METALLIC STRUCTURE FOR INTERIOR WALLS TO CARRY SHELF BRACKETS AND WALLBOARD

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18 Claims. (Cl. 52—36)

This invention relates to structures for interior walls of buildings and more especially to metal structures particularly adapted to partitioning walls in buildings used as large merchandising establishments, such as department stores wherein much merchandising is desirably displayed on shelves and supporting brackets carried by the interior walls.

A particular object of this invention is to provide simplified uprighting metallic wall stud structure with which well-known wall board, such as plasterboard, may be used as a wall surfacing material, and with which wallboard and vertical wall structure shelf brackets may be used in an adjustedly mounted positions for the carrying of shelves or for directly supporting merchandise pieces themselves.

An object of the present invention is to provide a vertical or upstanding metal wall structure which is relatively simple to produce, major portions of which are readily assembled in the manufacturing plant, and which portions may be readily installed as partitions in large storerooms and along the like, and may be easily set up to extend either up to the ceiling of the storeroom, or to a lesser height, as desired.

An additional object of the invention is to provide a metallic wall stud assembly provided with bar or plate means or standard having bracket receiving slots which means are readily mounted in position on their respective metal stud structures so as to be easily adjusted vertically in place so that shelves may be disposed in level positions.

A further object of the invention is to provide a metal stud and wall construction of improved nature wherein a slotted plate or bar for receiving the mentioned shelf brackets may be adjusted with relation to the respective studs and then bound in adjusted position to flanged portions of the metal studs, as by means of self-threading screws which are quickly driven into position by means of known heavy-duty motor driven screwdriver units. Such screws may be employed for the sole purpose of binding the slotted plates in position on the metal studs or for binding wallboard in position on the flanges of the metal studs, or both.

Briefly stated, in the best mode of practicing the invention known at this time, the present invention employs in a stud assembly, two upstanding or vertical channelled metal studs, which may approximate 2' x 4' in overall cross-section. These two channelled metal studs are disposed back-to-back and rigidly secured together, as by means of spot welding. The opposite edges of these channelled studs provide flanges and each flange is in the form of a reverse bend providing an elongated narrow channel which will slidably receive a slotted metal supporting plate for shelf brackets or the like. When the mentioned two channelled studs are secured back to back, the thin shallow channels formed in the opposing flanges of the opposing metal studs provide a slot which extends vertically from end to end of the resultant stud assembly and frictionally receives an elongated slotted plate or bar element to receive shelf brackets, as above indicated, which brackets are to be adjustably mounted in such elongated slotted element. The reversely bent outermost portions of the opposed studs are spaced to provide access by shelf brackets to the slots in the vertical slotted plate members. Additionally, opposing portions of the wall stud members adjacent their outer edges are shaped to provide, when assembled in back-to-back relationship, an elongated narrow pocket or passageway behind the slotted bracket supporting plate of sufficient depth to receive inner ends of the shelf brackets and narrow enough from side to side to engage inner edge portions of the shelf brackets and limit or prevent them from swaying laterally at their outward ends. Also, standard wallboard slabs, or the like, may be screwed to the outermost walls of the flanges of the opposed channelled wall studs, with opposing edges of such wall boards spaced to accommodate the passage of the inner portions of the mentioned shelf brackets into operative positioning.

Other objects of the invention and various features of construction thereof will become apparent upon reference to the following specification and the accompanying drawings which form a part hereof.

In the drawings:

FIGURE 1 is a perspective view of a portion of a wall structure embodying vertical rigid metal wall stud assemblies of this invention, these being shown in operative relation with wallboard slabs and shelf-supporting brackets thereon; and

FIG. 2 is a horizontal section through a metal wall stud assembly taken on line 2—2 of FIG. 1 and equipped for mounting shelf brackets and shelves at both sides of the wall;

FIG. 3 is a view similar to that of FIG. 2 showing a similar structure equipped for mounting shelf brackets at only one side of the wall;

FIG. 4 is a fragmentary sectional view of the mounting of appropriate shelf brackets; and

FIGS. 5 to 10 show variously in fragmentary perspectives and in cross sections various forms of a slotted narrow vertical plate or bar carried in flanges of the wall stud assembly for supporting shelf brackets.

As seen in FIG. 1, and also in FIGS. 2 and 3, metallic wall stud assemblies 10 of this invention are built up from pairs of channelled metal wall stud members, herein termed studs 12. Each stud 12 has a main web 14 provided at its two sides with laterally disposed channelled flanges 15. The webs 14 of each pair of studs 12 are arranged back-to-back and rigidly connected together as by means of spot welds 16.

In constructing a wall structure with stud assemblies 10 as indicated in FIG. 1, a suitable runner 20 is positioned upon the building floor to receive the lower ends of the stud assembly units. In the form illustrated, this runner 20 is a metallic structure of rectangular configuration having a web 22 appropriately secured to the floor and integral upstanding flanges 21 at its sides to receive between them the lower ends of the studs 12. Desirably, a similar runner (not shown) is provided at an elevated position which may be upon the ceiling of the building, or at a lower position such as on top of a partition if lower partition walls are being installed. Both upper and lower runners 20 frictionally receive the outer walls of the stud flanges 15 between the runner flanges 21. This relationship is maintained as by means of spot welds or preferably by self-threading screws as illustrated at 25.

In practice, both the upstanding studs 12 and the runners 20 provide overall rectangular configurations which correspond, in cross-sectional outline, with typical wooden two-by-fours (2 x 4's), these channelled studs and runners are commonly produced from galvanized steel or iron sheet of about 0.025" gauge, or about 0.022" thickness. In employing indicated stud assemblies 10 produced from the channelled metal studs 12 by welding them together back-to-back, such stud assemblies may be produced in the shop or the manufacturing plant of any appropriate
length and then moved onto the job for final wall assembly in properly spaced relationship along the runners 20. An important aspect of this type of metal wall construction is that provision be made in the stud assemblies for the mounting of the shelf brackets or other brackets or supports as indicated at 30 to support shelves 5. In the present construction, this is accomplished through the medium of upstanding slotted narrow plate means or standards or bars 32 which are mounted in shallow vertical channels 33 in the flanges 15. Each narrow plate or bar 32 is provided along a vertical median line with vertically disposed spaced slots 34 for reception of the inner ends of the respective brackets 30.

As well illustrated in FIG. 2, each flange 15 of each metal stud 12 is reversely bent at 35 to provide the above-mentioned vertical channel 33 in the respective stud. With this arrangement, as indicated in FIG. 3, the reverse bend at 35 results in an inner vertical wall 36 and a re-entrant opposing intermediate vertical wall 38. This re-entrant wall 38 leads to a position somewhat short of the projection of the main web or back member 14 of the stud at which position it is again reversely bent to form an outer wall 30 as desired. This outer portion of the flange 15 may be provided with an inwards bent terminal flange 42 approximately co-extensive with the bend 35. With the two opposing studs 12 arranged as illustrated, the two opposing vertical channels 33 of the assembly provide a sufficiently wide channel for insertion of a slotted plate or bar 32. As also seen in FIGS. 2, 3, and 3, tight or contiguous reverse bends 44 at the inner edge of the walls of the two studs 12 are spaced to provide a vertical entry way 45 to pass the inner end portions of the respective brackets 30 or other supports. Wall portions 46 of the opposing back walls 44 behind the bar 32 are laterally offset to provide a pocket 48 between them into which the end portion of the respective bracket 30 enters after being passed through a corresponding slot 34 in the plate 32. Thus, the walls 36, 38, and 40 of the flange member 15 are all parallel to one another and to the transverse axes of the channel 33, and these are normal to the web or back wall 14 and the transverse axis of the pocket 48. Also, the channels 33, the entryway 45, and the pocket 48 combine to form a longitudinally extending T-shaped slot or passageway receiving the bar or standard plate and the inner end portions or tongues 52 of the brackets 30 or other supports projecting through the slots 34.

The opposing inner walls of the portion 46 serve in general as means to limit lateral sway of the respective shelf brackets 30. However, since the entryway 45 is wider than the slots 34 and the thickness of the brackets 30, the wall portions 46 are tapered toward each other as indicated at 50 for engagement thereby of innermost hooked tongue portions 52 of the respective shelf brackets, as illustrated in FIGS. 2 and 3. With this arrangement the opposite edges of each slot 34 in the plate or bar 32 serve as fulcums to stabilize the inner portion 52 of the respective bracket held in slightly yielding relation in the tapered portion of the pocket 48 between the inclined walls 50. Thus the inner end of each bracket 30 is snugly held so that there is very little lateral sway of the outer end of the bracket. This is assured by reason of the fact that the hooked inner end 52 of each bracket 30 is in the form of a locking tongue, such as illustrated in FIG. 4, so that when the tongue 52 drops into the operating position shown in the lower portion of FIG. 4, the bracket 30, now in its level position, is held with the innermost edges of the tongue bound between the converging wall portion 50, as seen in FIG. 2.

In practice, when a metallic wall stud assembly 10 is produced by securing together two identical studs 12 in back-to-back relationship as illustrated, a slotted bracket supporting plate or standard or bar 32, is inserted into the wide but shallow, vertical channel formed by the two opposing channels 33, with the various slots 34 aligned with the entryway 45 and with the pocket 48 behind the plate or bar 32. This assembly, as has been indicated, is desirably performed in the shop or manufacturing plant with the slotted bars held frictionally in place but without the brackets installed, and then transported to the job. The plates or bars 32 are commonly provided from bar stock about % in. thick, and the thickness of the vertical channel 33 is only slightly greater than the thickness of the element 32. Thus when the plate or bar element 32 is inserted into the channels 33, a fairly snug fit is produced, as a result of which the plate or bar 32 retains substantially the position in which it was made in the plant. Later, when a wall is being constructed on the job and brackets 30 are being adjusted to desired levels, the plate or bar 32 is anchored in the channels 33 by means of self-threading screws 55 which are driven by power-driven screwdrivers into the positions illustrated in FIGS. 2 and 3. Such screws 55 are driven through the various wall portions 36, 38, and 40, and simultaneously through the respective bar 32.

Desirably, such screws 55 are placed above and below slabs of wallboard 60 employed in surfacing the main portion of the wall being constructed and behind the wallboard slabs 62 and 64, as illustrated.

In operating practice, stud assemblies 10 would ordinarily be sent to the job in some adequate length, such as 10 feet, and then cut to shorter lengths on reaching the job, if desired. The wallboard slabs 60 to be employed are ordinarily cut shorter than 10 feet, such as 6 feet in length. These slabs 60 may extend up from closely adjacent the floor, if desired, or they may extend downward only to the top of a foot board section 62. The lengths of the bracket-supporting plates or bars 32 desirably are somewhat longer than the lengths of the wallboards 60, but need be only enough longer to make it possible to mount the self-threading screws 55, which anchor the plates 32, above and below the main wallboard slabs 60.

Two main forms of the invention are illustrated. In one, illustrated in FIG. 3 (and also in FIG. 7), a metal trim element 70 is employed to protect the opposing edges of the slab 60. In this case the screws 55 are located behind the wallboard slabs 62 and 64 so as not to interfere with the positioning of the trim 70. This condition is represented at the lower left of FIG. 1. In the other, as illustrated in FIG. 2 (and also in FIGS. 6 and 8), no trim member 70 is employed. In this case the screws 55 are located behind the main wallboard slabs 60. However, to facilitate the showing in FIG. 3 (and also FIG. 7), the heads of the plate screws 55 are shown underlying the boards 60, and such an arrangement is indicated also at the upper left of FIG. 1.

In the structure shown in FIG. 2, the slots 34 in the plates 32, as well as the configuration of the pockets 48 as described, may be relied upon entirely to prevent sway of the outer ends of the brackets 30. However, in order to avoid possible damage to the edges of the wallboards 60 by excessive lateral movement of the brackets 30, it may be desirable to employ channeled U-shaped metal trim lengths 70, as shown in FIG. 3 in detail, which enclose the edges of the wallboards 60 and are trimmed close enough to the sides of the shelf brackets 30 to more thoroughly stabilize their outer ends.

In mounting the wallboards 60, self-threading board-retaining screws 65 are caused to extend through the edges of the flanges 15 outside of the loci of the plates or bars 32 as shown in FIGS. 1 and 2. This is also true of the structure of FIG. 3 where the channeled metal trim lengths 70 are employed. In practice, the heads of the bar-retaining screws 55 underlie the horizontal lower wallboard strip 62 and the upper wallboard 64 of FIG. 1. The heads of the screws 65 necessarily enter from the outer surface of the wallboards. In the case of the structure of FIG. 3, where the metal trim pieces 70 are employed, finish cement 72 is usually applied over the heads of the screws 65 and the outer flanges of the
trim pieces 70 to prepare a finished surface for painting.

Further stabilization of the constructed wall is effected by horizontal tie bars or brace bars 75 which are passed transversely through holes in intermediate portions of the webs 14 of the upstanding studs 12 and welded in rigid positions as indicated at 76.

Sometimes there are instances when there is a tendency to overload the shelf brackets 30, as a result of which the flanges 70 may be eliminated, and its inner flange 70b extended laterally sufficiently to be terminated by an adjacent self-threading screw 65.

Another variation designed to prevent warping or buckling of the flat bars or standards or plates 32 is illustrated in FIGS. 8 and 10. Here, the flat bar 132 is composed of heavier material than that used in bars 32. For example, bars of 3/8 of an inch thickness may be employed. Here, slots 134 are provided along the median line of the bar to correspond with slots 34, and the middle portions of the bar 132 along its median line are routed out or grooved at 135 to reduce the thickness at the median line to the standard thickness of 5/8 inch, so that the slots will receive standard shelf brackets 30 commonly found on market and represented in FIGS. 1 and 4. With this bar construction 132, the reinforcing stabilizers 80 might be additionally used, as is illustrated at the lower left-hand corner of FIG. 10, if desired to minimize side sway.

It is thus seen that this invention provides an improved wall structure assembly which is easily assembled in a factory but which facilitates mounting of shelf brackets to mount shelves in level position at arbitrary or predetermined heights above a floor when installed in the wall structure of a building.

The invention claimed is:

1. A wall stud assembly including: a pair of upstanding channelled metal stud members having main webs disposed in opposed substantially parallel relation and providing opposed spaced flange portions adjacent edges of said webs; said opposed flange portions having therein opposed shallow vertical channels extending longitudinally of said stud members to adjustably receive therein a metal bar, and edge portions of said webs providing between them a vertical passageway along the spacing between said opposed flange portions; means rigidly connecting such stud members in said parallel relation; slotted bar means positioned in said shallow channels of said opposed flange portions and having slots communicating with said passages between said webs and with the spacing between said opposed flange portions for reception of inner ends of support, said flange portions also providing means for engaging and supporting wallboards; and means rigidly connecting said slotted bar means in adjusted position in said vertical channels.

2. A wall stud assembly as in claim 1 wherein said standing channelled metal stud members are provided with opposed flange portions and slotted bar means so supported in said channels at both sides of said main webs.

3. A structure as in claim 1 wherein said slotted bar means carry angled flanges along opposite sides of the slots to reinforce said bar and pass said inner ends of said supports.

4. A combination as in claim 1 wherein said bar means is reinforced alongside said slots and grooved along said slots to reduce bar means thickness along the line of said slots.

5. A combination as in claim 1 wherein said bar means carries longitudinally thereof alongside said slots, means reinforcing said bar means to resist deformation under load on said supports.

6. A combination as in claim 5 wherein said reinforcing means includes angled flanges.

7. A wall stud assembly including: a pair of vertically channelled metal stud members having main webs arranged back-to-back and having opposed flange portions at adjacent edges of said webs for carrying wallboards; means rigidly connecting said stud members in assembled relation; said flange portions having reversely folded portions providing a vertical passageway;
slotted plate means vertically disposed in said vertical passageway for vertical adjustment of such plate means therein and providing slots to receive inserted supports at their inner ends;

and means rigidly securing said slotted plate means in adjusted position in said vertical passageway.

8. An assembly as in claim 7 wherein the securing means extends through walls of said passageway.

9. A combination as in claim 8 wherein said securing means are self-threading screws.

10. A combination including a wall stud assembly as in claim 8, and wallboards secured to the outermost walls of said opposed flange portions.

11. A combination as in claim 10 wherein securing means extend through said wallboards and through said flange means.

12. A wall stud assembly as in claim 7 wherein said slotted plate means carries longitudinally thereof along-side slots therein means reinforcing said plate means to resist buckling under overload.

13. An assembly as in claim 12 wherein said reinforcing means includes an angle bar having a flange located in said pocket, and means for engagement by the inner end of a support to stabilize the latter.

14. An assembly as in claim 7 wherein said slotted plate means is reinforced alongside slots therein and the plate is grooved along the line of the slots to reduce the plate thickness at the locus of said slots.

15. A wall stud assembly including:

a pair of upstanding channelled sheet metal stud members having main webs disposed in opposed substantially parallel relation, said stud members providing opposed spaced flange portions adjacent edges of said webs;

said flange portions having reversely folded portions providing opposed vertical channels forming a combined vertical passageway to receive slidably an adjustable vertical slotted bar, the reversely folded portions being opposed and providing between them a vertical entryway into said passageway;

said reversely folded flanges at said entryway being outwardly folded in each instance to lie in contiguos relation upon the flange wall forming the outer wall of the respective channel, and to provide an outermost face for attachment thereto of an edge portion of a wallboard, such edge portions of opposed wallboards lying in a spaced relation to permit access to said entryway;

and a slotted bar means vertically disposed in said vertical passageway;

means through said slotted bar means and secured to the flanges adustably holding said slotted bar means in a vertical position relative to the vertical passageway;

and support means extending between said edges of said wallboard through said entryway into slot means in said vertical bar means.

16. An assembly as in claim 15 wherein said plate means carries longitudinally thereof, alongside the slot means, reinforcing means to resist deformation under load on said support means.

17. An assembly as in claim 16 wherein said plate means is grooved along said slots to reduce plate thickness adjacent said reinforcing means.

18. In combination in a wall structure:

a pair of vertical channelled metal stud members having main webs and having opposed flanges at adjacent edges of said webs,

means rigidly securing said main webs in operative relation;
said opposed flanges being spaced apart and providing opposed shallow passageways extending vertically of said stud members to form a combined vertical channel for frictionally receiving opposite faces of a plate;

a plate vertically disposed in said combined channel for adjustment thereof in such channel and having slots communicating with the spacing between the opposed flanges for reception of the inner ends of support means;

and means fixedly retaining said slotted plate in adjusted position in said combined channel in said flanges;

and wallboards secured to said opposed flanges and in spaced relation to provide for passage of said inner ends of said support means.

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CERTIFICATE OF CORRECTION


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It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 5, line 50 (Page 15, line 3) change "opposed" to -- opposed --.

Column 8, line 4 (claim 29, line 2) change "plate" to -- slotted bar --.

Column 8, line 8 (claim 30, line 2) change "plate" to -- slotted bar --.

SIGNED AND SEALED

[Signature]

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