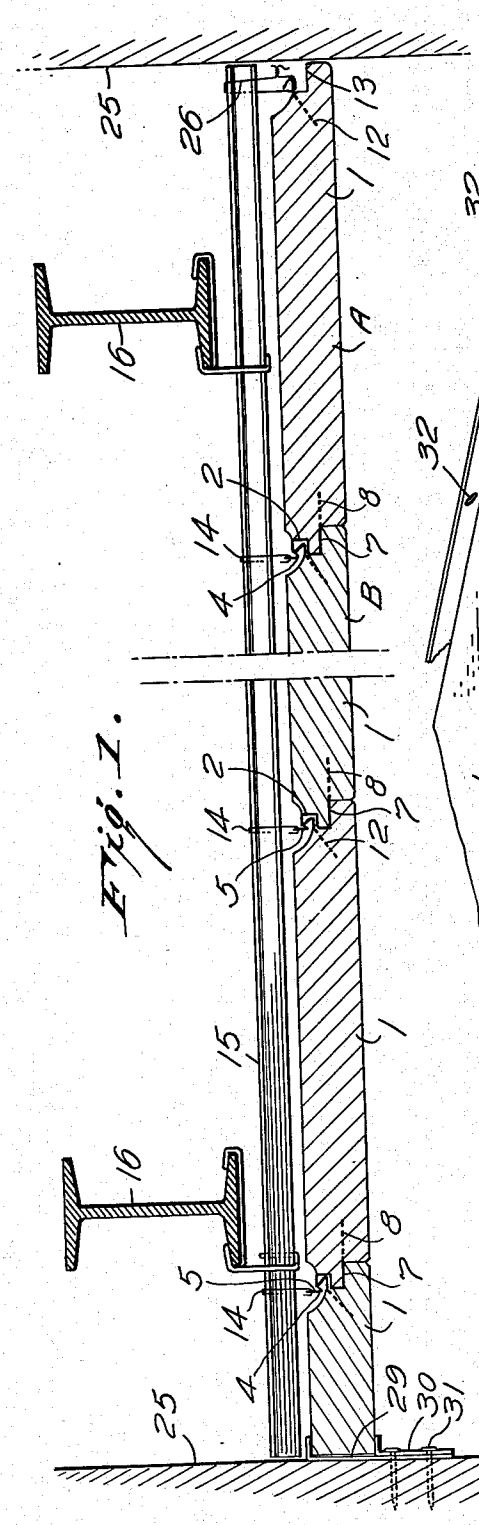


Fig. 1.

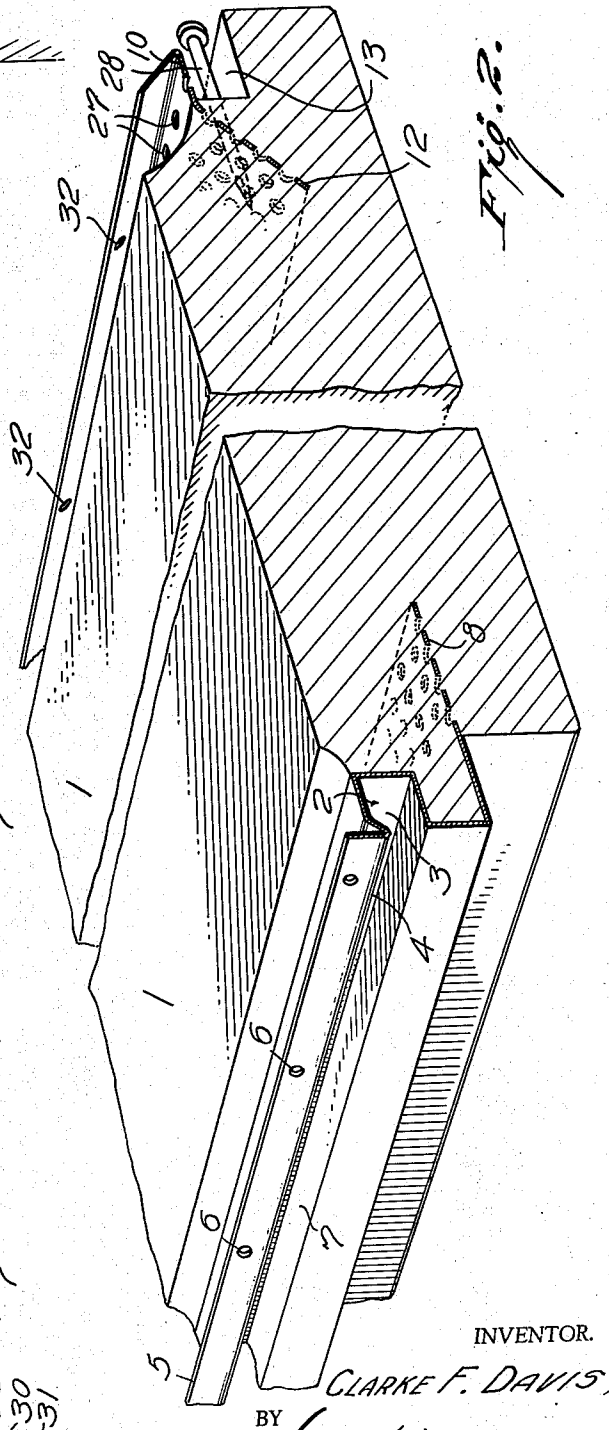


Fig. 2.

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Fig. 3.

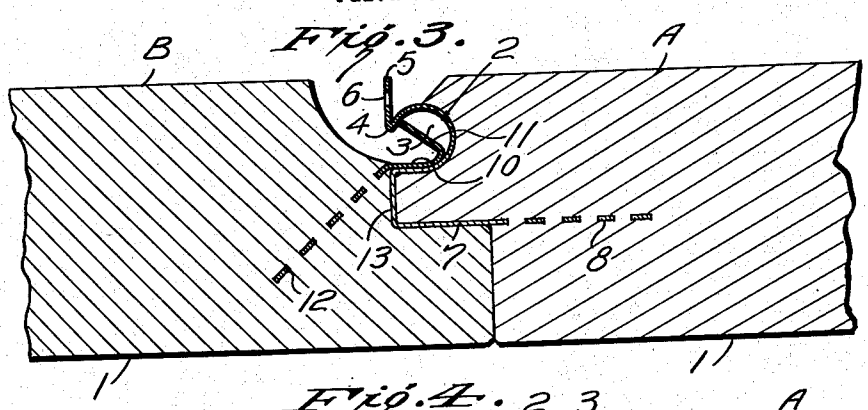


Fig. 4.

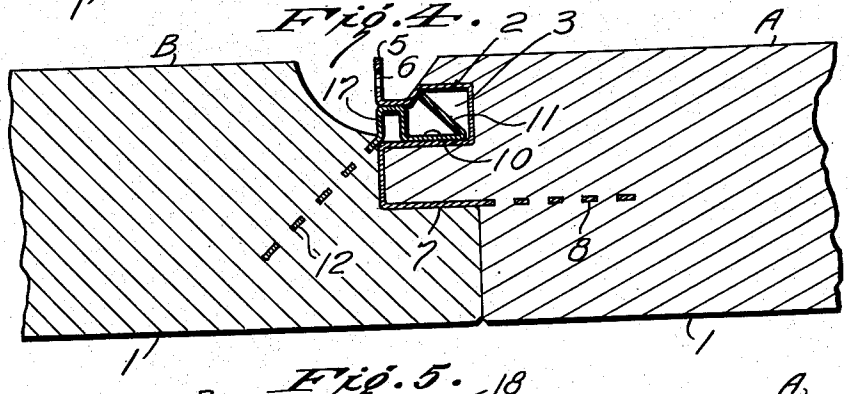


Fig. 5.

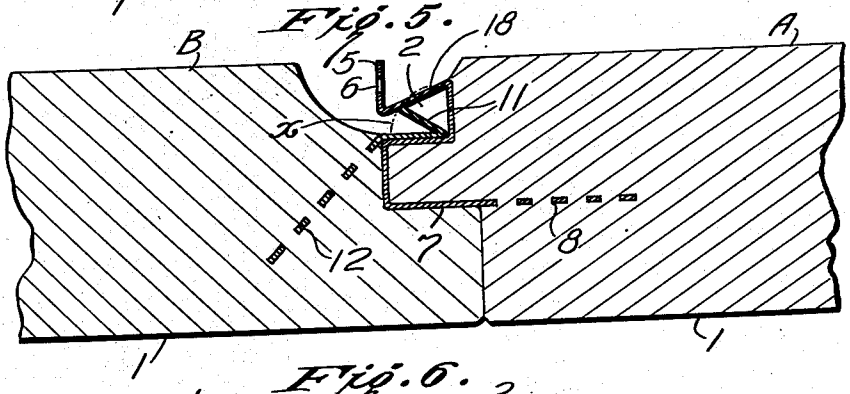
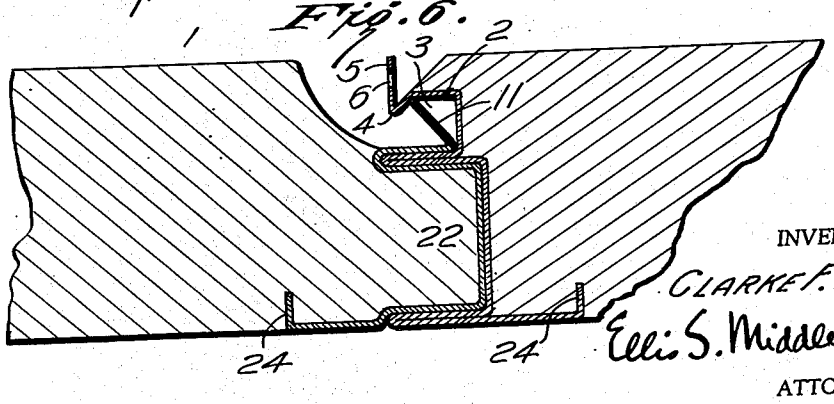


Fig. 6.



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Fig. 7.

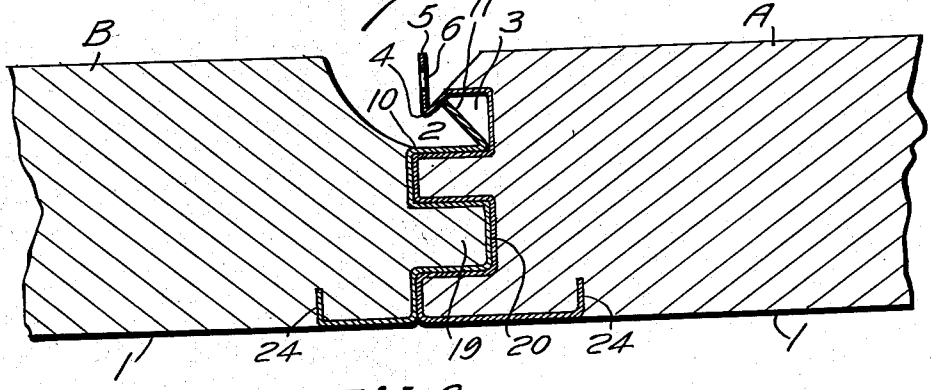


Fig. 8.

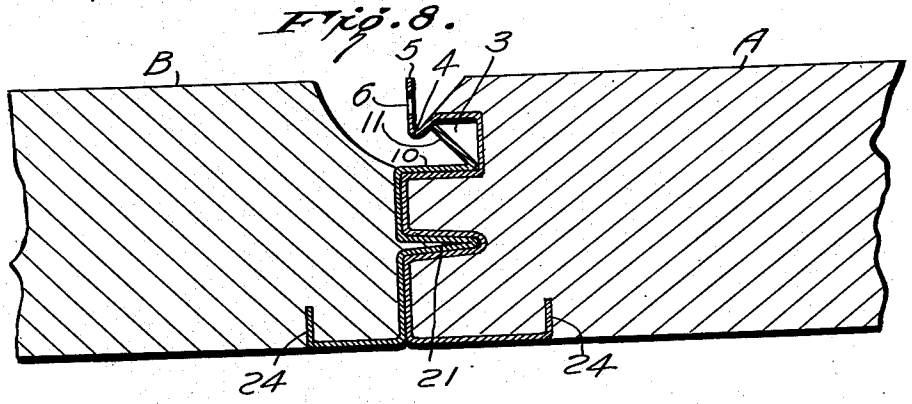
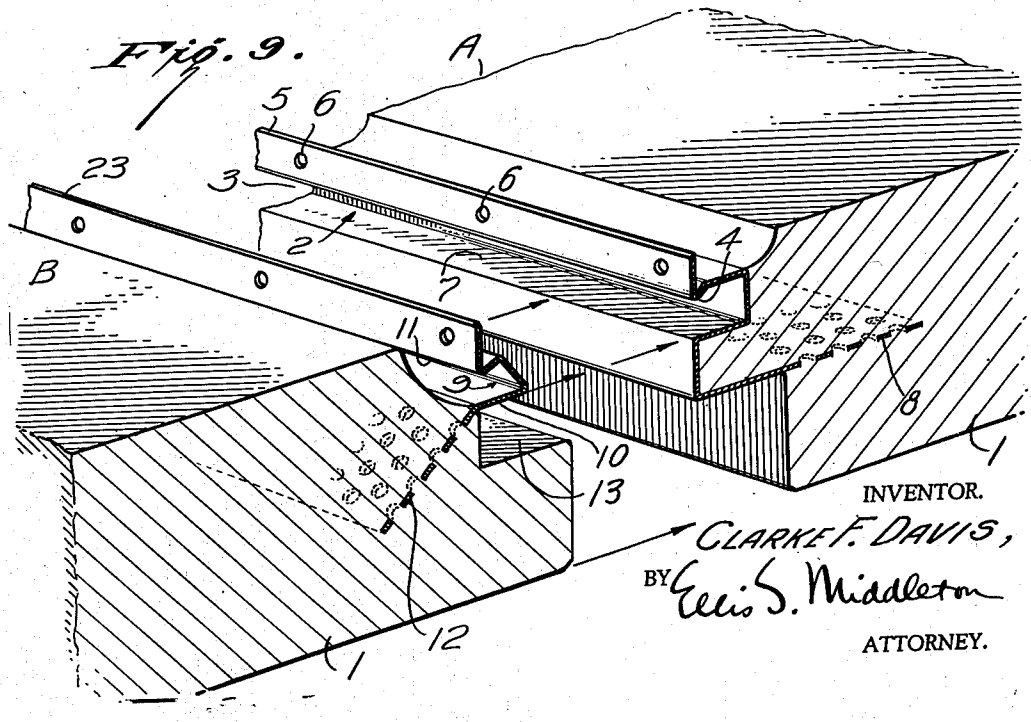


Fig. 9.



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UNITED STATES PATENT OFFICE

2,015,744

SNAP LOCKING SLAB

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Application February 20, 1933, Serial No. 657,567

22 Claims. (Cl. 72—68)

The present invention relates to a precast slab having a body of set cementitious material of which gypsum is typical, carrying means thereon to inter-engage a corresponding slab when the two are erected together, as by means of a snap lock, and to a building construction including such slabs.

While the invention is particularly concerned and is primarily directed to a slab of the above type which may be used for ceilings or the like, yet the invention is, of course, not to be restricted thereto as it is to be distinctly understood that the slab of this invention may be used in any other location as for instance in floor, roof, wall or in fact any situation where the particular structure thereof will be of advantage.

In building constructions using slabs of the precast variety, it is extremely desirable that when such slabs are used as a suspended ceiling, that means be provided to insure that the contiguous series of slabs are perfectly level, that is, the bottom faces thereof are in the same plane, that each slab be held securely to its neighbor without undue separation, and that contiguous slabs be held with relation to each other in such a rigid manner that in the event that a plastered surface is desirable, the plasterer, in applying the plaster as by means of a trowel or the like, will not be able accidentally to lift one slab in relation to its neighbor. If this accidental movement occurs from any reason, cracks are liable to develop in the eventual ceiling, which is of course undesirable.

In constructions using a suspended slab, it is also desirable that such slabs be adequately supported at all points with a minimum number of supporting elements, because an excessive number is not only expensive from the initial cost standpoint but slows up erection due to the fact that the individual supporting or hanging elements must be put into place and adjustments made to positively determine their accurate location.

The principal objects of the invention are, therefore, the accomplishment of the above desirable features without initially increasing the cost of the slab itself unduly, without resorting to complicated or cumbersome mechanism and with a minimum amount of expense, time and effort.

To this end the invention in its broadest aspect contemplates the provision of a precast slab of set cementitious material with metal members on at least two opposite edges thereof having complementary parts. Where desired all four edges of the slab may be so treated. It is contemplated that the complementary portions of the metallic members on adjacent slabs will inter-engage each other in a snap lock fit, that is, one slab may be pushed up against its neighbor and the adjacent metal parts made to fit with a spring lock to prevent accidental separation and to hold the two slabs together in a substantially rigid manner.

The invention also contemplates in such a construction the use of additional co-operating portions such as tongues and grooves, which not only serves the purposes of additionally securing the slabs together but permits one slab to be positively supported by the other slab, all of which makes for a more satisfactory, rigid and fool-proof construction.

Where a complete fireproof structure is desired, these metal members may be so arranged within the body of the slab that a substantial body of the cementitious material such as gypsum will cover them and protect the same against the ravages of fire. This is desirable, although not essential.

In the drawings—

Fig. 1 is a sectional view of a ceiling involving the slabs of the invention.

Fig. 2 is a perspective view of a single slab.

Fig. 3 is a sectional view of a modified slab.

Fig. 4 is a similar view of another form of slab.

Fig. 5 is a similar view of another form of slab.

Fig. 6 is a similar view of another form of slab.

Fig. 7 is a similar view of another form of slab.

Fig. 8 is a similar view of another form of slab.

Fig. 9 is a fragmentary perspective view of another form of slab showing the method of interlock.

In the drawings such a slab is shown to consist of the body 1 of set cementitious material of which gypsum is a type, either with or without admixtures such as wood chips, and of any desired thickness and other dimensions. This slab body has applied to one edge portion thereof a female element indicated generally at 2 having a groove 3 with a forward depending lip 4, and an upstanding flange 5 perforated as at 6. The opposite end of the metal member 2 is formed into a ledge portion 7 and the end is turned back into the slab body 1 as at 8. Where desired, the end 8 may be expanded or perforated to permit the cementitious material of which the body 1 is made to penetrate the same and assist in bonding the metal thereto.

At the opposite edge of the slab 1 is a male member indicated generally at 9 having a projection 10 with a collapsible portion 11. The

opposite end of the metal member 9 is likewise embedded in the body 1 as at 12 for the purpose specified in connection with the part 8. This opposite edge of the slab is cut away as at 13 to correspond with the ledge 7 at the opposite edge.

In assembling or erecting a series of such slabs, it will be apparent that a slab A having been erected as for instance in a ceiling or the like, the slab B is then merely shoved up against the slab A so that the metal projection 10 passes through the restricted throat in the recess 3, the collapsible portion 11 passing thereunder and then automatically springing out into the recess beyond the lip 4. The ledge 7 in the slab A fits in the cut away portion 13 of the slab B and hence the parts are closely fitted together. This arrangement insures against any accidental separation of the two slabs, and insures a tight joint between the parts.

The perforations 6 on the upstanding flange 5 of the slab A may receive suitable hanging devices 14 which may either pass around a furring strip 15 which is in turn suspended from suitable supports 16 or such slabs may be suspended directly from the supports 16 as circumstances will dictate. Due to the fact that the flange 5 has a series of such perforations 6, no particularly regard need be given to the arrangement of such slabs as the hooks 14 may be inserted in the nearest perforation to the particular point of support desired.

The collapsible portion 11 on the male projection should, of course, be of such dimensions as will permit the same to automatically spring up beyond the throat into the recess 3 and engage the shoulder defined by the metal lip to prevent the same from being accidentally withdrawn therefrom.

While in the preferred form of the invention the recess 3 is substantially rectangular in cross-section, yet obviously this either may be rounded as in Fig. 3 or given any other configuration desired to produce the above result.

In order to prevent any undue movement between slabs, the male projection 10 may be provided with a step 17 as shown in Fig. 4, which is adapted to underlie the lip 4 and make substantial contact therewith. This insures that the parts will fit tightly together without undue relative movement.

In some cases it will be found more expedient to arrange the upper wall of the recess 3 in the form of an inclined plane as at 18, Fig. 5, it being only necessary that this surface penetrate or intersect the arc X defined by the end of the collapsible portion 11 in its movement. Such a construction insures the tight fitting of the collapsible portion 11 in the recess 3 when the parts are pressed together and takes up any irregularities in manufacture that may exist.

In the above forms it is to be noted that the slab B is supported solely by reason of the stiffness of the metal defining the male projection 10. In cases, where to make this metal of such a gauge as will give requisite stiffness would be too expensive, an additional projection such as a tongue 19 may be placed on the slab B, which will inter-engage with a corresponding groove 20 on slab A. In this manner any undue strain is taken off of the projection 10 and the entire edge of the slab B may be supported on the slab A by reason of its tongued and grooved engagement. Various forms of tongues and grooves may be used as for instance the tapered tongue 21 and corresponding groove of Fig. 8 or the entire section below the recess 3 may be utilized as a tongue as at 22, Fig. 6.

Where additional rigidity is desired, the male projection 10 may likewise be provided with an upstanding flange 23 adapted to lie alongside of the projection 5 and if necessary secured thereto either by means of the supporting members 14 or otherwise as desired.

In all events it is desirable to extend the ultimate edge of each slab to the point where the metal element on that edge will not project therebeyond. This makes for ease of handling and prevents any undue distortion of the parts during shipment and erection.

It is desirable, of course, that the top of the flanges 5 and 23, or either of them, not project above the upper surface of the slab to which it is attached and for this purpose the tops of the slabs adjacent such projections are cut away as shown to render such flange or flanges accessible. While this is desirable, yet it is not absolutely essential.

In those slabs where the metal members are embedded in the slab body and do not project down to a point near the under surface thereof, such slabs are particularly of value from the standpoint of being fireproof. As indicated, there is a substantial body of the set cementitious material below the metal itself and this material, where the same is of gypsum or the like, is particularly efficacious for these purposes.

In circumstances, however, where only a semi-fireproof construction is desired or no regard need be paid to the ability to withstand fire, the metal members may extend all the way down to the under surface of the slab and along that surface. In such events it is desirable that the end of the metal be returned into the body of the slab as at 24. This prevents any accidental separation of the metal from the slab body.

In erecting such a construction into a ceiling, the first slab may be abutted close to a wall or the like 25. In such case a wire or hairpin 26 may be threaded through an aperture 27 in the metal member 10, and passed around the furring strip 15 to support that edge of the slab, or a nail 28 or staple driven into the slab beneath the metal part 10 and the wire 26 used as above described. Of course, any other means of supporting this edge of the slab may be used as desired, whether such edge is cut or uncut. Where the slab of Fig. 9 is used, and the male projection 10 is provided with an upstanding flange 23, the supporting element 14 may be used to carry this edge of the slab. As an alternative form, one slab may be provided with the metal members 2 on two opposite edges and this part secured in abutting relation to a wall as by nails or the like. As still another method of erection, the first slab may be erected with its part 2 against the wall and the other slabs worked in in the opposite direction.

It is contemplated, of course, that all rooms in which such slabs are used as ceilings, will not be of such a dimension that a predetermined number of slabs will completely fill out the same. In such event the slabs may be cut longitudinally at the point desired and the cut end supported in any of the ways described. In Fig. 1 the cut slab is supported by means of the parts 29 and 30 nailed to the wall as at 31.

While in many instances it will be found unnecessary to provide the shorter ends of such slabs with these snap interlocks, yet in many cases this

will be desirable and of course, the invention contemplates the application of these parts to either two or four edges of such slabs.

It is contemplated that such slabs will be erected with staggered joints as this feature has been found to be of advantage in producing a rigid construction.

The invention, of course, contemplates the various instrumentalities shown in combination with any other.

While ordinarily there will be no occasion to unlatch such slabs and as a matter of fact, the rigidity and security of such an interlock is one of the prime features of the invention, yet in case it is desired to release the latch, apertures 32 in the male element may be provided for this purpose. In such cases, an instrument may be hooked into such apertures and the upstanding flange collapsed and withdrawn from the recess.

While the part 11 on the male member has been designated as collapsible, yet it will be obvious that the accommodation of this spring latch in the recess may be by reason of the expansion or enlargement of the metal element constituting the recess or the recess itself respectively, as in most cases both of these parts will be made of inherently resilient material. At the same time, in some instances it may be found desirable to make either one or the other parts rigid and the complementary part, that is, either the receiving or the received portion expansible or collapsible as the case may be, and hence the claims are to be construed with this in mind.

While the invention has been shown with particular reference to the ceiling slab, yet obviously this same slab may be used as a floor, partition, roof, wall or in any situation where such a slab would be of advantage.

I claim:

1. A precast slab of set cementitious material having metal members on opposite edge portions, said members having complementary parts, one of said members having a recess with a restricted neck, the other member having a collapsible projection adapted to enter the corresponding recess on an adjacent slab when two such slabs are erected together, to be collapsed as it passes through the restricted neck and then automatically expand beyond the neck, with a step between the ends of such projection in substantial contact with the restricted neck, to positively interlock the two slabs together.

2. A precast slab of set cementitious material having metal members on opposite edge portions, said members having complementary parts, one of said members having a recess with a restricted neck and a second recess below the first, the other member having a collapsible projection adapted to enter the corresponding recess on an adjacent slab when two such slabs are erected together, to be collapsed as it passes through the restricted neck and then automatically expand beyond the neck, and a second projection noncollapsible in nature, to enter the second recess on the adjacent slab, to positively interlock the two slabs together.

3. A precast slab of set cementitious material having metal members on opposite edge portions, such members having complementary parts, one of said members having a recess with a restricted neck, the other member having a collapsible projection adapted to enter the corresponding recess on an adjacent slab when two such slabs are erected together, to be collapsed as it passes through the restricted neck and then automatically expand beyond the neck to positively interlock the two slabs together, one end of each member being embedded in the cementitious material with a substantial body of cementitious material below the same.

4. A precast slab of set cementitious material having metal members on opposite edge portions, such members having complementary parts, one of said members having a recess with a restricted neck, the other member having a collapsible projection adapted to enter the corresponding recess on an adjacent slab when two such slabs are erected together, to be collapsed as it passes through the restricted neck and then automatically expand beyond the neck to positively interlock the two slabs together, one of said metal members having an upstanding flange.

5. A precast slab of set cementitious material having metal members on opposite edge portions, such members having complementary parts, one of said members having a recess with a restricted neck, the other member having a collapsible projection adapted to enter the corresponding recess on an adjacent slab when two such slabs are erected togeher, to be collapsed as it passes through the restricted neck and then automatically expand beyond the neck to positively interlock the two slabs together, both of said metal members having upstanding flanges.

6. A building construction including two precast slabs erected adjacent to each other, each slab having a metallic member co-operating with a complementary portion of the adjacent metallic member, one of said members having a recess, the top of which is defined by an angular wall, and also having a restricted neck, the other member having a projection within said recess and sprung up beyond the restricted neck, the end of such projection being in contact with the top wall of the recess.

7. A building construction including two precast slabs erected adjacent to each other, each slab having a metallic member co-operating with a complementary portion of the adjacent metallic member, one of said members having a recess with a restricted neck, the other member having a projection within the recess and sprung up beyond the neck, and a step in substantial contact with the restricted neck.

8. A building construction including two precast slabs erected adjacent to each other, each slab having a metallic member co-operating with a complementary portion of the adjacent metallic member, one of said members having a recess with a restricted neck, the other member having a projection in said recess and sprung up beyond the neck, the slab carrying the recessed member having a groove below the recess and the other slab having a corresponding tongue engaging said groove.

9. A building construction including two precast slabs erected adjacent to each other, each slab having a metallic member co-operating with a complementary portion of the adjacent metallic member, one of said members having a recess with a restricted neck, the other member having a projection sprung up into said recess beyond the neck, one end of the metal member in each slab being embedded in the cementitious material with a substantial body of cementitious material below the same.

10. A building construction including two precast slabs erected adjacent to each other, each slab having a metallic member co-operating with a complementary portion of the adjacent metallic

member, one of said members having a recess with a restricted neck, the other member having a projection sprung up into said recess beyond the neck, one of said metal members having an upstanding flange.

11. A building construction including two precast slabs erected adjacent to each other, each slab having a metallic member co-operating with a complementary portion of the adjacent metallic member, one of said members having a recess with a restricted neck, the other member having a projection sprung up into said recess beyond the neck, both of said metal members having upstanding flanges.

12. A ceiling construction comprising supporting elements, a series of precast slabs suspended below the same with their edge portions adjacent, one of said slabs having a metal member on the edge portion thereof defining a groove with a restricted neck, the adjacent slab having a metal member on the edge portion thereof with a projection within said recess and sprung up beyond the restricted neck, the first metal member having an upstanding flange, and means to connect said upstanding flange to the supporting element.

13. A ceiling construction comprising supporting elements, a series of precast slabs suspended below the same with their edge portions adjacent, one of said slabs having a metal member on the edge portion thereof defining a groove with a restricted neck, the adjacent slab having a metal member on the edge portion thereof with a projection within said recess and sprung up beyond the restricted neck, the first metal member having an upstanding flange, and means to connect said upstanding flange to the supporting element, said slabs being additionally tongued and grooved together.

14. A building construction including two precast slabs erected adjacent to each other, each slab having a metallic member co-operating with a complementary portion of the adjacent metallic member, one of said members having a recess with a restricted neck, the other member having a projection sprung up into said recess beyond the neck and means to support said slabs in which adjacent edges of two slabs are ship lapped.

15. A building construction including two precast slabs erected adjacent to each other, each slab having a metallic member co-operating with a complementary portion of the adjacent metallic member, one of said members having a recess with a restricted neck, the other member having a projection sprung up into said recess beyond the neck and means to support said slabs in which adjacent edges of two slabs are ship-lapped, one of the ship-lapped edges of one slab being covered with metal.

16. A building construction including two precast slabs erected adjacent to each other, each slab having a metallic member co-operating with a complementary portion of the adjacent metallic member, one of said members having a recess with a restricted neck, the other member having a projection sprung up into said recess beyond the neck and means to support said slabs in which the recess is substantially rectangular in cross-section.

17. A building construction including two precast slabs erected adjacent to each other, each slab having a metallic member co-operating with a complementary portion of the adjacent metallic member, one of said members having a recess with a restricted neck, the other member having a projection sprung up into said recess beyond the neck and means to support said slabs in which the recess is substantially triangular in cross-section.

18. The slab of claim 4 in which the upstanding flange is free of cementitious material.

19. The slab of claim 4 in which the upstanding flange is free of cementitious material and terminates short of a plane including the upper slab face.

20. The combination of claim 12 in which one slab is supported at one edge solely by the interlocking engagement with the adjacent slab.

21. The combination of claim 10 in which the upstanding flange is located within a groove formed by adjacent cutaway portions of adjacent slabs.

22. A building construction including two precast slabs erected adjacent to each other, each slab having a metallic member co-operating with a complementary portion of the adjacent metallic member, one of said members having a recess with a restricted neck, the other member having a projection sprung up into said recess beyond the neck and means to support said slabs in which one slab is supported at one edge solely by the edge of the adjacent slab.

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