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(54) **METAL STUDS TO REPLACE WOOD STUDS**

METALLSTÄNDER ALS ERSATZ FÜR HOLZSTÄNDER

MONTANTS METALLIQUES DESTINES A REMPLACER LES MONTANTS EN BOIS

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AU-A- 4 514 972 **FR-A- 1 342 059**
FR-A- 2 085 789 **US-A- 2 699 669**

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Description

TECHNICAL FIELD

The invention relates to the field of construction materials and specifically to metal studs to replace conventional vertical wood studs, such as 50,8x101,6mm (2" x 4") wood studs (nominal dimensions) used to form walls having a unique configuration on the ends of the metal studs that meets structural requirements for walls yet allows carpenters to assemble wall sections at least as conveniently and rapidly as they can using wood studs, without additional training or new tools, to form a less expensive and higher quality frame for a wall.

BACKGROUND ART

It has been common construction practice for many years to form rooms in houses, offices and other buildings by the use of partitions or walls. Walls or sections of walls in houses, offices or other buildings have been typically constructed by use of opposing horizontal wood plates, consisting typically of 50,8x101,6mm (2" x 4") lumber, one each being adjacent to the floor and ceiling respectively, between which vertical wood studs are attached with a certain uniform separation, typically 406,4mm (16"), between each of the vertical studs, with the connection being made between the top and bottom horizontal wood plates and the vertical wood studs by means of toe nailing.

Metal has advantages over wood as a material for vertical studs in that metal will not warp over time, will not be subject to termites and other vermin, and will consistently provide a flat surface to which material, such as drywall, forming the vertical surface of the wall may be attached, resulting in a perfectly flat wall and a metal stud is lighter than a wood stud.

Notwithstanding the advantages of metal, wood has been the material of choice for the use as vertical studs in substantial part because wood studs have been easier for carpenters to use in assembling sections of walls. That assembly typically occurs on the floor of the building under construction or remodeling. After assembly of a section of wall, the section is tilted or lifted into a vertical position and moved to its intended location. Prior to the invention, carpenters have been unable to use metal vertical studs because of the additional time, tools or materials required for their use in assembling wall sections.

While the prior art contains several references disclosing metal framing structures and studs, none of these references disclose or suggest the combination of features that comprise the present invention. E.g. US-A- 2 699 669, U.S. Patent No. 3,482,369 issued on December 3, 1969 to Burke discloses a novel opening in vertical metal studs to receive a horizontal member to provide bracing to achieve lateral stiffness. Further, U.S. Patent No. 1,867,489 issued October 9, 1930 to Eck-

ett et al. discloses a horizontal bracing stud, adjustable to permit positioning between studs, also forming a fire block. Still further, U.S. Patent No. 5,157,883 issued on October 7, 1992 to Mayer discloses a metal stud responsive to the problem of earthquake shock by providing a metal-to-metal fastening system. The claims only relate to a clip, spaced intervally along the vertical section of the stud, to inhibit buckling. Finally, in the U.S. Patent No. 4,001,983 issued January 11, 1977 to Daniels, there is disclosed a wall system in which a strip of particle board is interposed between the ceiling (top) and floor (bottom) plates. The disclosed stud is a fully-enclosed stud with rectangular cross-section. Each end of the stud penetrates the particle board to achieve positioning; thus the particle board, not the plates are penetrated, and any weakening of the plates, caused by the weight being borne, is avoided. Two opposing faces of both ends of the stud are nailed to the floor and ceiling plates. Corrugated portions assure uniform distribution of the weight load, and contribute to stiffness.

DISCLOSURE OF THE INVENTION

The invention is a metal stud having a particular configuration at each end to allow efficient connection to wood plates to be permanently positioned along the floor and along the ceiling, by a carpenter without additional training or new tools, to interconnect these metal and wood members to provide a non-weight-bearing wall frame of superior quality.

An object of this invention is to provide a metal stud to replace the conventional wood stud, typically of 50,8x101,6mm (2" x 4") (nominal dimensions).

Another object of this invention is to provide a metal stud that can be used by carpenters, and without the use of new tools and without any significant additional training, to assemble sections of walls or partitions in a manner similar to and at least as efficient as the manner of assembly of conventional wood studs. That typical manner of assembly is to align and connect, by nailing or stapling, the top and bottom plates to the studs, on a floor, and then to lift or tilt the assembly into its permanent position.

Another object of this invention is to provide a metal stud that has realistic commercial utility to replace wood studs for use in assembling walls or partitions of superior quality.

Other objects of this invention are to provide a stud made from material for which there is a dependable supply at a stable price. Prices of wood have been subject to changes in price and availability depending upon uncontrollable events such as hurricanes, floods, and the preferred nesting habits of the spotted owl. The metal stud of this invention may be made of recycled steel. It also has the additional advantage of being lighter than a wood stud.

The objects of this invention are achieved by providing a steel stud of three walls with a [-shaped or open

rectangular construction, that attaches to wood plates as easily as wood studs may be attached. The inventive vertical steel stud is made by conventional shaping of sheet metal generally into the form of a wood stud of conventional dimensions and having an open rectangular, [-shaped cross section and thus having two parallel side walls perpendicular to a central wall. Only one of the side walls has an extension, to form a leg or flange, of a length approximately equal to or less than the thickness (typically 50,8mm (2") nominal) of a wooden plate, on each end of that side wall. The distance between the inner surfaces of the two parallel sides is equal to the width (typically 101,6mm (4") nominal) of the top and bottom wooden plates.

The other side wall of the metal stud has no such extension on either end, and is of a length approximately equal to the intended distance between the exposed surface of the top and bottom plates. At each end of the central wall portion of the stud there is a flange, integral to the central portion of the stud and outwardly perpendicular thereto.

The stud can be made by forming the sheet steel into the desired open, rectangular shape, making a cut along each seam of a length equal to or slightly less than the thickness of the top and bottom wood plates, forming a flange, on each end of the central wall portion, by bending the cut portion of such central wall outwardly and perpendicular to the surface of the central wall portion of the stud, and cutting the flange from both ends of one of the sides of the stud.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings can be briefly described as follows.

Figures 1A and 1B are perspective views of the interconnection between a metal stud, [10], having a block-[-shaped or open, rectangular cross section, and conventional floor and ceiling wood plates, [32], wherein the end of the central section of each end is bent outwardly at the floor and ceiling plates, to form a horizontal flange [34, 36] to interface with the surface of the wood plate [32], and an extension on each end of a single side of the stud provides a nailing flange [26, 28] to the surface of the lower (floor) and upper plates.

BEST MODE FOR CARRYING OUT THE INVENTION

In the preferred embodiment, the metal stud is formed to have exterior dimensions generally similar to those of the conventional finished wood stud, having a depth or thickness of a nominal 50,8mm (2") and actual depth or thickness of approximately 38,1mm (1½"), and a width of a nominal 101,6mm (4") and actual width of approximately 88,9mm (3½"), and is made from sheet metal made from recycled steel of approximately 0.508mm (0.02 inch) in thickness. The stud is formed into the desired open rectangular shape having dimen-

sions substantially equal to those of the conventional 50,8x101,6mm (2" x 4") wood stud and with the distance between the parallel side walls of the stud being substantially equal to the outside width dimensions of the 50,8x101,6mm (2 x 4), or approximately 82,55mm (3¼"). The sides are approximately 25,4mm (1") in depth. The length of the stud is approximately 2387,6mm (94") measured between the outside of the central flanges. The side wall of the stud having the extensions serving as flanges on each end thus is approximately 38,1mm (1½") by 2438,4mm (96"), the stud's side wall without flanges is approximately 38,1x2387,6mm (1½" x 94"), and the stud's central wall is approximately 88,9x2387,6mm (3½" x 94").

While the invention has been described in connection with what is presently considered to be the most practical and preferred embodiment, it is to be understood that the invention is not to be limited to the disclosed embodiment, but on the contrary, is intended to cover various modifications and equivalent arrangements included within the spirit and scope of the following claims.

Claims

1. An improved metal stud to replace conventional wood studs used as vertical studs in forming walls or partitions in houses, apartments, offices or other buildings, comprising:

a rectangular sheet metal strip bent into a [-shaped form, with an open rectangular cross-section to define three walls comprising two parallel side walls and a central wall;
a flange integral and perpendicular to each end of such central wall

characterised in that it further comprises

extensions on and integral to each end of only one of said extensions on and integral to each end of only one of said side walls to provide a flange or leg on each of such ends.

2. A method using metal studs as vertical framing members in non-weight-bearing wall construction, comprising the steps of:

bending a rectangular sheet metal strips each into a [-shaped form with an open rectangular cross-section, to define three walls comprising two parallel side walls and a central wall, to form metal studs;
providing a flange or leg on each end of only one of said side walls;
providing a flange at the end of each end of the central wall portion of said stud, perpendicular

to said central wall;
 providing two wood plates;
 making and marking such plates intervally to locate the planned position of the metal studs;
 assembling said plates and metal studs by aligning metal studs parallel to each other and perpendicular to said wood plates; and
 nailing the metal studs to said wood plates.

Patentansprüche

1. Verbesserter Metallständer zum Ersetzen üblicher Holzständer, die als vertikale Ständer zur Bildung von Wänden oder Trennwänden in Häusern, Wohnungen, Büros oder anderen Gebäuden verwendet werden, welcher aufweist:

einen rechteckigen Blechstreifen, der in [-förmige Gestalt mit einem offen rechteckigen Querschnitt zur Bildung von drei Wänden mit zwei parallelen Seitenwänden und einer Mittelwand gebogen ist; sowie
 einen einstückig verbundenen und senkrecht zu jedem Ende der Mittelwand stehenden Flansch;

dadurch gekennzeichnet, daß er ferner einstückig mit jedem Ende nur einer der Seitenwände verbundene Ansätze zur Bildung eines Flansches oder Schenkels an jedem der Enden aufweist.

2. Verfahren zur Verwendung von Metallständern als vertikale Rahmenteile in nicht-lasttragenden Wandkonstruktionen, welches die folgenden Schritte umfaßt:

Biegen von rechteckigen Blechstreifen jeweils in eine [-förmige Gestalt mit einem offen rechteckigen Querschnitt zur Bildung von drei Wänden mit zwei parallelen Seitenwänden und einer Mittelwand, um Metallständer zu bilden;
 Anbringen eines Flansches oder Schenkels an jedem Ende nur einer der Seitenwände;
 Anbringen eines Flansches am Ende jedes Endes des Mittelwandabschnitts des Ständers, der zur Mittelwand senkrecht ist;
 Anbringen von zwei Holzplatten;
 Herstellen und Markieren dieser Platten in Intervallen, um die geplante Stellung der Metallständer festzulegen;
 Zusammenbauen der Platten und Metallständer durch Ausrichten der Metallständer parallel zueinander und senkrecht zur den Holzplatten;
 und
 Festnageln der Metallständer an den Holzplatten.

Revendications

1. Montant métallique perfectionné destiné à remplacer les montants en bois conventionnels utilisés comme montants verticaux pour la construction de murs ou de cloisons dans des maisons, des appartements, des bureaux ou autres bâtiments, comprenant :

- une bande de feuille métallique rectangulaire pliée en forme de $\subset$ et présentant une section transversale rectangulaire ouverte de manière à définir trois parois comprenant deux parois latérales parallèles et une paroi centrale, un rebord d'un seul tenant faisant corps perpendiculairement avec chaque extrémité de la paroi centrale,

caractérisé en ce qu'

- il comprend en outre des prolongements formés d'un seul tenant à chaque extrémité de l'une seulement des parois latérales pour constituer un rebord ou pied à chacune de ces extrémités.

2°) Procédé utilisant des montants métalliques comme éléments de construction verticaux dans la construction d'un mur ne supportant pas de poids, comprenant les étapes consistant à :

- plier des bandes de feuille métallique rectangulaire chacune en forme de $\subset$ et présentant une section transversale rectangulaire ouverte, de manière à former trois parois comprenant deux parois latérales parallèles et une paroi centrale, pour former des montants métalliques,
- créer un rebord ou pied à chaque extrémité de l'une seulement des parois latérales,
- créer un rebord à l'extrémité de chaque extrémité de la partie de paroi centrale du montant, perpendiculairement à cette paroi centrale,
- utiliser deux plaques de bois,
- fabriquer et marquer ces plaques de bois à un intervalle permettant de fixer la position dans un plan des montants métalliques,
- assembler les plaques et les montants métalliques en alignant les montants métalliques parallèlement les uns aux autres et perpendiculairement aux plaques de bois, et
- clouer les montants métalliques aux plaques de bois.

FIG. 1A

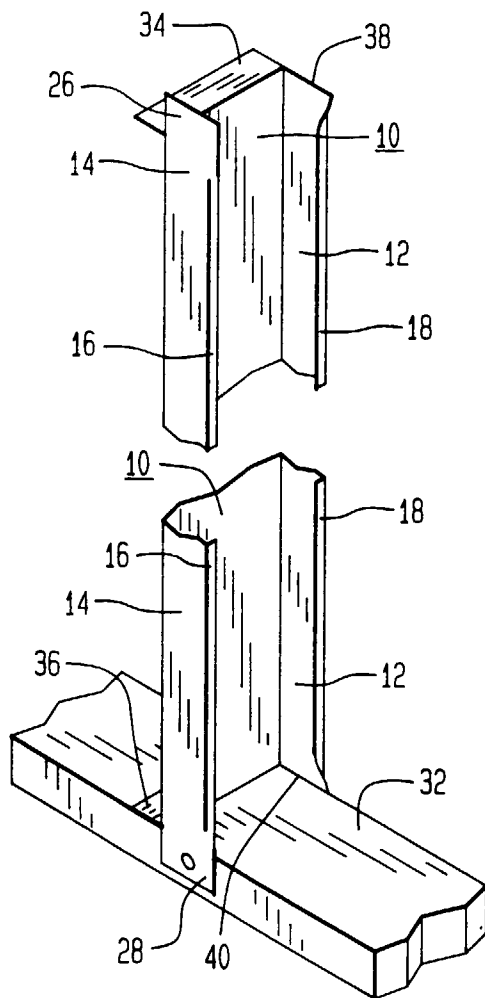


FIG. 1B

