Aug. 7, 1945. G. W. BAKER 2,381,635

PARTITION STRUCTURE

Filed June 15, 1942 3 Sheets-Sheet 1

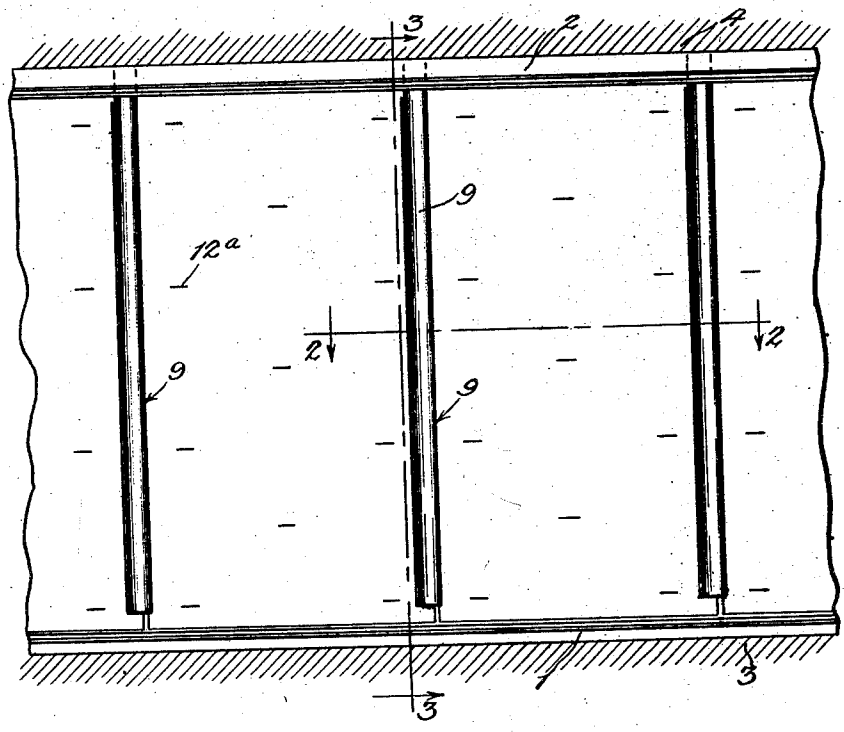


Fig. 1.

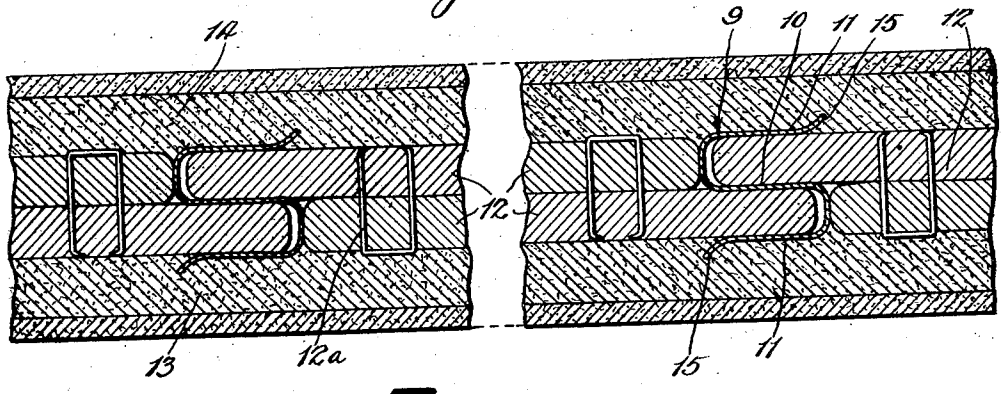


Fig. 2.

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By: Thiess, Olson & Mecklenburg
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PARTITION STRUCTURE

Filed June 15, 1942 3 Sheets-Sheet 2

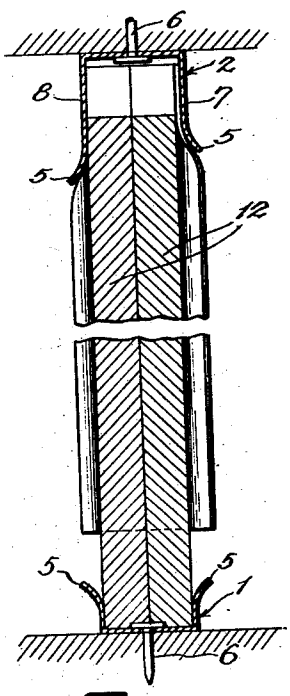


Fig. 3.

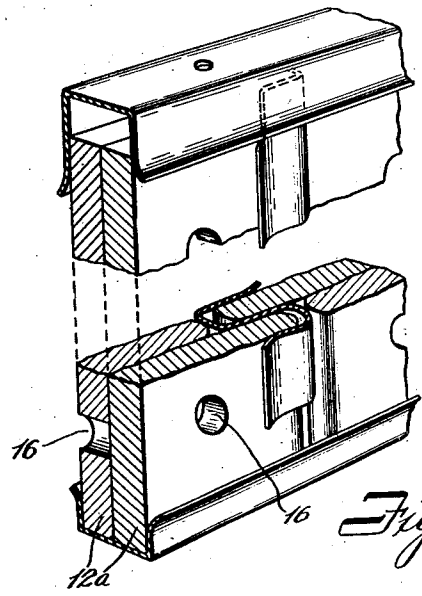


Fig. 4.

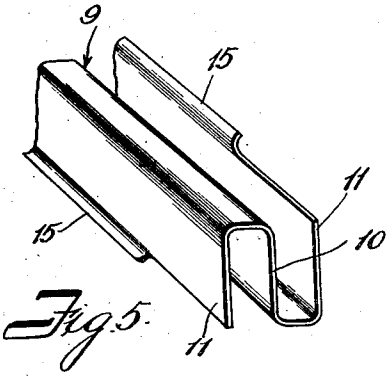


Fig. 5.

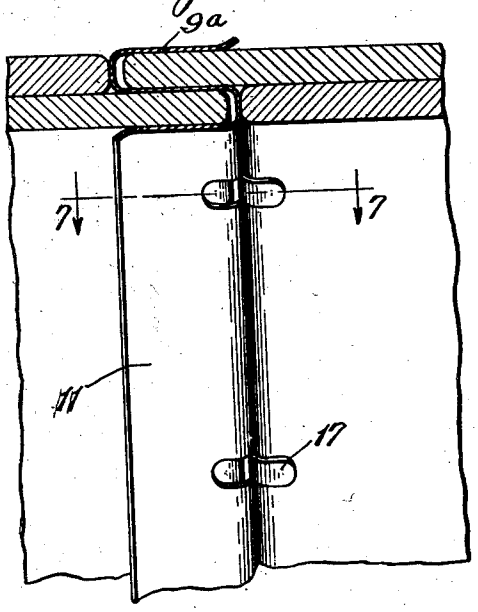


Fig. 6.

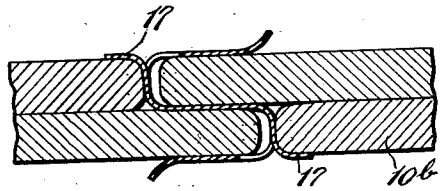


Fig. 7.

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PARTITION STRUCTURE

Filed June 15, 1942 3 Sheets-Sheet 3

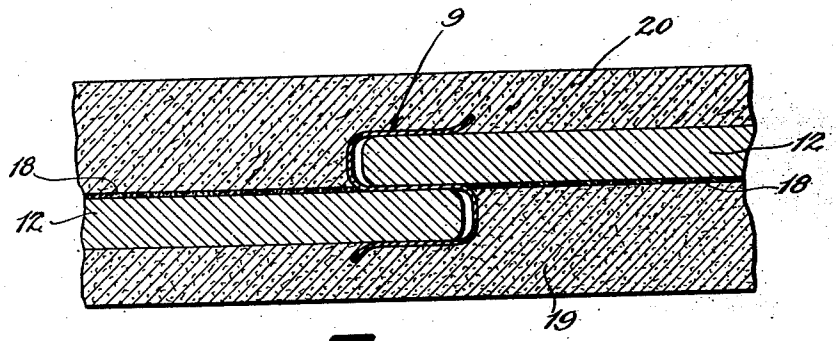


Fig. 8.

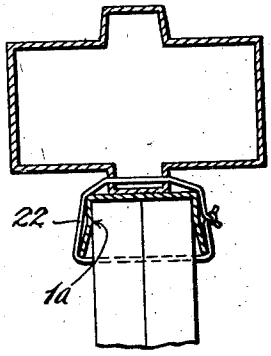


Fig. 10.

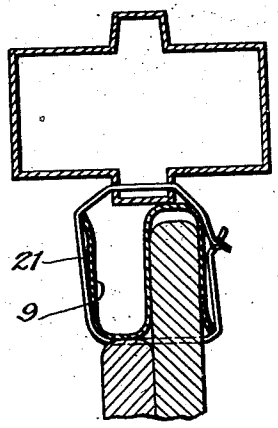


Fig. 9.

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UNITED STATES PATENT OFFICE

2,381,635

PARTITION STRUCTURE

George W. Baker, Chicago Heights, Ill., assignor to United States Gypsum Company, Chicago, Ill., a corporation of Illinois

Application June 15, 1942, Serial No. 447,037

13 Claims. (Cl. 72—46)

This invention relates to partitions, and more particularly to studs and associated elements for supporting the plaster base of a substantially monolithic or so-called solid partition, that is, partitions having 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.

In the usual partitions of the above noted rigid 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. This latter type of self adjusting or non-rigid partition is disclosed and claimed in the copending application of G. W. Baker and Nels Nelson Serial No. 447,036, filed June 15, 1942, and the instant invention is directed to a partition structure and stud therefor, which structure is particularly adapted for use in practicing the invention disclosed in the said copending application.

It is 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.

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 may be independently bonded to the relatively movable plasterboards.

A further object is the provision of a particular type of S-shaped stud adapted to support a plaster base comprising gypsum boards or the like in which the adjacent edges of the boards are supported in the studding in shiplapped relationship.

Another object of the invention is to provide a substantially monolithic or so-called solid partition and stud therefor of the character described which will be cheap to manufacture, easy to install, and which will be characterized by freedom from plaster cracks.

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

In the drawings:

Fig. 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 the assembled plaster base including a stud and floor and ceiling runners.

Fig. 5 is a perspective view of the upper end of the S-studs shown in Figs. 1 to 4.

Fig. 6 is a perspective view of a slightly different embodiment of stud for supporting the gypsum boards.

Fig. 7 is a detail sectional view taken on a line substantially corresponding to line 7—7 of Fig. 6.

Fig. 8 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 bonded to one side thereof.

Referring to the drawings in detail, the embodiment illustrated in Figs. 1 to 5, 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 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 are outturned slightly, as illustrated in Fig. 3, to enable easy insertion of the 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 being materially wider for a purpose which will be described later. The partitions are usually erected on the job by positioning suitable studs 9 between the floor and ceiling runners and supporting suitable gypsum boards or the like 10 between these studs to provide a two-ply plaster base.

The studs 9 are substantially S-shaped in cross section and comprise a central web 10 and oppositely disposed flanges 11 which are so related that the edges of 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 12*a* 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 any other suitable means for securing the boards non-rigidly 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 a stud, one of the boards entering the stud 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 stud, 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 the stud 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 the panel raised upwardly into the runner and then seated into the floor runner and moved laterally into engagement with a stud. The narrow flange of the ceiling runner is materially wider than the corresponding flange of the floor runner so that the boards are retained in the runners. 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. The runners are preferably of the type shown; however, the studs may be supported in any suitable manner between the floor and ceiling. Also, if desired, the boards only may extend into the runners to support the partition, and the S-shaped stud 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 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 imperforate 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 smaller 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 10*a* 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, and also in the event that the perforations coincide, the perforations may be coated with a suitable lacquer or other plaster non-bonding agent so that there is no rigid bonding of the plaster therein.

Figs. 6 and 7 illustrate a slightly different embodiment of stud construction for retaining the two-ply plaster base in assembled relation without the necessity for using staples, nails, or other means for securing the boards together. In this embodiment, the stud 9*a* may be of substantially the same general construction as the stud 9 previously described, with the exception that tongues or so-called knockouts 17 are punched outwardly from the material of the stud and extend substantially parallel with, but in the reverse direction from, the flanges 11 so that the tongues overlap the edges of the boards 12*b* to retain these boards in assembled relation without using staples, nails, or the like, as previously described.

A slightly different embodiment is illustrated in Fig. 8, in which a single layer of plasterboard may be used to form a plaster base. In this embodi-

ment, 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 18 to provide a comparatively weak bonding surface. This coating may be of any suitable type, such as sodium silicate, asphalt, or other suitable material, whereby a substantially yieldable bond is provided in such a manner as to enable slight relative planar movement of the plaster coverings 19 and 20.

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. 9 illustrates a method of securing a door frame or the like to one of the studs. In this construction, a sheet metal door buck is shown and may be secured to the stud by means of a wire 21 inserted through the door buck in the manner illustrated and tied around the partition as shown. The wire may extend through a small hole in the edge of one of the overlapping panels.

Fig. 10 illustrates the manner of securing the cut edges of the plasterboard base to a door buck. In this embodiment a strip of floor runner 1a is placed over the edges of the plasterboard panel and secured to the door buck by means of a wire 22 which is passed through the door buck and through the boards forming the panel and tied in the manner illustrated.

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 solid partition comprising a plaster base formed of two relatively movable layers of wallboard in face-to-face relation and laterally offset sufficiently to provide oppositely disposed shiplap edges, S-shaped studs embracing said shiplap edges to support said boards therebetween in two-ply self-adjusting planar relationship, and a layer of plaster on each side of said plaster base.

2. A solid partition comprising a plaster base formed of two relatively movable layers of wallboard in face-to-face relation and laterally offset sufficiently to provide oppositely disposed shiplap edges, S-shaped studs embracing said shiplap edges to support said boards therebetween in two-ply self-adjusting planar relationship, a layer of plaster on each side of said plaster base, and floor and ceiling channels for supporting the top and bottom edges of said plaster base therein.

3. In a solid partition structure, the combination with a U-shaped floor runner and a resilient U-shaped ceiling runner, of a stud substantially S-shaped in cross section and frictionally supported in said ceiling runner, and plasterboards having their edges embraced in overlapping relation in said stud and with their lower edges supported in said floor runner.

4. A solid partition structure comprising an elongated stud substantially S-shaped in cross section, a plurality of plasterboards disposed with adjacent boards on opposite sides of a median plane and having the adjacent edge of each board embraced between the web and a flange of said stud so that said edges are in overlapping relation in said stud, said boards and stud forming a plaster base, a layer of plaster on each side of said base to provide a solid partition, and a coating of bond-weakening material on at least one side of each board said coating comprising bonding means between face-to-face contiguous boards.

5. A solid partition comprising spaced studs of thin sheet metal, said studs being substantially S-shaped in cross section so that the space between the web and a flange of a stud is substantially the width of the usual plasterboard, a pair of plasterboards each having an edge engaged in one of said studding between the web and a flange, further independent plasterboards overlapping said plasterboards throughout substantially the remainder of their length, means to retain said boards in snug face-to-face relationship to form a panel, said retaining means enabling relative planar self-adjustment of said boards, and a comparatively thick plaster covering rigidly bonded to each board of said panel.

6. A solid partition comprising spaced studs of thin sheet metal, said studs being substantially S-shaped in cross section so that the space between the web and a flange of a stud is substantially the width of the usual plasterboard, a pair of plasterboards each having an edge engaged in one of said studding between the web and a flange, further independent plasterboards overlapping said plasterboards throughout substantially the remainder of their length, means to retain said boards in snug face-to-face relationship to form a panel, said retaining means comprising tongues struck out of said studs in a position to overlap the adjacent free end of a plasterboard to enable relative planar movement of said boards, and a comparatively thick plaster covering rigidly bonded to each board of said panel.

7. A substantially monolithic partition comprising sheet metal U-shaped floor and ceiling runners, said runners having substantially flat webs and outstanding flanges, said ceiling runner having one flange materially longer than the other with the edges of said flanges rolled or turned outwardly to enable easy insertion of a stud therebetween, studs having their upper ends frictionally embraced by said ceiling runner and terminating short of said floor runner, said studs being formed of sheet metal and being S-shaped in cross section so that the flanges of each stud are parallel with each other and with adjacent runner flanges, two-ply plasterboard panels supported in said runners and having overlapping shiplap vertical edges supported in opposite sides of said studs in overlapping relationship, means to retain said two plies in snug face-to-face relationship while permitting relative self-adjusting planar movement, and a plaster covering bonded to each side of said panels.

8. In a panel support for a partition, a pair of U-shaped sheet metal runners secured to a floor and ceiling, respectively, said runners having substantially flat webs and outstanding flanges, a resilient sheet metal stud substantially S-shaped in cross section to snugly embrace the edges of oppositely extending plasterboard panels in overlapping relation, said stud having one end frictionally engaged between the flanges of one runner, the opposite end terminating short of the other runner.

9. A gypsum board plaster base comprising U-shaped runner channels secured to a floor and ceiling, respectively, vertical gypsum boards supported in said floor channel and between the flanges of said ceiling channel and terminating short of the web thereof a distance greater than the height of at least one flange of said floor channel so that the upper edge of a board may angularly be inserted in said ceiling channel and the lower edge then inserted and supported in said lower channel, said boards having their vertical edges in overlapping relation, and an elongated thin sheet metal connector conforming to the overlapping edge contour of said boards and embracing said edges between a central web and oppositely extending flanges.

10. A partition comprising a stud including a thin sheet-like web in substantially the central plane of said partition, a plurality of plasterboards disposed with adjacent plasterboards on opposite sides of said web and each having an edge portion overlapping said web so that said web is between said overlapping board edges, and means integral with said web for retaining said boards and web in assembled relation.

11. A partition comprising spaced studs, each stud comprising a thin web in substantially the central plane of said partition, relatively movable plasterboards mounted in snug face to face multi-ply relation between pairs of said spaced studs to form multi-ply plasterboard sections, the edges of plasterboard in adjacent sections overlapping a stud web so that said web is snugly enclosed between plasterboard edges, and means integral with said web for retaining said boards and web in assembled relation.

12. A partition comprising spaced studs, each stud comprising a thin web in substantially the mounted in snug face to face multi-ply relation between pairs of said spaced studs to form multi-ply plasterboard sections, the edges of plasterboard in adjacent sections overlapping a stud web so that said web is snugly enclosed between plasterboard edges, means to secure said plasterboard together to retain all of the said elements in snugly assembled relation while permitting relative self-adjusting planar movement between said face to face plasterboard and between said plasterboard and said webs, and a layer of plaster on each side of said partition.

13. An elongated stud for plasterboard panels in a solid partition of the character described comprising an elongated sheet metal strip formed substantially S-shape in cross section with the web and flanges substantially parallel providing oppositely directed parallel grooves with the web as a common wall therebetween, said web and flanges being spaced to embrace the edges of oppositely disposed plasterboards and resiliently hold them in overlapping relation to form a plaster base, and tongues struck out from the stud flanges, said tongues extending parallel with and in the opposite direction from said flanges to embrace the edge portions of further plasterboards disposed in substantially the same planes but extending in opposite directions to the first mentioned plasterboards.

GEORGE W. BAKER.

CERTIFICATE OF CORRECTION.

Patent No. 2,381,635. August 7, 1945.

GEORGE W. BAKER.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 4, second column, line 4, claim 12, after the words "substantially the" insert --central plane of said partition, plasterboards--; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 20th day of November, A. D. 1945.

Leslie Frazer

(Seal) First Assistant Commissioner of Patents.