United States Patent

Miller

[15] **3,638,370**

[45] **Feb. 1, 1972**

[54] FASTENING STRUCTURE FOR SECURING SUPPORT BRACKETS TO A WALL

[72] Inventor: **Peter H. Miller**, Newark, N.J.

[73] Assignee: **Evon Industries, Inc.**, Newark, N.J.

[22] Filed: **June 24, 1970**

[21] Appl. No.: **49,434**

[52] **U.S. Cl.**.....**52/36**, 52/105, 52/586, 211/134

[51] **Int. Cl.**.....**E04b 1/41**

[58] **Field of Search**.....52/36, 582, 464, 105, 248, 52/586; 211/87, 134, 135

[56] **References Cited**

UNITED STATES PATENTS

2,187,087	1/1940	Leary	52/105
3,034,609	5/1962	Young	52/220
3,193,885	7/1965	Gartner	52/36
3,492,766	2/1970	Andrews	52/36

Primary Examiner—Frank L. Abbott
Assistant Examiner—Robert A. Schwartz
Attorney—Hane, Baxley & Spiecens

[57] **ABSTRACT**

Shelf brackets having a mounting hook at one end are releasably secured to a wall constructed of spaced pairs of channeled studs secured to each other, web to web, at localized areas and spanned by wallboards by inserting the mounting hooks of the brackets into slots formed at the end of the long arm of a T-shaped spline forced between the webs. A marker attached to an end of the spline constitutes a reference point for determining the location of the slots in the spline. As these slots are concealed after insertion of the spline between the webs of the studs such reference point facilitates the attachment of the brackets to the wall.

9 Claims, 8 Drawing Figures

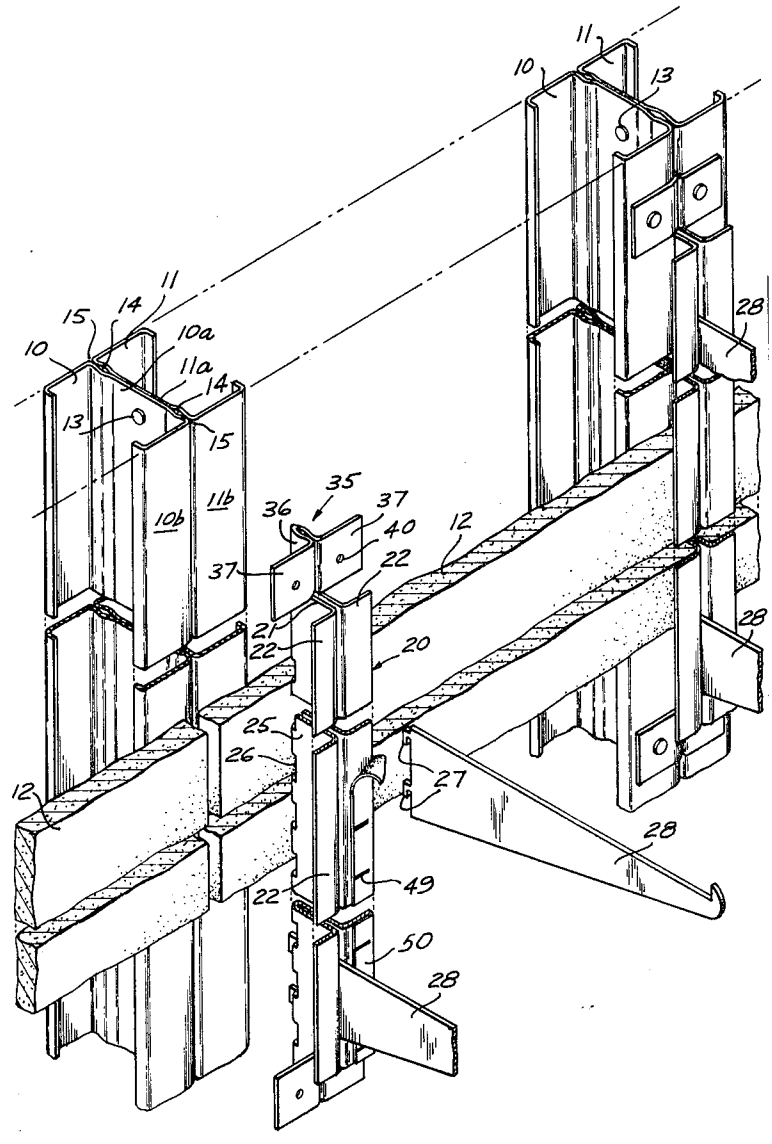
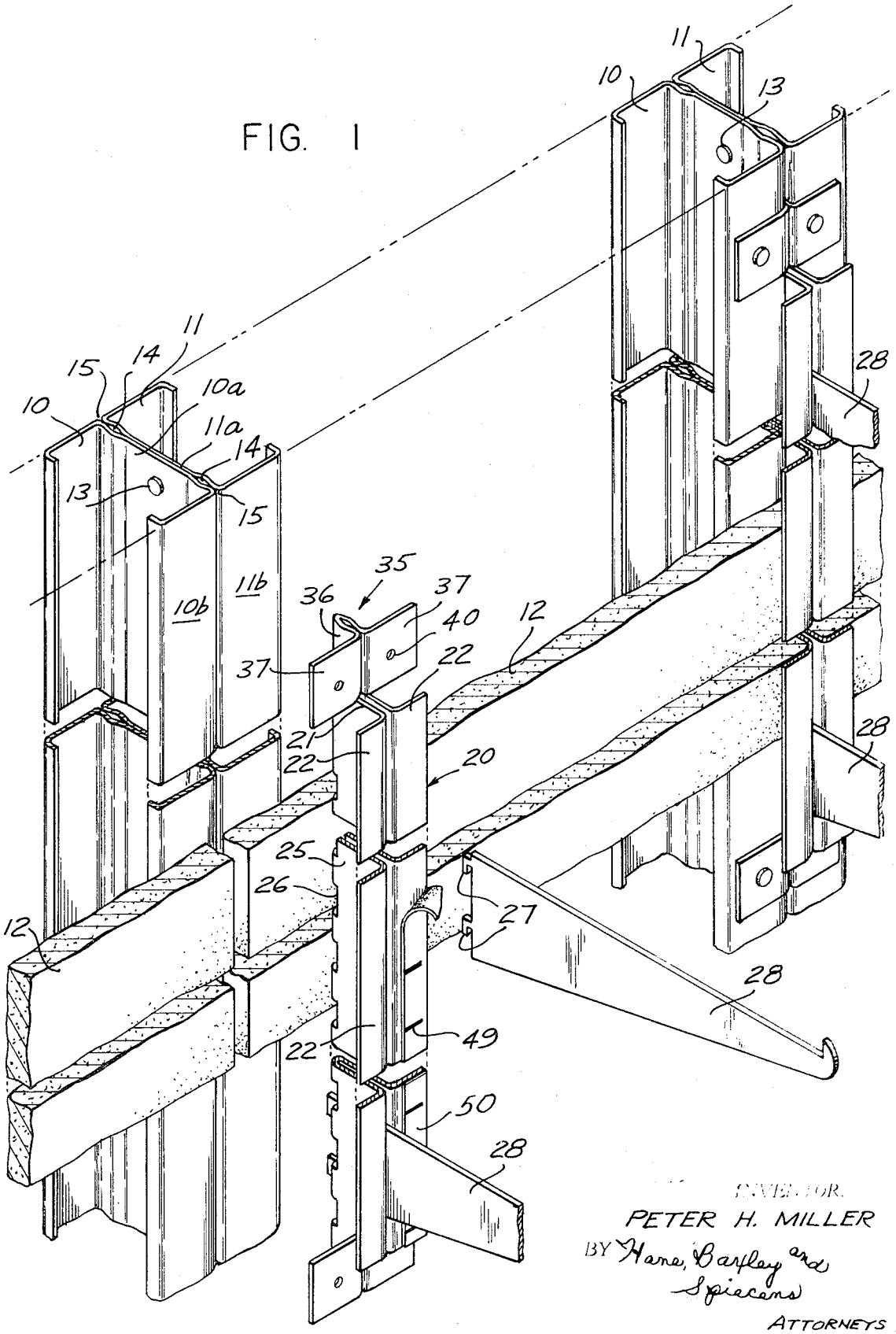


FIG. 1



INVENTOR.
PETER H. MILLER
BY Hane, Barclay and Spiecans
ATTORNEYS

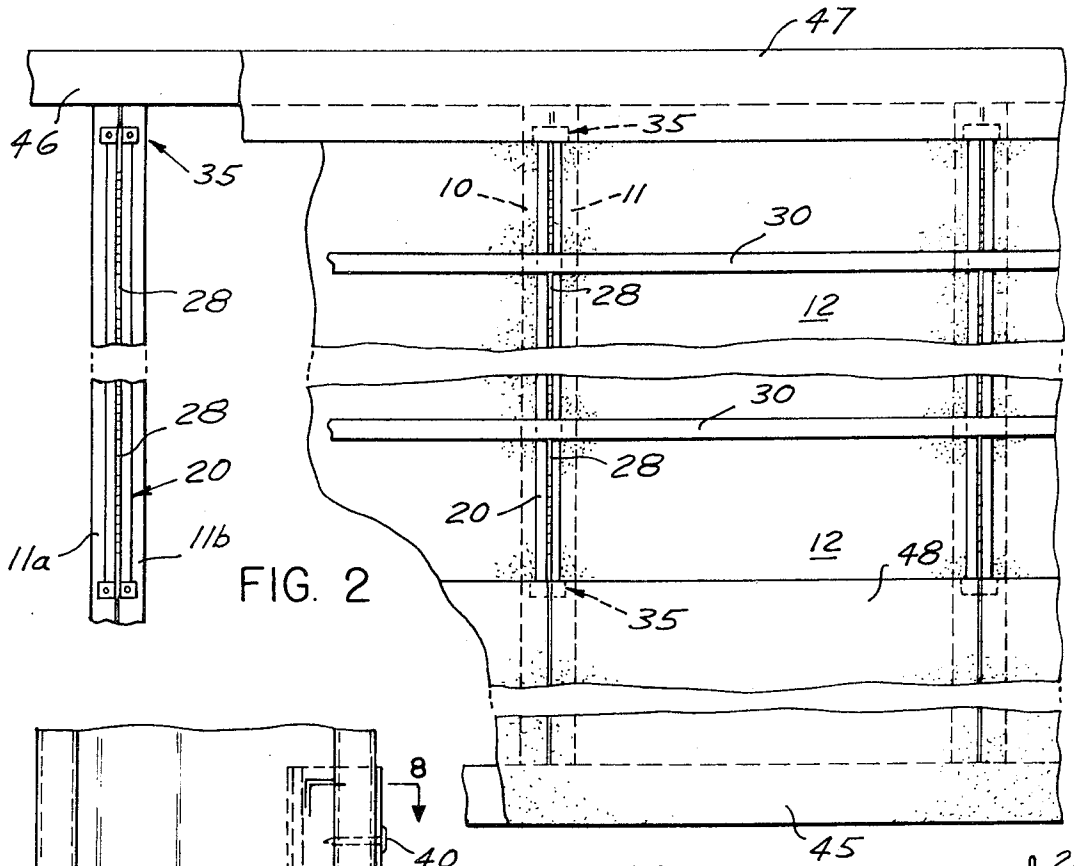


FIG. 2

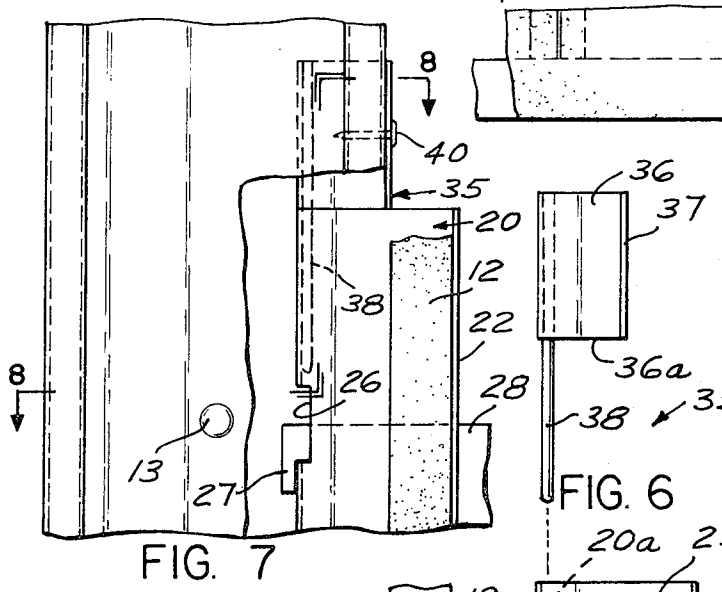


FIG. 7

FIG. 6

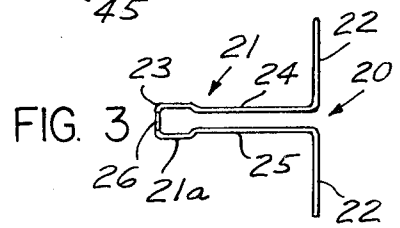


FIG. 3

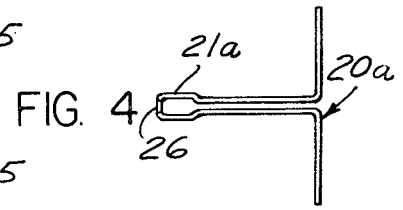


FIG. 4

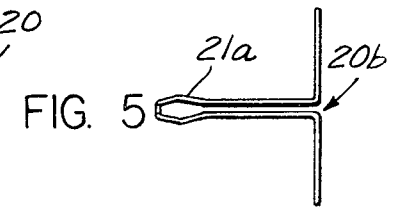


FIG. 5

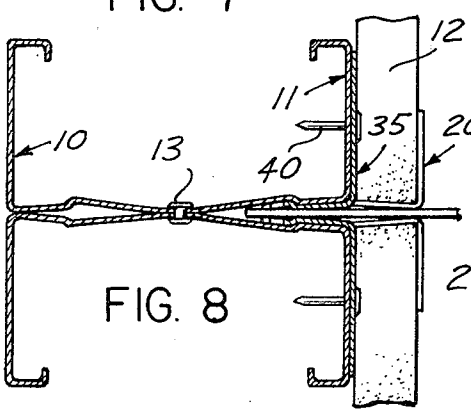
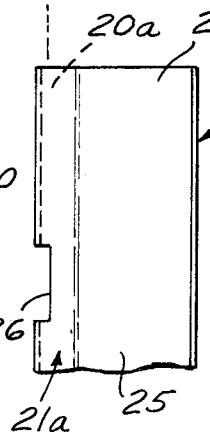


FIG. 8



INVENTOR
PETER H. MILLER
BY Hane, Bayley and Spiecens
ATTORNEYS

FASTENING STRUCTURE FOR SECURING SUPPORT BRACKETS TO A WALL

The present invention relates to a fastening structure for attachably securing brackets to building walls, and particularly to walls such as partition walls constructed by erecting spaced-apart pairs of upright-channeled studs joined to each other, web to web, at localized points as by spotwelding and spanning the spaces between the pairs of studs by wallboards such as boards made of sheet rock, plaster board or other comparatively soft material as customarily used in the building industry, said wallboards being held in position by splines of generally T-shaped cross section forced between the webs of adjacent studs.

BACKGROUND

Walls of the general kind above referred to are widely used as partition walls in manufacturing and merchandising establishments such as factories and stores, especially department stores, supermarkets, etc. Establishments of this kind and also many other establishments such as libraries, find it often necessary to place a great number of items on open shelves for display or ready accessibility. The items to be placed on the shelves may be individually heavy or present a heavy load in the aggregate, so that the shelves themselves must be sturdy and the brackets therefor be strongly anchored to the wall. Moreover, it is often necessary or desirable for business or other reasons to relocate the shelves.

Wallboards of the kind above referred to, being made of rather soft material, have very little load-carrying capability so that the studs themselves usually made of metal are the only available wall components capable of supporting the brackets and thus the shelves. As the studs are not readily accessible at the time the brackets are to be secured thereto, it is difficult and time consuming to mount the often large number of brackets so that the brackets and eventually the shelves placed thereupon are spaced at the required distances and are level. Relocation of the brackets is similarly time consuming for the same reason.

Several types of structures for securing brackets to the studs have been proposed, but the proposals as now known require special mounting plates and other fastening members so that the installation of the brackets is still a complex and time-consuming operation—time being a very important factor at today's labor costs. Moreover, the now-known means for fastening brackets to the studs do not provide readily available markers or indicators which assist a construction worker installing the brackets in finding the correct locations for the brackets, but such locations must be found by trial and error.

THE INVENTION

It is a broad object of the invention to provide a novel and improved fastening structure for attachably securing the brackets to a wall of the kind above referred to by means of which the brackets can be rapidly and safely secured to walls of the kind above referred to at the desired levels and spacings one from another.

Another important object of the invention is to provide a novel and improved structure for attachably securing brackets to a wall of the kind above referred to by means of which the brackets can be rapidly and strongly secured to the wall by modifying splines of the kind customarily fitted between the webs of pairs of studs for securing the wallboards to the branches of the studs. Accordingly, the fastening structure of the invention introduces a completely new concept in that structural components, already required for constructing the wall, namely the splines, are utilized but so modified that they are capable of receiving and supporting the brackets instead of the heretofore-used special mounting plates and other special fastening means thereby reducing the overall costs of the installation.

Still another important object of the invention is to provide a novel and improved structure for fastening brackets to building walls of the kind above referred to which structure includes means for guiding the person installing the brackets in ascertaining the exact locations available for securing the brackets to the wall thereby further simplifying and expediting mounting of the brackets in correct positions on the wall.

SUMMARY OF THE INVENTION

The afore-pointed-out objects, features and advantages, and other objects, features and advantages which will be pointed out hereinafter are obtained by providing for a wall structure of the kind hereinbefore described generally T-shaped splines with a long arm in the form of a generally U-shaped strip. This long arm of the splines includes at its joined end lengthwise-spaced slots each dimensioned to receive and retain therein the mounting hook at the end of the brackets to be fastened to the wall. Brackets of this kind are conventionally used as shelf brackets and for similar purposes, and readily available in the market. The slots are generally uniformly spaced and it is advantageous to provide more slots than the minimal number required for the number of shelves to be attached to the wall so that the person installing the brackets has ample latitude to provide virtually any spacing of the shelves which may be required and also to relocate the shelves.

As it is evident, the slots in the splines become invisible from the outside of the wall when the splines are pressed home during the construction of the wall. This makes it cumbersome for the person installing the brackets to locate the slots to be used for securing the brackets at the desired spacing and a level position. According to the invention, locating of the slide slots is facilitated by providing at least at one end of the spline a marker which constitutes a reference point by means of which the locations of all the slots can be readily ascertained. The workman installing the brackets knows by checking the spline before installing the same that the slots are spaced, for instance by a distance of 2 in. and the slot nearest to the marker is at a distance of, say, 4 in. All he has to do to locate the slots is to mark off on the wall spacings of 2 in. starting with the marker as reference point.

Location of the slots can be also simplified by adhering to one of the crossarms of the spline, or if the crossarms should be covered by a wall finish, to the surface of this finish a strip bearing a calibration showing the distance of the slots, again using the marker as a reference point for locating the calibrated strip.

DETAILED DESCRIPTION OF THE INVENTION

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

In the drawing:

FIG. 1 is an exploded perspective view of a fastening structure for releasably securing brackets to a wall of the kind described;

FIG. 2 is a diagrammatic elevational view upon a wall such as a partition wall incorporating fastening structure, according to the invention;

FIGS. 3, 4 and 5 are end views of modifications of splines as used in the fastening structure of the invention;

FIG. 6 is a side view upon a marker and a spline as used in the fastening structure of the invention;

FIG. 7 is an elevational fragmentary view, partly in section, of the wall with a bracket attached thereto by means of the fastening structure of the invention; and

FIG. 8 is a section taken on line 8—8 of FIG. 7.

Referring now to the figures in detail, and first to FIG. 1, the exploded view shown in this figure illustrates structural components used for the partition wall as the same is erected, fastening structures of the invention and several brackets to be releasably secured to the wall by means of the fastening structures.

In many establishments such as department stores, supermarkets, storage rooms for inventory, libraries, etc., a row of superimposed spaced-apart shelves is required; the lowermost

shelf may be placed at about the level of tables or counters, and the uppermost shelf at a level at which it can be conveniently reached. The wall area below the lowermost shelf and above the uppermost shelf is generally covered by continuous wallboards which may or may not be further finished.

A partition wall of the type to which the invention particularly relates and which is shown in FIG. 1 in the process of assembly, is erected by first mounting on floor and ceiling supports two or more pairs of upright-channeled studs **10** and **11** generally made of sheet metal. These studs are placed so that their webs **10***a* and **11***a* face each other and their branches **10***b* and **11***b* are in alignment to constitute supporting surfaces for wallboards **12**. The webs are secured to each other at localized points, as by a row of spot-welds along the centerline of the webs, as is indicated at **13**.

As it is clearly shown in the figure, the outer portions of the webs, either on one side or on both sides of the studs, are outwardly bent to define spaces **14** between the facing web portions while the edges **15** at which the branches **10***b* and **11***b* are joined to the webs, are close to each other or even in direct engagement. Spaces **14** and edges **15** serve to retain splines forced between the webs, as will be more fully explained hereinafter. After erecting the studs, wallboards **12** are placed against branches **10***b* and **11***b* so that the butt line between each two wallboards is in alignment with edges **15** of the webs. The wallboards are held in position by means of splines **20**.

Referring to FIG. **3**, each spline has a generally T-shaped cross-sectional configuration, that is, each spline has a long arm **21** and crossarms **22**. The splines may be conveniently formed by appropriately bending a strip of metal whereby the crossarms are formed by a single layer of the strip while the long arm **21** is generally U-shaped. The end of long arm **21** is enlarged, as it is shown at **21***a*.

The spline as described so far is a conventional spline, while in fact FIG. **3** shows a spline according to the invention; the distinctions between a conventional spline and a spline of the invention will be described more fully hereinafter.

The long arm of the spline is pushed between the two webs of a pair of studs to a depth such that the enlarged spline end **21***a* is located in space **14**. As it is apparent, such location of the spline end within the space in conjunction with the frictional pressure exerted by edges **15** upon the long arm of the spline retains the spline in its position between the webs but permits withdrawal of the spline if a sufficiently strong pulling force is applied thereto. The length of long arm **21** is so selected that when the spline is pressed into the position in which its enlarged portion **21***a* is within space **14**, the crossarms **22** of the spline are spaced apart from branches **10***b* and **11***b* a distance corresponding to the thickness of wallboards **12** as used for spanning the spaces between adjacent pairs of studs. Accordingly, the wallboards can be installed by simply pushing the same into the receiving slots formed between the branches and the crossarms of the splines, but it is, of course, also possible to place the wallboards first in positions such that the butt lines therebetween are in registry with edges **15** and then to insert the splines as previously described.

The construction of the wall as hereinbefore described is conventional and does not constitute part of the invention.

Turning now to the description of the invention, a spline **20** according to the invention has generally the same configuration as conventional splines. Additionally, the spline has at the end of its long arm **21**, that is, in the strip portion **23** joining the strip portions **24** and **25** defining the generally U-shaped long arm of the spline, a plurality of lengthwise-spaced slots **26**. These slots serve to receive mounting hooks **27** at one end of brackets **28**. The brackets are of the kind widely used for supporting shelves; they are readily available in the market and do not constitute part of the invention.

As it is evident, insertion of mounting hooks **27** into slots **26** will releasably secure the bracket to the spline.

Reverting to FIG. **3**, the spacing between strip portions **24** and **25** is selected in accordance with the thickness of brackets **28**. With conventional splines the enlargement **21***a* at the end of long arm **21** may be a very slight one so that the splines can be pushed home without great effort, but with a spline according to the invention a pronounced enlargement as it is shown in FIG. **3** is preferable. While the force tending to pull out a spline merely used for retaining a wallboard in position is a fairly small one, the pulling force acting upon a spline used for mounting shelf brackets is likely to be a much greater one. Accordingly, it is advantageous to anchor such spline more strongly in position by a strongly enlarged head at the end of its long arm, even though such large head may make it more difficult to push the spline home.

FIG. **4** shows a spline **20***a* according to the invention which is basically similar to the spline of FIG. **3**, but is designed for a bracket less thick than the bracket for which the spline of FIG. **3** is designed. As is shown, the spline of FIG. **4** also has a very pronounced enlargement **21***a*.

Spline **20***b* of FIG. **5** has a strongly enlarged spline head **21***a* but the configuration of this spline head is such that it can be somewhat more conveniently inserted between the webs of the studs, and also pulled out than the splines of FIGS. **3** and **4**. A spline according to FIG. **5** may be used when the loads to be carried by the shelves are not likely to be heavy.

FIG. **2** shows the completed wall structure with splines according to the invention as hereinbefore described applied thereto. The figure also shows two installed shelves **30** placed upon brackets **28**. For the sake of clarification, slots **26** are indicated in FIG. **2**, but as it is readily apparent in actuality the slots are invisible as they are at the bottom of a very narrow slot into which light cannot penetrate for all practical purposes.

To facilitate location of the concealed slots in the installed splines, the invention provides an indicator or marker **35**, as shown in FIG. **6**.

Before discussing this marker in detail, it should be pointed out that the slots are preferably uniformly spaced. Accordingly, if a person after installing a spline knows the location of at least one of the slots relative to a reference point, he can easily ascertain the location of all the other slots. Marker **35** provides such reference point. The marker as shown in FIG. **6** and FIG. **1** has a generally T-shaped cross section, that is, it defines a long arm **36** and crossarms **37**. It may be formed by suitably bending a metal strip. Such bending automatically results in a generally U-shaped long arm. The space between the two branches of the long arm is used to secure therein a mounting pin **38** which may be anchored in the slot by suitable fastening means, such as soldering.

A marker as described is releasably fitted to one end of, for instance, spline **20**, by pushing pin **38** into enlarged portion **21***a* of the spline until the edge **36***a* of the marker abuts against the respective end of spline **20**, as it is shown in FIG. **1**. As also shown in this figure, the marker is so oriented that its crossarms **37** are substantially parallel with the crossarms **22** of the spline.

As is evident from the previous description, the spline and the marker attached thereto can be simultaneously inserted between webs **10***a* and **11***a* of the studs. The lengths of the long arm **36** of the marker and of the long arm **21** of the spline are so correlated that when the marker is pushed into a depth at which its crossarms **37** abut against stud branches **10***b* and **11***b* the enlargement **21***a* of spline **20** occupies space **14**. In other words, the aforedescribed spacing between crossarms **22** of the spline and the branches of the studs is maintained. As it is shown in FIG. **1**, one or more holes **40** in crossarms **37** of the marker permit positive attachment of the marker to the branches, thereby also positively locking the spline in position between the webs of the studs.

The marker, when placed in the position just described, is at a known distance from the next adjacent slot. Accordingly, it constitutes the desired reference point for determining the locations of all other slots in the spline.

Referring to FIGS. **7** and **8**, these figures show clearly the manner in which a spline **20** with marker **35** secured thereto is fitted between the webs of two studs. The figures also show

brackets **28** hooked into the slots **26** of the splines and the manner in which wallboards **12** are retained on the branches of the studs by the crossarms **22** of the spline.

Reverting to FIG. **2**, this figure shows an elevational view upon a partition wall to which are attached brackets **28** for shelves **30** by means of fastening structures according to the invention. The figure further shows that the foot ends of the studs are secured in a conventional manner to a floor support **45** and the upper ends to a ceiling support **46**. The slotted splines as described hereinbefore need not extend from the floor to the ceiling but may be limited to the maximum and minimum levels between which it is desired to provide shelves, two shelves being shown by way of example. The upper shelf may be placed at the top level at which a person can conveniently reach items placed, and the lower shelf may be placed at the level of a counter or tabletop.

It is customary practice, primarily for ornamental reasons, to cover the wall space above the uppermost shelf and below the lowermost shelf by continuous finished wallboards, as it is indicated by panels or board **47** and **48**. As FIG. **2** also shows, markers **35** are so placed that they are just concealed by the upper paneling **47** and the lower paneling **48**. Such location of the markers permits a person installing the brackets to ascertain the locations of the slots by using the known locations of the markers as reference points. Without such markers he would have to ascertain the locations of the slots (now concealed within the wall) by trial and error, that is, in a cumbersome fashion.

Location of the slots can be further facilitated by applying a strip **50** to one of the crossarms **22** of the spline, as it is shown in FIG. **1**. This strip bears calibration lines **49** which are indicative of the locations of the slots. The strip may be coated on one side with a suitable and conventional pressure adhesive and stripped off after it has served its purpose and before finishing of the wall. It is of course also possible to apply the calibration lines directly to the crossarms of the spline.

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, and it is intended, therefore, to cover all such changes and modifications in the appended claims.

What is claimed is:

1. A fastening structure for releasably securing support brackets having a mounting hook at one end to a wall constructed of spaced pairs of channeled studs secured to each other, web to web, at localized areas and spanned by wallboards abutting against the branches of the studs, said fastening structure comprising in combination:

an elongate spline of generally T-shaped cross section insertable with its long arm between the webs of a pair of said channeled studs, said long arm of the spline being generally U-shaped, the bight of the long arm including a plurality of slots, each for receiving therein the mounting hook of one of said brackets, said slots being lengthwise spaced by selected distances; and

a marker means attachably secured to one end of said spline in alignment with the length of the spline and located at a predetermined distance from the next adjacent slot, said marker means constituting a reference point for determining the location of the other slots in the spline after insertion thereof between the two webs of a pair of studs.

2. The fastening structure according to claim **1** wherein the bight end of the long arm is cross-sectionally enlarged for releasably locking the spline between the two webs of a pair of studs, the spacing between the branches of the U-shaped long arm just fitting the thickness of the brackets to be fastened.

3. The fastening structure according to claim **1** wherein said marker means comprises a member of generally T-shaped cross section, and a mounting pin secured to the free end of the long arm of said marker member and extending normal to the crossarms of the member, said pin being inserted between the branches defining the long arm of the spline at the bight end of said arm, and said long arm of the marker member being aligned with said long arm of the spline and insertable between the two webs of a pair of studs simultaneous with the insertion of the long arm of the spline.

4. The fastening structure according to claim **3** wherein said marker member consists of a substantially rigid strip, the midportion of said strip being folded to form the U-shaped long arm and the outer portions of the strip extending from said long arm substantially normal thereto to define the crossarms of the marker member.

5. The fastening structure according to claim **4** wherein one end of said pin is inserted between the two branches of the long arm of said marker member at the bight end of said arm thereby securing the pin to the marker member.

6. The fastening structure according to claim **5** wherein said marker member is secured to the spline with the crossarms of the spline and the crossarms of the marker member disposed substantially parallel to each other.

7. The fastening structure according to claim **3** wherein the lengths of the long arms of the spline and the marker member are so correlated that upon insertion of the long arm of the marker member between the two webs of a pair of studs to a depth at which the crossarms of the marker member rest upon the branches of said studs the crossarms of the spline are spaced apart from said branches by a distance selected for fitment of wallboards into the spaces defined by the branches of the studs and the crossarms of the spline.

8. The fastening structure according to claim **1** wherein one of the crossarms of the spline bears along its surface calibration lines indicative of the locations of said slots in the spline.

9. The fastening structure according to claim **8** wherein a strip detachably supported by said surface bears said calibration lines.

* * * * *