March 6, 1945. G. W. BAKER ET AL 2,370,769

WALL STRUCTURE

Filed June 15, 1942 2 Sheets-Sheet 1

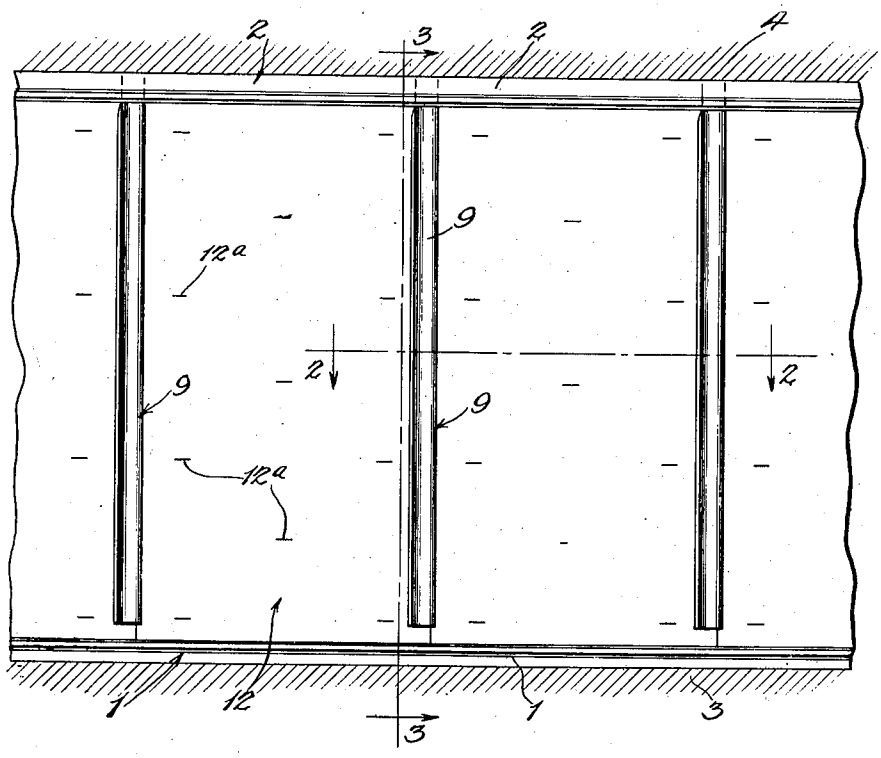

Fig. 1.

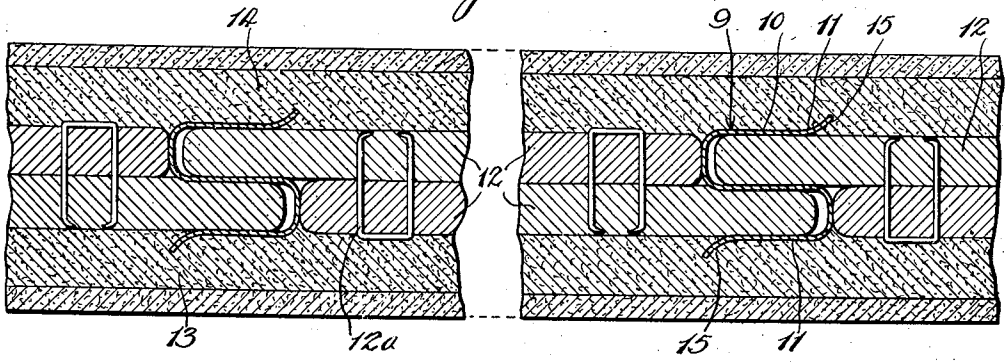

Fig. 2.

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WALL STRUCTURE

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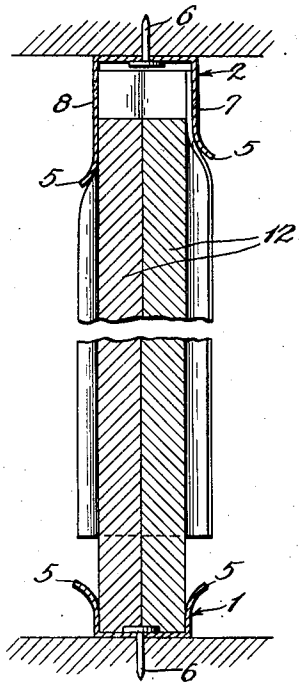

Fig 3.

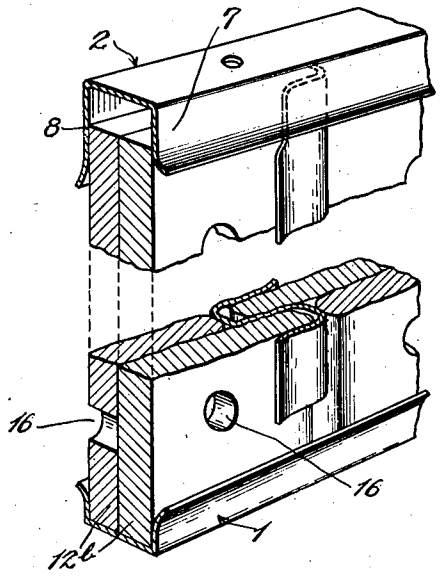

Fig 4.

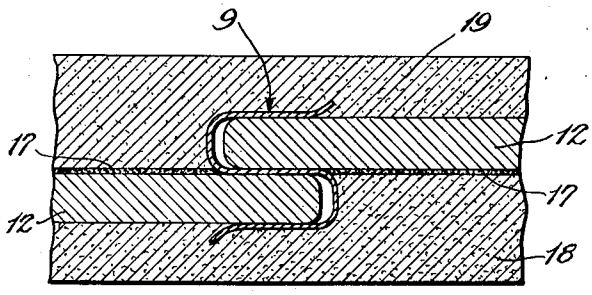

Fig 5.

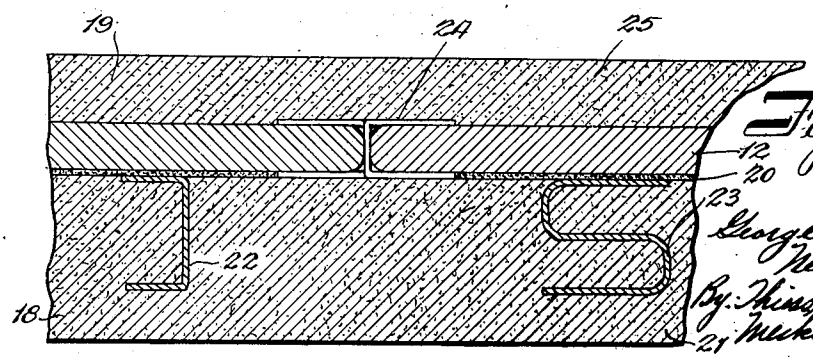

Fig 6.

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UNITED STATES PATENT OFFICE

2,370,769

WALL STRUCTURE

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Application June 15, 1942, Serial No. 447,036

4 Claims. (Cl. 72—46)

This invention relates to wall structures, and more particularly to substantially monolithic or so-called solid partitions, that is, where there is no substantial air space within the wall itself. These partitions are ordinarily about two inches thick, and it has been common practice to build up a plaster base comprising a single layer of gypsum boards or the like, either perforated or unperforated.

The gypsum boards are ordinarily secured to narrow studs, all of the boards being in the same plane and having their adjacent edges retained in alignment by means of suitable clips. A comparatively thick layer of plaster is applied to each side of the plaster base, with which it forms a very rigid bond. When perforated plasterboard is used, the two oppositely disposed plaster layers are further bonded together and bonded to the gypsum board by plaster keys which extend completely through the perforations.

It has been found that, with the usual rigidly bonded partitions of this type, there is a decided tendency for cracks to form in the plaster coatings after the partition has been erected for a short time. These cracks may occur at any location on the partition, although they are more apt to appear adjacent the joints between the various pieces of gypsum boards. Also, when perforated board is used, so-called "sunburst" cracks appear adjacent the various perforations. It has been found that, if the two oppositely disposed plaster layers are not rigidly bonded together, but instead are loosely or yieldably bonded or supported so that each side of the partition is capable of slight planar movement or self-adjustment relative to the other, any tendency of the plaster to crack at the board joints or adjacent the perforations or at any other point is substantially completely eliminated.

If the relatively movable plaster layers are not reinforced in some manner, cracks other than the joint and sunburst cracks may occur; these latter cracks usually extend across the wall diagonally or otherwise and with no definite pattern. However, if one layer of plaster is reinforced by the plasterboard to which it is applied in the usual bonding manner, and the opposite layer is reinforced by stud-like channels or the like with a substantially non-bonding or bond-weakening agent between the plaster layer and the gypsum board, then all cross or diagonal cracks are also substantially eliminated.

The present invention provides for such self-adjustment between the plaster coverings, and it is, therefore, an object of the present invention to provide a substantially monolithic or so-called solid partition formed of gypsum boards or the like, and plaster coverings in which the plaster coverings will remain substantially free from cracks of any type for a greatly extended period under all normal conditions.

A further object is the provision of a partition of the type disclosed, in which the plaster coverings are loosely or yieldably bonded to the plaster base in such a manner that sufficient relative self-adjustment is provided that the normal stresses and strains incident to such a structure will not crack the plaster coverings.

It is also an object to provide a solid partition of the type disclosed in which the plaster base comprises a double or multiple thickness of plasterboard or the like so supported as to enable slight relative planar movement therebetween and in which the oppositely disposed plaster coverings are independently bonded to the relatively movable plasterboards.

Further objects will be apparent from the specification and the appended claims.

In the drawings:

Figure 1 is a side elevation of one embodiment of the invention before the plaster coverings have been applied, and with the floor and ceiling indicated in section.

Fig. 2 is an enlarged detail sectional view taken on a line substantially corresponding to line 2—2 of Fig. 1.

Fig. 3 is a transverse sectional elevation taken on a line substantially corresponding to line 3—3 of Fig. 1.

Fig. 4 is a fragmentary sectional perspective view of a portion of an assembled plaster base using perforated plasterboard and including a stud or elongated clip and floor and ceiling runners.

Fig. 5 is a transverse sectional view through a slightly different embodiment in which only one layer of gypsum board is used to form the plaster base and the plaster coverings are loosely or yieldably bonded to one side thereof.

Fig. 6 is a detail sectional view through a partition and illustrates another embodiment including a non-bonding agent between a reinforced plaster covering and the plaster base.

Referring to the drawings in detail, the embodiment illustrated in Figs. 1, 2, and 3, inclusive, comprises a floor runner 1 and a ceiling runner 2 secured to the floor and ceiling 3 and 4, respectively, as shown in Figs. 1 and 3.

These runners may be of any suitable type adapted to permit slight relative planar move-

ment or self-adjustment of wallboards supported thereby to form a plaster base. The runners are preferably of more or less resilient sheet metal substantially U-shaped in cross section, with a flat web and outstanding flanges as shown. The edges 5 of the flanges may be outturned slightly, as illustrated in Fig. 3, to enable easy insertion of studs and panels therebetween. The runners may be secured to the floor and ceiling by means of stub nails 6 driven through suitable holes in the web. The ceiling runner 2 is provided on one side with a comparatively narrow flange 7, the opposite flange 8 preferably being materially wider for a purpose which will be described later. The partitions are usually erected on the job by positioning suitable studding 9 between the floor and ceiling runners and supporting suitable gypsum boards or the like between these studs to provide a two-ply plaster base. The specific structure of the supporting runners and studs or clips forms no part of the present invention, which invention contemplates the use of any suitable supporting means permitting the previously mentioned relative planar self-adjustment of the elements of the finished wall.

The studding 9 shown in the drawings is substantially S-shaped in cross section and comprises a central web 10 and oppositely disposed flanges 11 which are so related that the edges of the gypsum boards 12 may be inserted between the web and each oppositely disposed flange, so that the boards are in overlapping relation in the stud and the edges thereof are embraced snugly between the web and the respective flanges in the manner illustrated in Fig. 2.

The plaster base is preferably a two-ply gypsum board structure, as shown, and the boards may be yieldably secured together by means of small staples 12a or the like, whereby the boards are capable of slight relative planar movement. The staples illustrated are not essential, but instead it is contemplated to use small nails or wires or other suitable means for securing the boards nonrigidly together so that there may be some slight self-adjusting movement therebetween. The boards are offset relative to each other in the manner illustrated, so that they provide a substantially shiplap joint within the confines of the studding, one of the boards entering the studding to be embraced between the web and a flange and the other board terminating adjacent the side of the stud.

Thick plaster coverings 13 and 14 are applied to the respective sides of the partition, and these coverings form a substantially rigid bond with the adjacent boards. Each plaster covering, together with the layer of board to which it is bonded, is slightly movable or self-adjustable relative to the other plaster covering and its support, and, therefore, stresses and strains are not transmitted from one side of the partition to the other with sufficient force to cause plaster cracks.

The outer edges of the stud flanges 11 are preferably curved or rolled outward slightly, as shown at 15, to permit the edges of the gypsum boards to easily be entered into the studding, and these outturned portions preferably terminate short of the upper end of the stud as shown. This enables the upper end of the stud to be easily inserted in the ceiling runner 2 and to be retained in alignment therein. The stud preferably terminates short of the floor runner 1 and the upper end of the stud is retained in the resilient ceiling runner by friction of the runner flanges against the sides of the stud.

The flange 8 of the ceiling runner 2 is somewhat wider than the opposite flange 7, so that the end of the stud may rest against this depending flange while it is being inserted into the runner. This depending flange is also of assistance in directing the upper edges of the gypsum boards into the runner. The upper edge of a board panel may be rested against the depending flange 8 and raised upwardly into the runner and then seated into the floor runner and moved laterally into engagement with a stud. The boards, when assembled, are supported in the floor runner as shown in Figs. 1 and 3, with their edges engaged in the stud, as shown in Fig. 2.

The studs may be of any desired length, but preferably terminate short of at least one of the runners, as shown in Fig. 3. If desired, they may be of sufficient length to extend into both runners. Also, if desired, the boards only may extend into the runners to support the partition, and the S-shaped members may then function merely as elongated clips for aligning the edges of the boards in shiplap relationship therein.

The S-shaped type of stud or clip disclosed herein presents many advantages in that it may easily and cheaply be formed merely by rolling elongated strips of thin sheet metal, which metal may be of sufficient resilience to retain the edges of the boards snugly therein.

The plasterboards or the like are preferably of ceiling height to form comparatively large panels, and they may be of either ordinary imperforated plasterboard or of the usual perforated type to provide a more efficient plaster bond. In the embodiment shown, the plaster base panels are of ceiling height. However, the invention also contemplates the use of small size plasterboard or the like which may be supported in the studding in the same manner as illustrated and described herein, and, if desired, any adjacent free edges of the plasterboards may be secured together or retained in alignment by means of clips applied thereto in the usual well known manner.

Fig. 4 illustrates the use of perforated plasterboard as assembled to form a plaster base. In this embodiment, the boards 12b are provided with perforations 16, which perforations are usually in longitudinal and transverse rows. It will, therefore, be apparent that, when the two layers of boards are assembled in the staggered relationship shown, the perforations in the respective boards will be out of alignment and, therefore, the two oppositely disposed plaster coverings will not be keyed together. If desired, the perforations may be coated with a suitable nonbonding lacquer or the like, so that there is no rigid bonding of the plaster therein.

A slightly different embodiment is illustrated in Fig. 5, in which a single layer of plasterboard may be used to form a plaster base. In this embodiment, the edges of the boards 12 are inserted in overlapping relation in the stud 9, as illustrated, and each board is provided on at least one side with a coating 17 to provide a comparatively weak bonding surface. This coating may be of any suitable type such as sodium silicate, asphalt, aluminum foil, or other suitable material, so that a substantially weakened bond is provided in a manner to enable slight relative planar movement of the plaster coverings 13 and 13.

It will be apparent that, in the embodiments

herein illustrated and described, or their equivalents, a substantially monolithic or so-called solid partition may be provided, in which partition there is sufficient yieldability throughout the assembly to permit relative self-adjustment of the opposed plaster coverings and to thereby prevent cracking of these coverings irrespective of whether imperforate or perforated plaster base panels are used in the construction.

Fig. 6 illustrates an embodiment wherein one side of the plaster base 12 is provided with a substantially non-bonding surface or coating 20 to which a thick layer of plaster 21 is applied. The plaster layer is reinforced with channels 22 or the like or S-studs 23 may be used. The plasterboard edges may be secured together by means of the usual clips 24 and a plaster layer 25 is applied in the usual manner to the bonding surface of the boards 12. This latter plaster layer is reinforced by the plasterboards and the opposite non-bonded layer 21 is reinforced by the stud-like members 22 or 23 and relative planar self-adjustment between the two layers is permitted by the non-bonding agent 20. The wall is therefore substantially crack-proof under all normal conditions.

It is intended, of course, that the invention should not be limited to the specific embodiment or embodiments disclosed herein, since modifications may be made, and it is contemplated, therefore, by the appended claims to cover any such modifications as fall within the true spirit and scope of this invention.

Having thus described this invention, what is claimed and desired to be secured by Letters Patent is:

1. A partition construction comprising a plasterboard panel, a first continuous monolithic layer of plaster extending across one face of said panel and bonded thereto, and a second continuous monolithic layer of plaster extending across said panel on the opposite face thereof from said first plaster layer, and facewise yieldable bonding means between said panel and said second plaster layer, whereby the first plaster layer and the panel bonded thereto may yield facewise with respect to the second plaster layer.

2. A partition construction comprising two plasterboard panels having edge portions adjacent each other, a first continuous monolithic layer of plaster extending across both of said panels, and a second continuous monolithic layer of plaster extending across both of said panels on the opposite side of said panels from said first plaster layer, one face of each panel being bonded to a plaster layer, and facewise yieldable bonding means between each panel and a juxtaposed portion of the plaster layer which extends across the opposite face of said panel, whereby a plaster layer and the panels bonded thereto may yield facewise with respect to the other plaster layer without cracking either plaster layer, said facewise yieldable bonding means including a thin coating between each panel and a plaster layer, of such material and thickness that the bond between each panel and said plaster layer is substantially reduced.

3. A partition construction comprising two plasterboard panels having edge portions adjacent each other, a first continuous monolithic layer of plaster extending across both of said panels, and a second continuous monolithic layer of plaster extending across both of said panels on the opposite side of said panels from said first plaster layer, one face of each panel being firmly and rigidly bonded directly to a plaster layer to provide a substantially monolithic two-ply rigidly bonded composite sheet, and facewise yieldable bonding means between each panel and a juxtaposed portion of the plaster layer which extends across the opposite face of said panel, whereby a plaster layer and the panel bonded directly thereto may yield facewise with respect to the other plaster layer without cracking either plaster layer.

4. A partition construction comprising two plasterboard panels having edge portions adjacent each other, a first continuous layer of plaster extending across both of said panels, and a second continuous layer of plaster extending across both of said panels on the opposite side of said panels from said first plaster layer, one face of each panel being firmly and rigidly bonded directly to a plaster layer to provide a composite substantially monolithic two-ply rigidly bonded composite sheet, a facewise yieldable bonding means between each panel and a juxtaposed portion of the plaster layer which extends across the opposite face of said panel, whereby a plaster layer and the panel bonded directly thereto may yield facewise with respect to the other plaster layer without cracking either plaster layer, said facewise yieldable bonding means comprising a thin coating between each panel and a plaster layer, of such material and thickness that direct bonding between each panel and said plaster layer is substantially reduced.

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