

[54] **INTEGRAL STUD AND BRACKET STANDARD FOR USE IN A WALL CONSTRUCTION**

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[57] **ABSTRACT**

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[51] Int. Cl. ....E04b 2/32

[58] Field of Search.....52/729, 732, 720, 35, 481, 52/241, 738; 211/729, 732, 720, 36, 481, 241, 738; 248/243

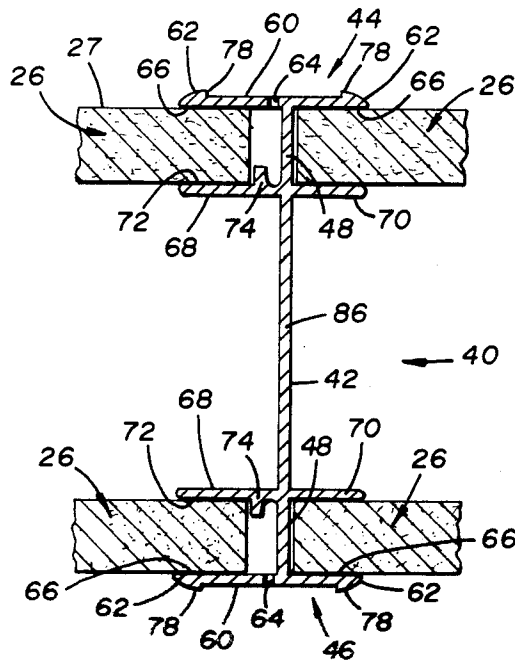
A stud and wall assembly constructed therewith for supporting shelf brackets and the like, the stud having as an integral part thereof, both a slotted flange for engaging shelf brackets, and as an extension of the flange, flat surfaces for engaging partition members which make up the wall. The slotted portion of the flange may be recessed within the stud or projected therefrom, so as to conceal or expose, respectively, the slotted portion. Additional bracket-supporting hooks can be extruded as part of the flange. The overall cross-sectional configuration of most of the embodiments of the stud is an "H"-shaped configuration.

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12 Claims, 11 Drawing Figures



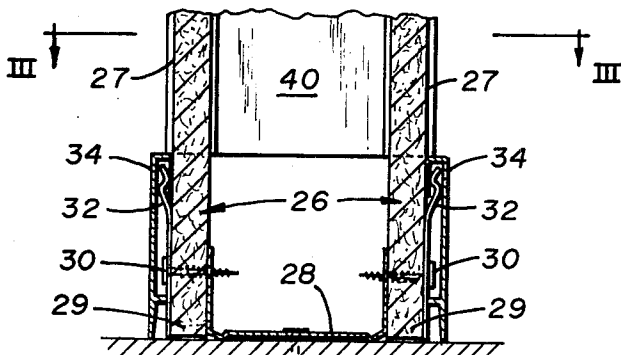


Fig. 2

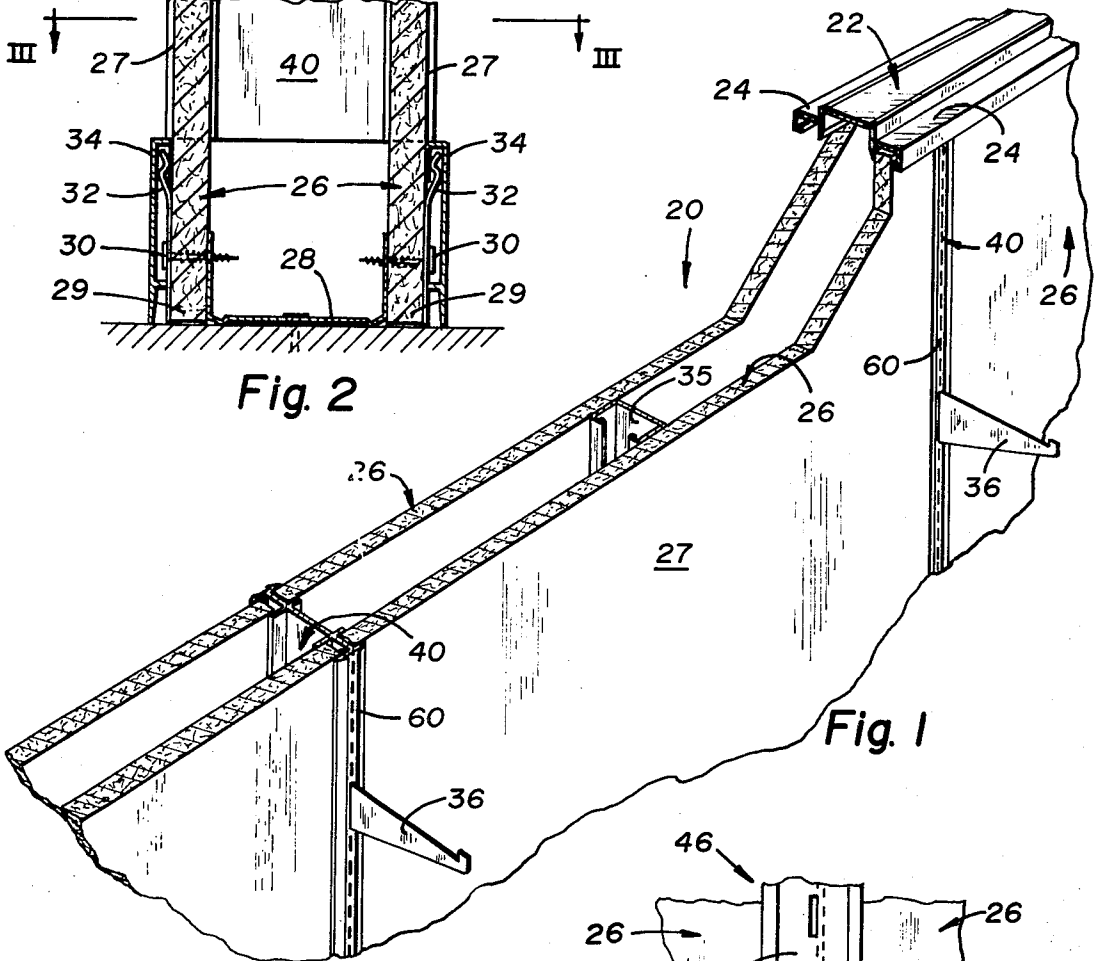


Fig. 1

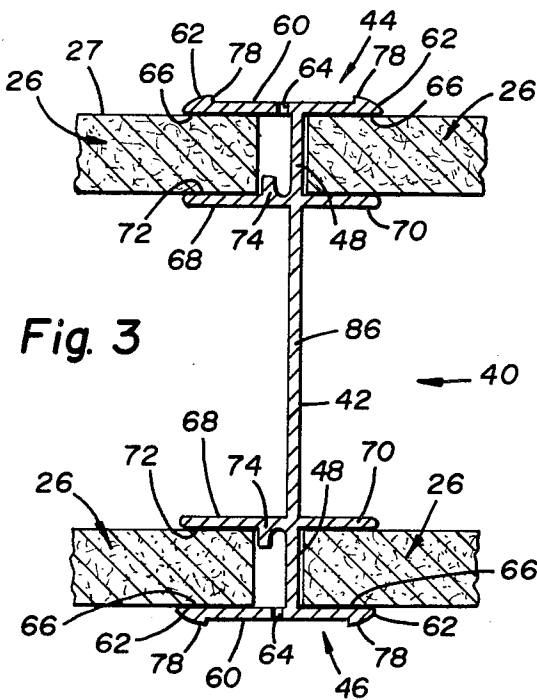


Fig. 3

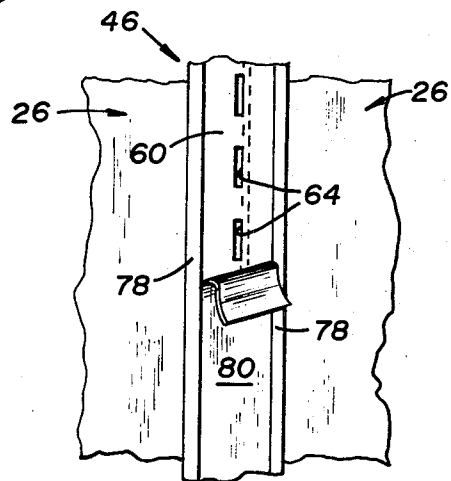


Fig. 4

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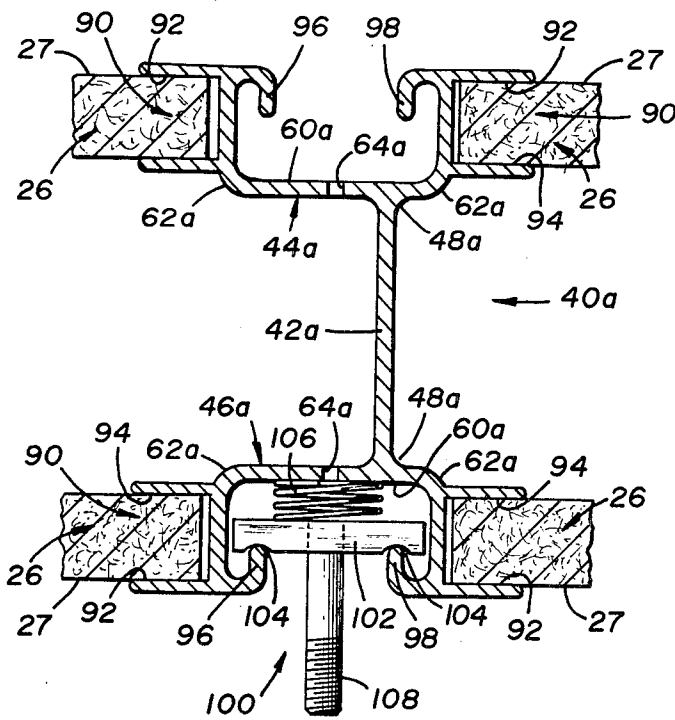


Fig. 5

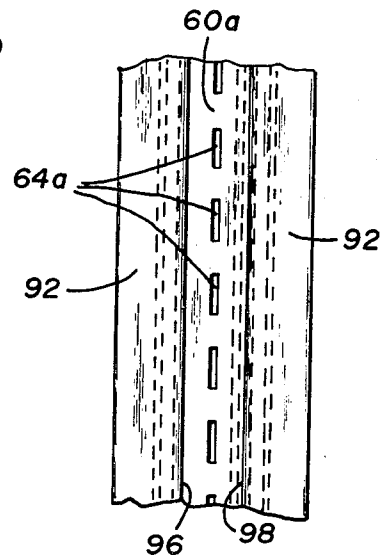


Fig. 6

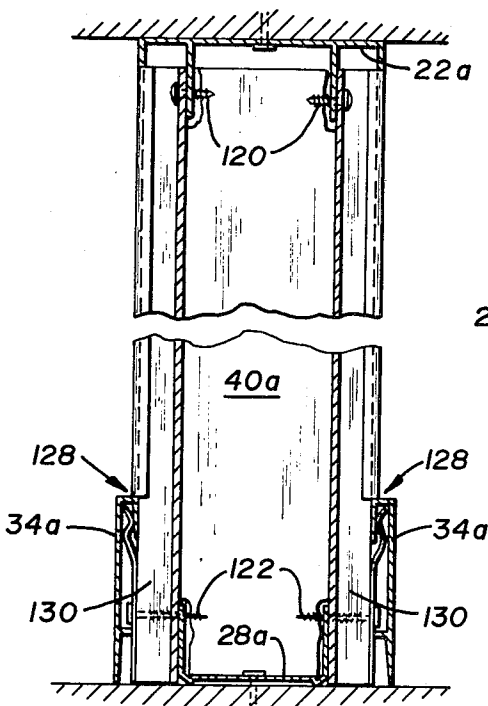


Fig. 7

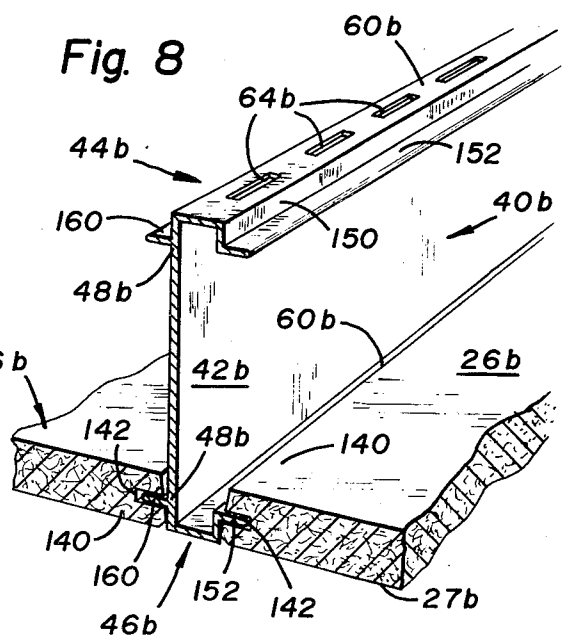


Fig. 8

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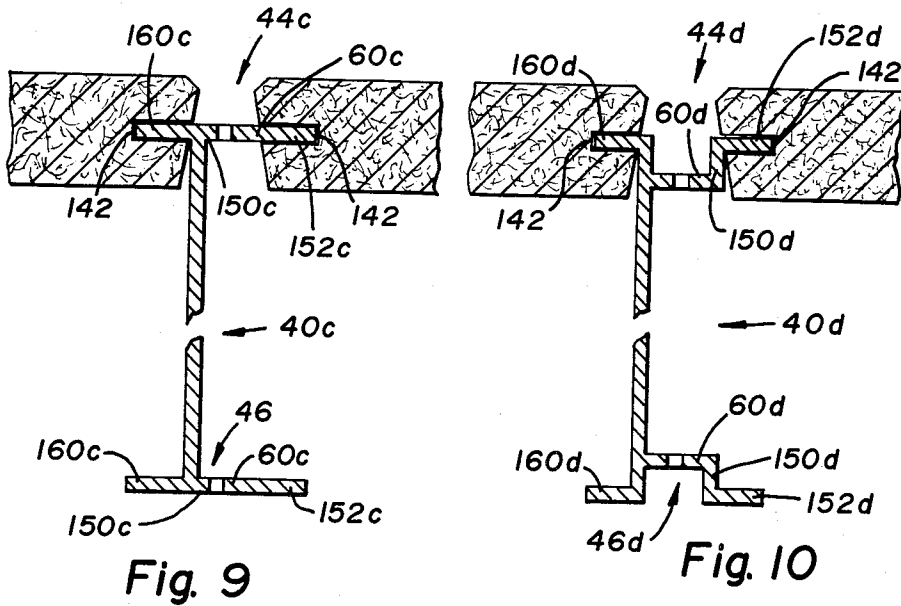


Fig. 9

Fig. 10

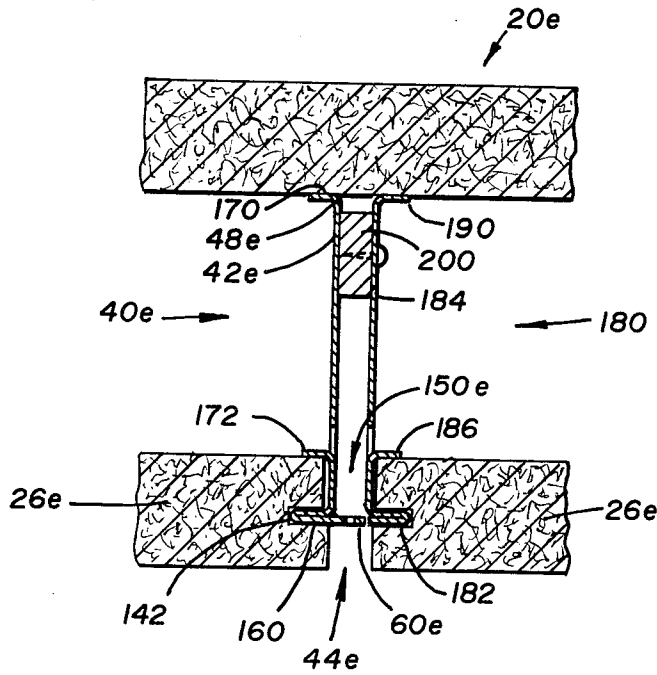


Fig. 11

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## INTEGRAL STUD AND BRACKET STANDARD FOR USE IN A WALL CONSTRUCTION

### BACKGROUND OF THE INVENTION

Conventional drywall constructions provide for the wall attachment of shelves and other heavy articles generally by the location of bracket standards in conjunction with the joint of two wallboards and the stud mounting these wallboards. This is necessitated by the inability of the wallboards to support a significant load directly, and also by the convenience and occasional necessity of mounting the wallboards so as to be removable or demountable without the brackets having been attached directly thereto. On the other hand, the strength and general permanence of the supporting web portion of the studs have permitted the standards to be structurally attached to and/or dependent thereupon, but only as separate articles independently manufactured.

Thus, the bracket standard has heretofore generally been a separate member which is mounted in place with the stud only by the use of a large number of components. For example, one construction requires, apart from the wallboard panels and shelf brackets, two studs, two separate bracket standards, two fillers, an "S" shaped web, support channels for the studs, four metal edges for the wallboard panels, and four screws mounting the panels in place; in all 17 components. In the construction utilizing these parts, all but the screws and metal edges must be mounted between the two studs which are to support the four panels. Such a construction puts a premium on miniaturization, as the studs so joined must preferably have a minimum longitudinal extension. Such miniaturization and a large collection of parts complicate the assembly, making it tedious, time consuming, and expensive at best.

Yet another conventional bracket standard requires it to be attached after the wall has otherwise been assembled. Such independent erection of the standard is time consuming and may depend, for successful erection, upon accurate placement of the standard with respect to the now-covered studs. For example, it may be necessary to screw-attach the standard to the stud underneath the wallboard. Where considerable effort is made, as in many cases, to hide the joints on the finished wall assembly with a filler, the later accurate location of the studs may become a guessing game.

### SUMMARY OF THE INVENTION

The disclosure relates to an improved stud and the assembly of this stud in a demountable drywall construction wherein the bracket standard for mounting shelves and the like and the stud cooperate in the engagement of the partition members to form the wall. Preferably, this is accomplished by making the standard an integral part of the stud, and specifically the part connecting the central web to the ends of the stud which engage the partition members. Thus, there is provided a stud having a central supporting web portion and a flange extending at an angle therefrom, the improvement featuring a portion of the flange having vertically spaced therealong means for removably accommodating shelf brackets. The integral stud and standard combination is provided in a variety of different stud configurations, most of which generally have an "H"-shaped cross-sectional configuration. This

variety essentially eliminates the need for adaptor components for other types of studs. Means are also provided at at least one integral extension of the flange to engage the partition members comprising the wall, the engaging means being especially shaped and dimensioned to support the partition members without the use of additional components such as screws.

Accordingly, it is an object of the invention to provide a bracket supporting stud and a demountable wall assembly utilizing this stud to mount brackets wherein a reduced number of component parts is necessary for the assembly.

Another object of the invention is to provide such a stud and assembly wherein the bracket standard is an integral part of the stud, regardless of the particular type of stud involved.

It is a related object of the invention to provide such a stud and wall construction formed thereby which are inexpensive to manufacture and simple to install.

It is a further object of the invention to provide such a stud and the wall construction assembled therefrom which will permit the standard portion of the stud to be concealed or exposed, as desired.

Yet another object of the invention is to provide such a stud and wall construction wherein the completion of the assembly of the wall components automatically provides for the incorporation of brackets.

Other objects and advantages will become apparent on reference to the following drawings and detailed discussion.

### BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a fragmentary, partially broken away perspective view of a demountable wall constructed in accordance with the invention;

FIG. 2 is a fragmentary, sectioned elevational view illustrating the assembly of the wall at the floor runner;

FIG. 3 is a fragmentary sectional view taken along the line III—III of FIG. 2, the runners and the shelf brackets having been eliminated for clarity;

FIG. 4 is a fragmentary end elevational view of the stud and wall shown in FIG. 3;

FIG. 5 is a fragmentary sectional view similar to FIG. 3 but illustrating an alternate embodiment of the invention;

FIG. 6 is a fragmentary end elevational view similar to FIG. 4 but of the embodiment shown in FIG. 5;

FIG. 7 is a fragmentary, sectioned elevational view of the wall constructed in accordance with the embodiment shown in FIG. 5 and 6;

FIG. 8 is a fragmentary sectioned perspective view of yet another alternate embodiment of the stud and the wall assembly constructed in accordance with the invention;

FIGS. 9 and 10 are fragmentary sectional views of studs which are alternate embodiments of that shown in FIG. 8; and

FIG. 11 is a fragmentary sectional view similar to FIGS. 3 and 5 but illustrating still another alternate embodiment.

### DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to FIGS. 1 and 2, the demountable wall assembly 20 of the invention features conventional ceil-

ing and floor runners 22 AND 28, the former having two generally parallel track portions 24 adapted to removably engage partition members 26 therewithin. By "partition member", it is meant any drywall wallboard or the like, of any convenient type and size, laminated or unlaminated, a preferable form being paper and/or vinyl covered cast gypsum board the edges of which may or may not be reinforced. By the word "engage" and its other forms, it is meant an interrelationship between two parts either one of which, or both, are especially shaped or formed for that particular relationship. This meaning is to be contrasted with the meaning for the word "interengage" and its other forms, which word is intended in which both parts are so especially formed.

The outwardly facing surface 27 of the board which is to be exposed when the wall is assembled may or may not have special decorative effects thereon.

The floor runner 28 conventionally engages the bottom edges 29 of the wallboard 26 by means of screws 30 which pass through both the runner and the partition members and also through external metal clips 32. A base 34 can be used to cover the screw-attached bases. The structural support of the partition members 26 is provided by studs 35 and 40. The former are conventional metallic channels which support the interior surfaces of the partition members 26 either removably or by adhering thereto by means of adhesive. Conventional brackets such as shelf brackets 36 are associated with the wall assembly 20 at the joints thereof for supporting loads. It will be readily appreciated that brackets performing other functions, such as the mounting of cabinets, can also be used and mounted in a manner more fully described hereinafter.

In accordance with one aspect of the invention the brackets 36 are directly inserted into and directly structurally supported and accommodated by the studs 40 without the need for a separate standard. This is accomplished by combining into a single piece the standard and the structure which engages the partition members. Preferably, this is accomplished in a manner which will now be discussed. Turning now to FIGS. 3 and 4, the particular embodiment shown therein comprises a stud 40 having a single integral central vertically extending supporting web portion 42, having legs or flanges 44 and 46 integrally extending from opposite edge portions 48 of the web portion at an angle thereto. Specifically, each of the flanges 44 and 46 extends beyond both sides of the web portion generally perpendicular thereto and parallel to each other so as to give to the stud 40 a generally "H" shaped cross-sectional configuration. A portion 60 of the flanges located at a point between the ends or edges 62 of the flanges is provided with vertically spaced slots 64 which are especially positioned and shaped to accommodate the brackets 36. The slots 64 are necessarily offset from the web portion. To engage the members 26, the ends 62 are especially positioned and shaped to accommodate the brackets 36. The slots 64 are necessarily offset from the web portion 42 a slight amount to permit the end of the bracket to be inserted therinto. The amount of offset is not critical; for example, the inside edge of the slot can be flush with the web portion. To engage the members 26, the ends 62 are especially provided with a flat inner surface 66 which abuts the outwardly facing

surface 27 of the partition members. The engagement of the members 26 by the stud 40 is completed by a second set of flanges 68 and 70 which project from both sides of web portion 42 at the edges 48 thereof generally parallel to flanges 44 and 46 but spaced interiorly therefrom an amount which will just accommodate the thickness of a partition member. Each of the flanges 68 and 70 has a flat reinforcing surface 72 which abuts against the interior surface of the member 26, thus forming with flanges 44 and 46 a track-like member the two parts of which accommodate the partition member 26. The spacing of the flanges 44, and 68 and 70 defines a leg in the edge 48 the length of which must not be a greater than the thickness of the partition members 26. The member 26 is thus engaged so that the slotted portion 60 projects outwardly from the plane of surface 72. The abutting surfaces 66 and 72 are thus covered, while, as shown in FIG. 1, the slotted portion 60 of the flanges 44 and 46 are exposed. A shoulder 74 projects from the surface 72 into the partition member- accommodating space to terminate the insertion of the member 26 short of the space reserved for the end of the bracket 36.

In accordance with another aspect of the invention, to permit unused slotted portions 60 to be covered, the opposite, exposed surface of the ends 62 of the flanges 44 and 46 include projecting ridges 78. A wallboard tape 80 of conventional material such as vinyl and which is dimensioned to fit between said ridges is thus removably held in place by a backing over those slots 64 which are not intended to support brackets.

Thus, the above-described embodiment preferably has a plane of symmetry which extends longitudinally through the approximate center 86 of the web portion 42, so that the opposite edge portions 48 and all the flanges extending therefrom are mirror images of each other. Specifically, flange 46 is the mirror image of flange 44, having the identical function of interengagement with, and support of brackets, and engagement with opposite partition members. This mirror image construction simplifies installation as no one end or one side of the stud is unique or requires a specified location.

The stud 40 shaped in the above fashion is preferably metallic, and therefore can be manufactured by a variety of techniques, of which extrusion is one example.

The assembly of the components to form the wall assembly 20 as shown in FIGS. 1 and 2 requires simply the mounting of an end stud 40 with respect to the floor or ceiling runner, and the placement of the first partition members 26 in an oppositely positioned pair which are engaged within the first stud and the ceiling runner 22. After the first members 26 are fixed to the floor runner, the next stud is engaged with the edge of the first sections 26, and the process repeated. As shown in FIG. 2, it is not necessary that the stud 40 be fixed such as by screws to the floor runner 28. Instead, the stud need only be mounted thereabove, preferably resting upon the base 34.

Because of the aforescribed construction wherein the standard is an integral part of the stud, the parts necessary to mount the brackets have been considerably reduced, resulting in a substantial savings of manufacturing cost and time of assembly. The elimina-

tion of components heretofore used to adapt the standards to the studs also avoids the need for miniaturization. Instead, the stud 40 provides all of the supporting, attaching, and bracket-engaging functions heretofore provided by the stud, said components, and a bracket standard, respectively. Furthermore, the assembly of the complete wall thus automatically and readily provides the bracket standards for the support of brackets, should they be needed at a later date.

FIGS. 5 - 7 illustrate an alternate form of the embodiment shown in FIGS. 1-4, wherein the stud is shaped to accommodate an additional support element. Parts similar to those previously described bear the same reference numeral to which the distinguishing suffix "a" has been added. Thus, stud 40a has a central supporting web portion 42a the opposite edges 48a of which each have integrally extended therefrom at an angle thereto from both sides of the web portion a flange or leg 44a and 46a. Thus, as in the previous embodiment the cross-sectional appearance of the stud is generally one of an "H" shape due to the approximate perpendicularity of the flanges to the web portion 42a. A central portion 60a of these flanges spaced from the edges 62a of the flange is provided with slots 64a shaped as in the previous embodiment to interengage with brackets for shelves and the like. The offset relationship of the slots 64a from the web portion 42a is accomplished in this case by extending the flanges 44a and 46a considerably more from one side of the web portion 42a than from the other.

To engage the partition members, the studs 40a are formed in the following manner. The edges 62a are extruded so as to turn outwardly away from the plane of the flange portion 60a, and are each split into a track-shaped element 90 having two flat rails 92 and 94. The interior surfaces of the rails abut against the exterior surface 27 and the interior surface of a partition member. The interior rails 94 serve to reinforce the back surface of the partition members 26 abutted thereagainst.

It is thus apparent that, when assembled in a wall, the stud 40a mounts the partition members 26 so that the slotted portion 60a is recessed and generally hidden from view. This effect is further enhanced by forming the extreme ends of the flanges 44a and 46a so as to form two vertically extended rows 96 and 98 of hooks inwardly faced towards the flanges. The hooks serve the additional function of guides for an additional support element 100 which is slidably interengaged by the hooks within the turned-out edges 62a of the flanges 44a and 46a. The support element 100 conventionally comprises a bolt head 102 having parallel grooves 104 spaced along one face thereof for accommodate the hooks 96 and 98, a spring 106 for biasing the bolt head against the hooks to hold element 100 in a desired position, and a bolt 108 projecting from the head for interengagement with a shelf or the like. Thus, the stud 40a is integrally formed with structure which will interengage and support two different types of mounting elements for shelves and the like.

FIG. 7 illustrates one method of assembling stud 40a within a wall. Because of the additional loads likely to be incurred through the use of the additional supporting elements 100, it is preferred that the studs 40a be attached by means such as bolts 120 and 122 to the

ceiling and floor runners 22a and 28a respectively. The floor runner can be further modified so that the studs 40a and the partition members 26 are completely inserted therewithin. In that event the stud 40a should have a notch 128 formed near the bottom edges 130 thereof, to permit the clips 34a to fit flush against the partition members 26 as opposed to being bent outwardly around the rails 92.

FIG. 8 illustrates yet another embodiment of the bracket-engaging stud of the invention, which stud is designed for a different type, thicker partition member. Parts similar to those previously described bear the same reference numeral to which the distinguishing suffix "b" has been added. Thus, the partition members 26b forming wall assembly 20b comprise a conventional wall board panel of substantially thicker dimensions, the vertical edges 140 of which have kerfs 142 formed therein. A representative thickness of the panel is three fourths of an inch. The stud 40b comprises a central supporting web portion 42b and flanges 44b and 46b extending angularly from both sides of the opposite edge portions thereof approximately perpendicular to portion 42b and generally parallel to each other. Each flange has two extensions 150 and 160, each projecting from one of the two sides of the web portion 42b. One extension or part 150 of the flanges 44b and 46b is formed with a portion 60b which projects outwardly from the plane of the rest of the part 150. It is this portion 60b which is slotted with openings 64b to receive the brackets, as in the previous embodiment. The remainder or edge 152 or part 150 is bent back generally to lie in the plane of the extension 160. The edge 152 of the extension 150, and the extension 160 are shaped to be essentially flat, providing the means necessary for interengaging the interior of the kerfs 142. The over-all cross-sectional configuration of the stud 40b, as in the previous embodiments, thus is "H"-shaped.

By the above construction, as shown with flange 46b, the partition members 26b are mounted with exterior surfaces 27b that are flush with the exposed slotted portion 60b, the partition member-engaging portions of the flanges 44b and 46b being hidden from view. For this configuration of the assembly, the outward projection of the slotted portion 60b from the remainder 152 of the extension 150, and from the extension 160, is approximately 0.375 of an inch for partition members having a total thickness of 0.75 of an inch.

The stud 40b may be "floating", i.e., not structurally dependent in any way upon the floor or ceiling runners; or it may rest upon or be fixed to the floor runner, and/or fixed to the ceiling runner. The stud may provide additional support to the back surface of the partition members in the form of knock-out tabs, not shown.

A number of fabricating methods will be readily apparent for the stud 40b. Preferred examples, in the case where the stud is preferably metallic, are extrusion and roll forming. Thereafter, the slots or openings 64b can be punched or otherwise machined out.

FIGS. 9 and 10 illustrate alternate forms of the embodiment of the bracket-engaging stud shown in FIG. 8, the stud being altered to accommodate both the brackets and the partition members in different positional relationships. Parts similar to those previously described bear the same reference numeral to which

the distinguishing suffixes "c" and "d", respectively, have been added.

Thus, FIG. 9 illustrates a stud 40c identical to the stud 40b except that the extension 150c and the remainder or edge 152c thereof are all in the plane of the extension 160c, thereby providing completely flat flanges 44c and 46c. Because the edge 152c and the extension 160c are interengaged within the kerf 142 of the two partition members, as shown, flanges 44c and 46c result in the slots 64c of the slotted portion 60c of extension 150c being at least partially hidden by the partition members.

In FIG. 10, the slotted portion 60d of the flanges 44d and 46d of the stud 40d is recessed even more from view. The extension 150d is itself recessed with respect to the edge portion 152d thereof, which along with the extension 160d lie in a common plane which projects considerably outwardly beyond the slotted portion 60d. This construction further insures that the slotted portion 60d will be hidden by the partition members interengaged at their kerfs 142 by the flanges of the stud.

FIG. 11 illustrates a form of the stud similar to the stud shown in FIG. 9 and which is closely allied to the one of the floating studs disclosed and claimed in my copending U.S. application Ser. No. 77,997, filed on Oct. 9, 1970. Parts similar to those previously described bear the same reference numeral to which the distinguishing suffix "e" has been added. Thus stud 40e is characterized by a single partition-member interengaging flange 44e, the extension 160e of which is the only portion especially shaped and dimensioned to fit within the kerf 142 of the partition member 26e. Thus the stud 40e interengages only one such partition member, permitting selective assembly and disassembly of the wall 20e without disturbing other neighboring partition members. The extension 150e is shortened compared to the previous embodiments, so as to comprise solely the slotted portion 60e. Yet another difference in stud 40e is the provision of a surface 170 at the edge 48e of the web portion 42e which is especially shaped and adapted so as to rest against and abut in a supportive, non-interengaging fashion, the back surface of the opposite partition member. As shown, the surface 170 is preferably a flange of short length bent at the edge 48e so as to be properly spaced from the flange 44e, i.e., spaced a distance approximately equal to the distance from the midpoint of one side of the wall 20e to the back surface of the opposite side of the wall. A knock-out tab 172 may be used to reinforce the back surface of the member 26e, but it is not essential.

Because the stud 40e is interengaged with only one partition member, it is necessary that a second stud 180 be positioned adjacent to stud 40e generally back-to-back therewith to interengage the adjacent partition member forming that side of the wall 20e. The stud 180 is preferably identical with one of the embodiments shown and claimed in my aforesaid copending application. Accordingly, the specification of that application is incorporated herewith. The stud 180 can thus be characterized as having a kerf-engaging flange 182 projecting at an angle from the web portion 184, and generally perpendicular thereto. A knock-out tab 186 reinforces the back surface of the partition member 26e interengaged by the stud 180. A second flange 190

projecting from the edge portion of the web 184 opposite to the flange 182 and generally parallel to that flange provides the same limited function as does flange 170 for the stud 40e.

The extension 150e of the flange 44e of necessity must be spaced from, or at least not covered by, the flange 182 of the stud 180. Accordingly, the two studs 40e and 180 are preferably spaced apart by a shim or channel 200 to which one of the studs may be anchored. If it is desired that selective removal of a partition member not be possible, the shim 200 may be anchored to both the studs by a single bolt (not shown).

It will be readily apparent that the embodiment of FIG. 11 results in the slotted portion 60e being recessed from view in a manner similar to that shown in FIG. 9. It will also be recognized by those skilled in the art that any of the embodiments shown in FIGS. 9, 10 and 11 can be manufactured preferably from suitable metal by the techniques listed for the embodiment of FIG. 8.

It will thus be recognized that, in accordance with yet another aspect of the invention, a great variety of differently shaped studs can be provided wherein the bracket standard is an integral part thereof. The slotted portion supporting the brackets can be exposed or covered. Even studs each of which is adapted to interengage only a single partition member can be so constructed. Thus, the invention is suitable in a variety of construction assemblies so that the attendant savings in manufacturing cost and time of assembly can be extended to many different types of wall construction.

Although this application sets forth certain preferred embodiments, it is not intended that the invention be limited thereto. Rather, it is intended that the invention cover all alternatives, alternate arrangements, and embodiments as may be included within the scope of the following claims.

What is claimed as exclusive property is:

1. In a stud for assembly in a wall construction with partition members, said stud having a central supporting web portion, at least one flange extending at an angle from a portion of at least one edge of said web portion, and means associated with said flange for engaging said stud with at least one of the members; the improvement comprising a portion of said flange having accommodating means integrally mounted therewith and vertically spaced therealong, for removably accommodating brackets, said accommodating means being offset from the web portion, said engaging means including as an integral part of the flange, a track-shaped extension both sides of which accommodate therebetween one of the members, said extension projecting generally perpendicularly to, and away from, said web portions.

2. The improved stud as defined in claim 1, wherein said flange extends beyond both sides of said web portion.

3. The improved stud as defined in claim 2, wherein said two-way extending flange has two edge portions each shaped to abut against at least one surface of one of said members.

4. The improved stud as defined in claim 1, wherein said slotted portion is positioned between said track-shaped element and said web portion.

5. The improved stud as defined in claim 1, wherein said engaging means project outwardly considerably



beyond the plane of said slotted portion of said flange, whereby said slots are generally hidden from view when said engaging means and a partition member are assembled with others of said stud and the members to form the wall construction.

6. The improved stud as defined in claim 1, and further including a second flange extending from said web portion in a direction generally parallel to said one flange and from the same side of the web portion as said one flange.

7. The improved stud as defined in claim 6, wherein said second flange extends from the edge of said web portion opposite to said one edge and includes as an integral portion thereof accommodating means for removably accomodating brackets.

8. The improved stud as defined in claim 7, wherein the stud has a plane of symmetry extending longitudinally along the stud through said web portion, whereby said web portion edges and said one and said second flanges are mirror images of each other.

9. The improved stud as defined in claim 1, wherein said extension projects outwardly beyond the plane of said slotted portion, whereby said slots are generally hidden from view when the engaging means and the members are assembled to form the wall construction.

10. In a stud for assembly in a wall construction with partition members, said stud having a central supporting web portion, at least one flange extending at an angle from a portion of at least one edge of said web portion, and means associated with said flange for engaging said stud with at least one of the members; the improvement comprising a portion of said flange having accommodating means integrally mounted therewith and vertically spaced therealong, for removably accommodating brackets, said accommodating means being offset from the web portion, and further including a spring biased support element and means integrally projecting from said flange for slidably engaging said support element.

11. The improved stud as defined in claim 10, wherein said accommodating means include vertically spaced slots in said flange portion especially positioned and shaped to accommodate brackets inserted therein.

12. The improved stud as defined in claim 10, wherein said element engaging means include a channel integral with said flange and formed by two vertically extended rows of hooks inwardly faced towards said flange and positioned on both sides of said slots.

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