Dec. 16, 1969 P. H. MILLER 3,483,665

DRY WALL TWO-PIECE STUD STRUCTURE

Filed Nov. 30, 1967 3 Sheets-Sheet 1

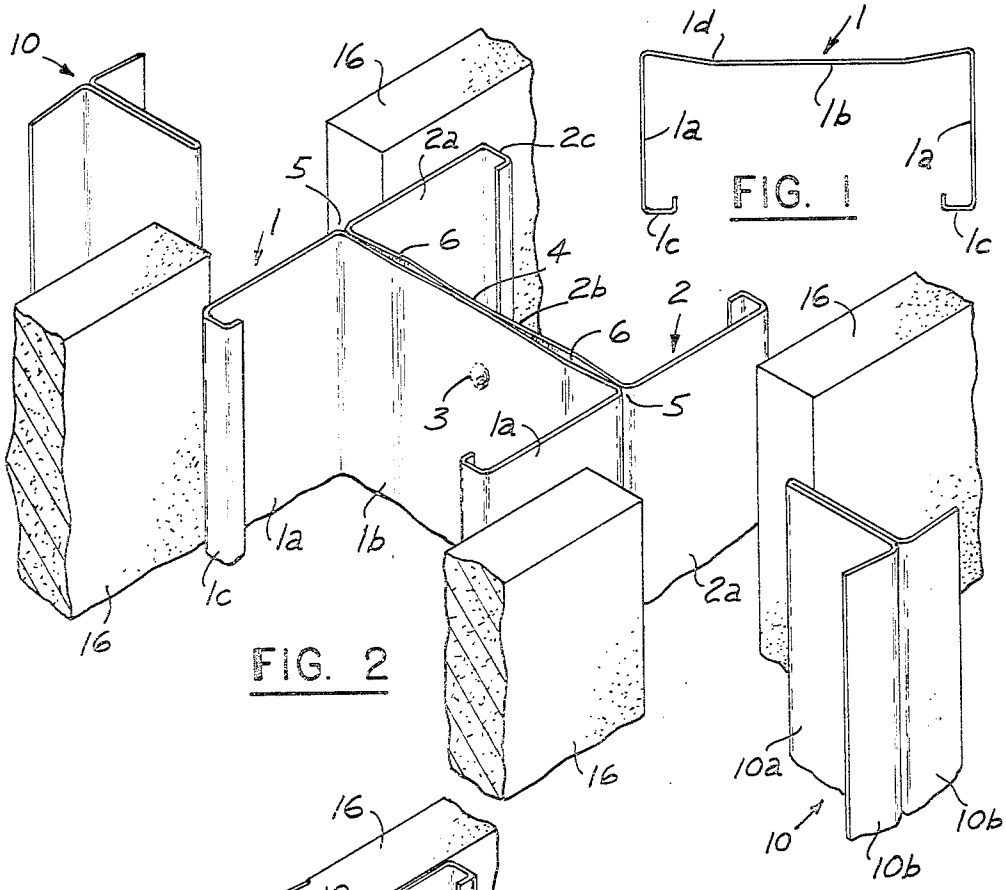

FIG. 2

FIG. 1

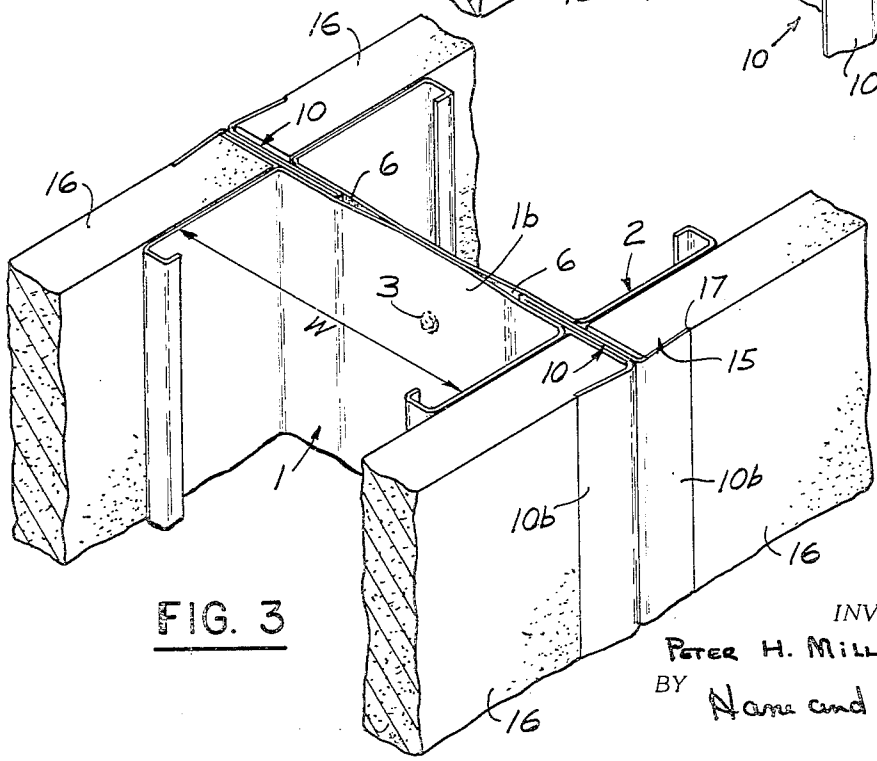

FIG. 3

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DRY WALL TWO-PIECE STUD STRUCTURE

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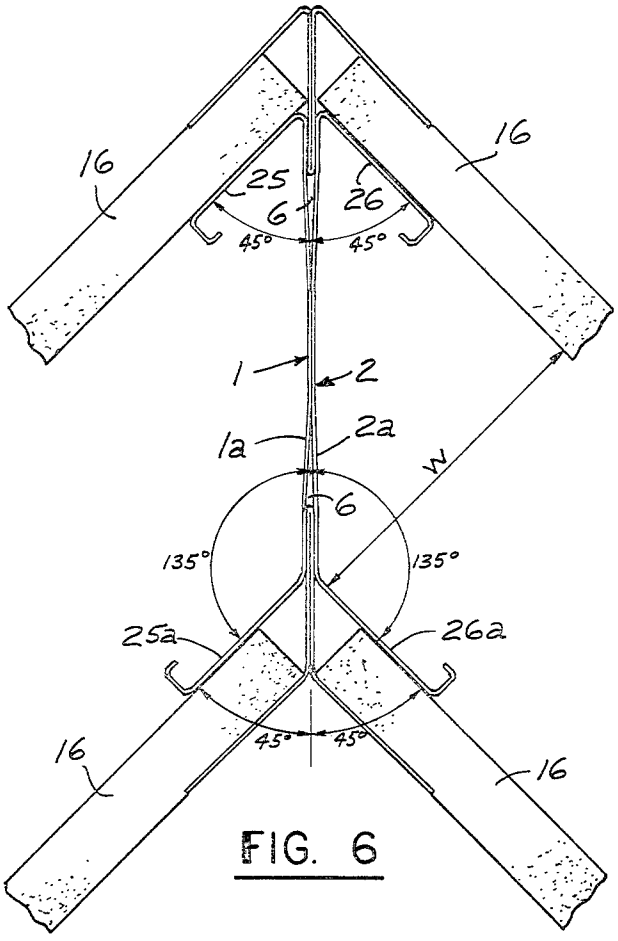

FIG. 6

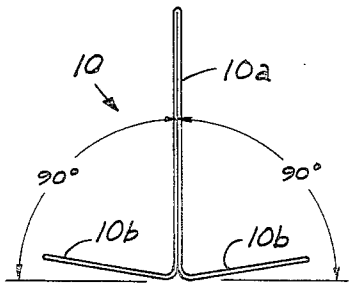

FIG. 4

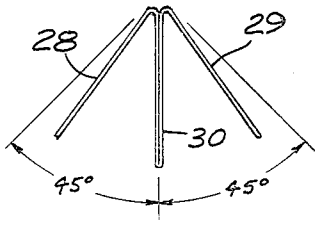

FIG. 7

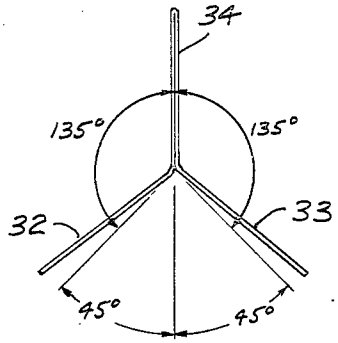

FIG. 8

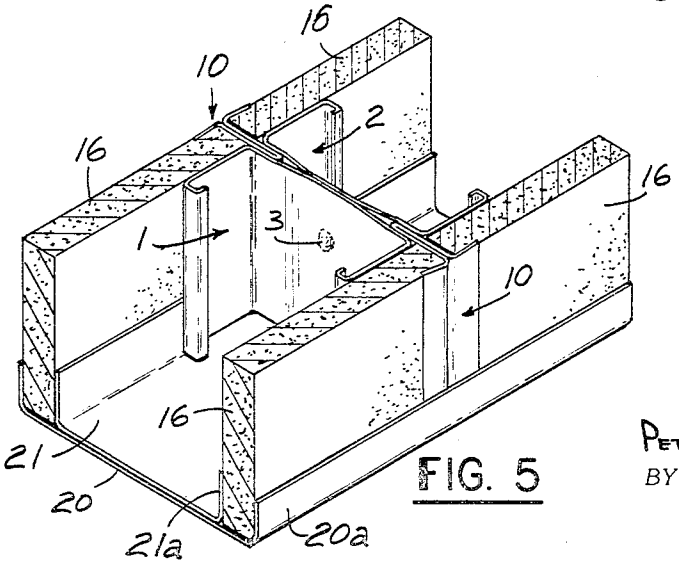

FIG. 5

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DRY WALL TWO-PIECE STUD STRUCTURE

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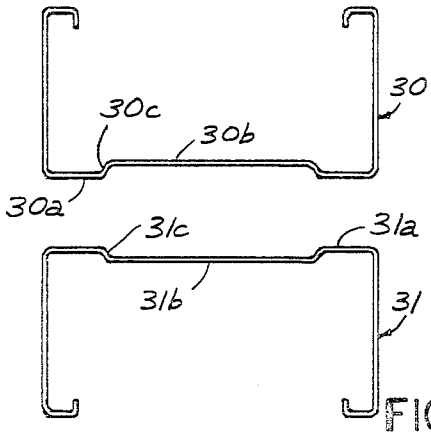


FIG. 9

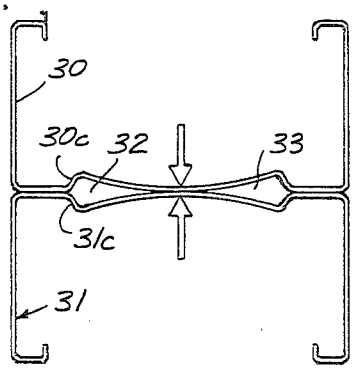
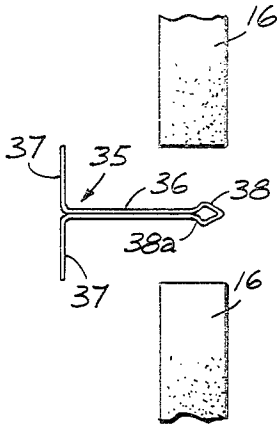


FIG. 10



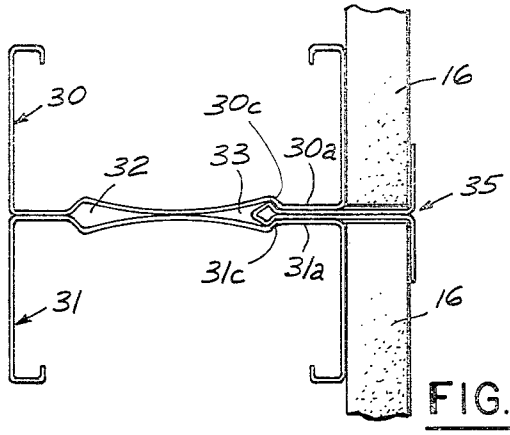


FIG. 11

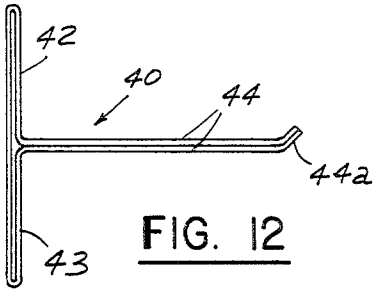


FIG. 12

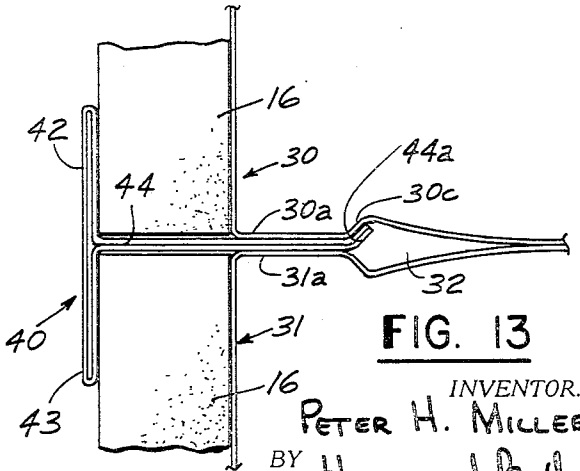


FIG. 13

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United States Patent Office

3,483,665
Patented Dec. 16, 1969

3,483,665

DRY WALL TWO-PIECE STUD STRUCTURE

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Filed Nov. 30, 1967, Ser. No. 686,921
Int. Cl. E04b 2/32, 2/78
U.S. Cl. 52—461 7 Claims

ABSTRACT OF THE DISCLOSURE

There is shown a building structure assemblage for erecting dry walls by holding construction wall boards or panels in position by inserting splines between the webs of channelled studs secured to each other back to back. The splines which have a generally T-shaped cross-section, are forced between the stud halves and retained between the same by frictional pressure engagement with the webs thereof. The cross arms of the splines in conjunction with the juxtaposed side branches of the stud halves define channels for receiving therein upright edges of the wall boards or panels.

The present invention relates to means for readily assembling and disassembling dry wall installations and more particularly to a building structure assemblage for securing wall boards, plaster boards, panels, etc., to upright studs.

A frequently occurring operation in the dry wall construction industry is the erection of partition walls particularly of internal partition walls, either of the full room height or of partial height. It is essential that such walls can be economically and rapidly erected, that they are sufficiently sturdy, present an ornamentally attractive appearance and can be conveniently finished by papering, panelling or painting. It is also essential that the walls can be rapidly and readily disassembled for relocation as is often necessary in industrial and office buildings.

It is an object of the invention to provide a novel and improved building structure assemblage of the general kind above referred to in which the wall boards, etc. are secured to a stud by inserting the wall boards along an edge thereof into channels defined by a pair of channelled stud halves secured to each other back to back to form the stud and T-shaped elongated splines forced between the two webs of the stud halves and held in position therebetween by pressure engagement with the webs.

A more specific object of the invention is to provide a novel and improved building structure assemblage in which four wall boards are each held along an edge by inserting said edges into four channels defined by the side branches of a joined pair of upright stud halves and two splines forced into the gaps between the webs of the stud halves on opposite sides thereof.

Another more specific object of the invention is to provide a novel and improved building structure assemblage in which two wall boards inserted in two oppositely facing channels along one side of the stud are held in coplanar alignment by using stud halves of rectangular cross-section and splines the cross arms of which are substantially parallel to the side branches of the stud halves, or in which the two wall boards are held at an angle in reference to each other by using stud halves the side branches of which define selected angles with the web and splines the cross arms of which match said angles.

As is evident, the first type of stud halves and splines produces straight walls and the second type wall corners.

A further more specific object of the invention is to provide a novel and improved building structure assemblage in which the wall boards retained in the channels formed at opposite sides of the stud are held in fixed parallel spaced apart relationship thereby providing space for insulating filler between the boards, conduits, etc.

It is also an object of the invention to provide a novel and improved building structure assemblage in which the stud halves with the splines secured thereto and the wall boards retained by the stud halves and the splines are releasably anchored to the floor or the ceiling of a room by being fitted into the channelled runners.

Other and further objects, features and advantages of the invention will be pointed out hereinafter and set forth in the appended claims constituting part of the invention.

In the accompanying drawing several preferred embodiments are shown by way of illustration and not by way of limitation.

In the drawing:

FIG. 1 is a plan view of one-half of a stud as used in a dry wall installation according to the invention;

FIG. 2 is a perspective exploded view of a dry wall installation according to the invention;

FIG. 3 is a perspective view of the assembled dry wall structure according to FIG. 2;

FIG. 4 is a detailed view of a spline used in the dry wall installation;

FIG. 5 is a perspective view of the dry wall structure according to FIG. 3 inserted into runners anchored to the floor or the ceiling of a room;

FIG. 6 is a plan view of an assemblage according to the invention for erecting a dry wall corner wall;

FIGS. 7 and 8 are plan views of splines for use in the assemblage according to FIG. 6;

FIG. 9 is a cross-sectional view of a modification of the stud halves of the dry wall structure;

FIG. 10 is a cross-sectional view of the two stud halves secured to each other in coacting relationship;

FIG. 11 is a partly exploded and a partly assembled cross-sectional view of a modified dry wall structure including stud halves according to FIGS. 9 and 10 and a modified spline;

FIG. 12 is a further modification of the spline; and

FIG. 13 is a frgamentary view of a dry wall structure assembled with a spline according to FIG. 12.

Referring first to FIGS. 1 to 5 inclusive more in detail, the exemplified dry wall installation comprises two stud halves **1** and **2** preferably made of somewhat springy metal. The two stud halves have a generally U-shaped cross-section and more specifically the side branches **1***a* and **2***a* of each stud half define a right angle with the respective stud web **1***b* or **2***b*. The side branches of both stud halves may be turned inwardly at their ends as is indicated at **1***c* and **2***c* but this is not essential for the purpose of the invention.

The two studs halves are joined with their webs back to back along substantially the midline of the webs either continuously along the entire length of the webs or by spot welding as is indicated at **3**.

As can best be seen in FIG. 2, the two webs are in fixed abutment with each other in the mid-area **4** and also near the junction lines **5** between the webs and the respective side branches but are slightly spread apart

between the area **4** and lines **5** to form two shallow pockets **6** on opposite sides of area **4**. To facilitate the formation of such pockets when the webs of the studs halves are welded together or otherwise joined to each other, the web **1***b* or **2***b* of each stud half is preferably slightly depressed at **1***d* as is shown in FIG. 1 for web **1**. As is now evident, pulling together of the mid-portions of the two webs when being welded or otherwise joined results automatically in the formation of the aforedescribed pockets. As is also now evident, the pockets are self-closing along lines **5** but can be entered by forcing apart the stud webs at the junction lines **5**.

The building structure of the invention further comprises two splines **10**, one for each side of the stud. The splines have a generally T-shaped cross-section. They can be conveniently and economically formed by folding a strip of suitable reasonably springy metal so that a double thickness of the strip forms the long arm **10***a* of the spline and bent-off single thickness strip portions the cross arms **10***b*. Forming the long arm **10***a* with a double thickness gives this arm a high rigidity and a greater thickness, particularly at the bent over end of the strip which is desirable for a reason which will become evident from the subsequent description. The cross arms preferably define an angle of slightly less than 90° with the long arm for a reason which will also become apparent from the subsequent description. The length of the splines is preferably substantially equal to the length of the stud halves.

ERECTION OF A DRY WALL STRUCTURE

Let it be assumed that the two stud halves **1** and **2** are secured to each other back to back as previously described and shown in FIGS. 1, 2 and 3 and that the two stud halves are suitably secured in upright position in runners on the floor or on another support as will be more fully described in connection with FIG. 5.

The long arms **10***a* of the splines are now forced for part of their length past junction lines **5** into the pockets **6** on both sides of the stud halves. As is evident, the side branches **1***a* and **2***a* of the stud halves in conjunction with the outwardly protruding part of the long arms of the two splines and the cross arms thereof now define on each side of the pair of stud halves two oppositely facing channels **15**, that is, four channels in toto. The initial depth of insertion of the splines into the pockets is selected so that the edges of wall boards **16** can be conveniently slid into the channels as is shown in FIG. 3. The splines are then further pressed in until their cross arms tightly butts against the wall boards. Due to the angle of slightly less than 90° of the cross arms the same will bite into the comparatively soft material of the wall boards as is indicated at **17** thus locking the wall boards in the channels. The splines themselves are safely secured in position by the strong frictional pressure exerted by the web portions along the junction lines **5**. Moreover, the long arms of the splines will be in frictional engagement with a narrowing inner part of pockets **6** due to the thickness of the two strip layers forming the long arms of the splines.

As can be seen in FIG. 3, the aforedescribed simple and rapid assembly operation results in holding the four wall boards in alignment. The space W left vacant between the boards on opposite sides of the stud halves may be used in a conventional manner to accommodate insulation material and conduits or pipes.

As is shown in FIG. 3, the splines when fully pressed home are nearly flush with the surfaces of the wall boards so that the walls can be conveniently finished by painting, paneling or papering. The splines themselves may be ornamented in any desired fashion, if so desired.

Turning now to FIG 5, the runner assembly according to this figure comprises an outer runner **20** of substantially U-shaped cross-section into which is nested an inner runner of also substantially U-shaped cross-section. The side branches or lips **20***a* and **21***a* of the runners are spaced from each other so as to accommodate the respective ends of the wall boards as is clearly shown in FIG. 5. The respective ends of the stud halves abut against the inside of lips **21***a* as also is shown in FIG. 5 and may be secured to the lips by suitable fastening means. The lips of the inner runner are preferably higher than those of the outer runner to provide a strong anchor base for the stud halves.

It should be understood that it is within the scope of the invention to simplify the runner assembly by using one runner only.

Disassembly of the dry wall structure hereinbefore described, can be rapidly and conveniently effected by at least partly pulling the splines out of the stud halves. As is evident, loosening of the splines permits detachment of the wall boards by simply pulling the same out of channels **15**.

The runner assembly of FIG. 5 may be used to anchor the dry wall structure to the floor and also the ceiling of a room.

If the wall structure is of the type ending short of the ceiling of the room in which the wall structure is installed, the top of the wall may be finished by using finishing caps with or without tracks for mounting glass panels as disclosed in my co-pending application Ser. No. 626,886 filed Mar. 29, 1967.

The aforedescribed dry wall structure can be used to produce straight walls of any desired length by simply duplicating the illustrated assemblage, but the concept of the invention can be equally well applied to the erection of wall corners. FIGS. 6 to 8 show the adaptation of the invention to a wall corner.

The structural components required to erect a wall structure including a corner are similar in principle to those previously described and, accordingly, the same reference numerals are used to describe corresponding components or parts of such structure. The components according to FIGS. 6 to 8 are distinguished from the previously described components in that side branches of the stud halves **1** and **2** define angles with the webs other than substantially 90° angles. FIG. 6 shows two spaced apart walls including a corner. Accordingly, side branches **25** and **26** on one side of the stud halves define angles of about 45° with the webs **1***a* and **2***a* while the side branches **25***a* and **26***a* on the other side of the stud halves define angles of 135° with the webs. Similarly, the cross arms **28** and **29** of the spline (FIG. 7) designed for coaction with side branches **25** and **26** define angles of about 45° with the long arm **30** of the spline while the cross arms **32** and **33** of the spline (FIG. 8) designed for the coaction with side branches **25***a* and **26***a* define angles of 135° with the long arm **34** of the spline. The angles of the cross arms of the splines are preferably made slightly smaller than 45° and 135° respectively, to cause the cross arms to bite somewhat into the surface of the wall boards when the splines are driven home, as previously described.

The assemblage of the wall structure as shown in FIG. 6 and also disassemblage thereof, is evident from the previous description. It suffices to state that the total width of the stud halves used for corner construction should be such that the two walls when assembled are separated by the same distance W as are the two walls shown in FIG. 3.

Referring now to FIGS. 9 to 11 inclusive, the dry wall structure as exemplified in these figures comprises two channelled stud halves **30** and **31**. The stud halves are of U-shaped cross-section and preferably made of somewhat springy metal. The side branches of both stud halves may again be turned inwardly at their ends, as is shown. The webs **30***a* and **31***a*, respectively, of the stud halves have each a preferably centric lengthwise recess **30***b* and **31***b* respectively, joined to the adjacent non-depressed portions of the respective web by slanted side walls **30***c* and

31*c* for a purpose which will be more fully explained hereinafter.

The two stud halves are placed back to back as shown in FIG. 10 and the recessed portions in the webs thereof are pulled together, as also shown in FIG. 10 and secured to each other along substantially the mid line of the webs by suitable fastening means such as spot welding indicated by opposed arrows. As a result, two pockets **32** and **33** are formed on opposite sides of the mid line.

While splines as shown in FIG. 4 and described in connection therewith may be used for insertion between stud halves **30** and **31** as previously described, splines **35** as shown in FIG. 11 are preferable. Splines **35** are formed by bending back upon itself an elastic metal strip to form a double-thickness long arm **36**. The two cross arms **37** of the spline are formed by again bending off the free ends of the strip in opposite direction. The distinguishing feature of spline **35** is the generally lozenge-shaped head portion **38** which is shaped by a suitable technique when the strip is bent, for instance by bending the strip over an appropriately shaped mandrel. The slant of the side walls **38***a* of the lozenge-shaped end portion **38** substantially matches the slant of side walls **31***c* constituting one of the boundary sides of pockets **32** and **33**, as previously explained.

To assemble the dry wall structure, two wall boards or panels **16** are placed in alignment with each other upon the side branches of stud halves **30** and **31** as previously described and shown at the righthand side of FIG. 11. A spline **35** is now forced between web portions **30** and **31***a* on each side of the stud halves spreading the same slightly apart until the lozenge-shaped head **38** of the spline comes to rest in the respective pocket such as pocket **33**. The length of the long arm of the spline is so selected that the spline head has fully entered pocket **33** and rests with its side walls **38***a* more or less closely against the respective pocket walls **30***c* and **31***c*, just when the cross arms **37** of the spline come to rest against the outside of wall boards or panels **16**, thereby anchoring the spline in the pocket. The spline is further secured in position by the frictional pressure between the web portions **30***a* and **31***a*. The cross arms may again be slightly slanted inwardly so that they somewhat bite into the usually rather soft material of the wall boards.

Referring now to FIGS. 12 and 13, the dry wall construction shown in these figures incorporates the same channelled stud halves **30** and **31** of the type as shown in FIGS. 9 to 11 and described in connection therewith, but the splines used for securing wall boards or panels **16** to the stud halves are modified. FIG. 12 shows a spline **40** made of an elastic metal strip. The strip is initially bent back upon itself at both ends to form double-thickness cross arms **42** and **43** and is again bent at both arms to form a double-thickness long arm **44**. The long arm has an angularly bent-off end portion **44***a*. Arms **42** and **43** may be slightly slanted for the previously explained purpose.

Assembly of the dry wall structure of FIG. 13 is similar to the previously described assemblies, that is, the two wall boards are placed upon the side branches of the two stud halves in alignment with each other and a spline **40** is then forced between the webs of the two stud halves on each side thereof until the slanted end portion **44***a* of the spline has fully entered pocket **32** formed by the stud webs, as previously described. As also previously described, the length of the long arm of the spline is such that complete entry of angular portion **44***a* into the pocket and engagement of cross arms **42** and **43** with the surfaces of wall boards **16** coincide. As is clearly shown in FIG. 13, the angle of bent-off portion **44***a* is about the same as the slant of side wall **30***c* of the pocket.

As is evident, the spline is anchored in the pocket by virtue of its bent-off portion **44***a* and is further retained in position by the frictional pressure engagement between web portions **30***a* and **31***a*.

The spline according to FIGS. 12 and 13 has the advantage over the splines previously described in that its outwardly facing top surface is continuous while the corresponding top surface of the other exemplifications of the splines have a slit along the line at which the cross arms and the long arm of the splines join. Such continuous top surface facilitates finishing of the spline for ornamentation and also applying a smooth layer of wall paper or paint thereto.

While the invention has been described in detail with respect to certain now preferred examples and embodiments of the invention, it will be understood by those skilled in the art, after understanding the invention, that various changes and modifications may be made without departing from the spirit and scope of the invention.

What is claimed is:

1. A building structure assemblage for erecting wall board dry walls, said assemblage comprising in combination:

a stud formed of a pair of co-extensive stud halves of generally U-shaped cross-section having straight side branches and generally straight webs, lengthwise median portions of the webs being secured to each other, said stud halves being biased into pressure engagement with each other along the junction lines between the webs and the side branches of the stud halves and being further biased to be slightly spread apart intermediate said junction lines and said median portions at which the webs are secured to each other thereby forming a pair of shallow pockets on opposite sides of said median portions; and

at least one elongate spline of generally T-shaped cross-section having a straight long arm and two straight cross arms, the long arm of said spline extending partly between said engaging junction lines in frictional pressure engagement therewith, the cross arms of the spline overlying the respective side branches of the stud halves spaced apart therefrom, the cross arms, the part of the long arm protruding from the stud halves and the side branches of the stud halves in conjunction defining a pair of oppositely facing channels of generally U-shaped cross-section with flat side branches each for receiving an edge portion of a wall board of the dry wall to be erected.

2. A building structure assemblage according to claim **1** wherein the long arm of the spline comprises a double thickness of a substantially rigid straight strip and the cross arms comprises single thickness straight strip portions oppositely extending from the long arm.

3. A building structure assemblage according to claim **2** wherein said spline comprises an elastic metal strip bent back upon itself to define the double thickness long arm and bent off outwardly at both ends to define the double thickness long arm and bent off outwardly at both ends to define the single thickness cross arms.

4. A building structure assemblage according to claim **1** wherein each cross arm of the spling defines an angle of slightly less than 90° with the long arm of the spline.

5. A building structure assemblage according to claim **1** and comprising two splines, each for coaction with the side branches on one side of the stud halves, and wherein the side branches of each stud half define a right angle with the respective web portion and the cross arms of each of the splines define a substantially right angle with the long arm of the spline whereby said oppositely facing channels defined by the protruding part of each of the splines, the cross arms and the side branches of the stud halves have each a substantially rectangular cross-section.

6. A building structure assemblage according to claim **5** wherein the side branches of one of said pair of stud halves define an angle of about 45° with the web portion and the side branches of the other of said pair of stud halves define an angle of about 135°, and wherein the cross arms of one of the splines define an angle of about 45° with the long arm of the respective spline and

the cross arms of the other of the splines define an angle of about 135° with the long arm of the respective spline thereby forming two pairs of oppositely facing channels for securing two pairs of wall boards with the boards of each pair in right angle relationship.

7. A building structure according to claim 1 wherein said spline comprises an elastic metal strip doubled upon itself at both ends to define said cross arms as continuous double-thickness arms and defining at both ends an angle of about 90° to form the long arm of the spline as a double-thickness arm.

References Cited

UNITED STATES PATENTS

1,214,017	1/1917	Day	52—364
1,772,417	8/1930	Ellinwood	52—461
2,412,401	12/1946	Holm-Hansen	52—461
3,034,609	5/1962	Young	52—461 X
3,292,318	12/1966	Clevenger	52—464 X

FOREIGN PATENTS

126,233	12/1947	Australia.
202,340	7/1956	Australia.
59,085	12/1953	France.
866,234	4/1961	Great Britain.

ALFRED C. PERHAM, Primary Examiner

U.S. Cl. X.R.

52—282, 364, 729