United States Patent [19]

Zachman

[11] **3,837,135**

[45] **Sept. 24, 1974**

[54] **COMBINED JOIST AND REINFORCING BAR HOLDER AND STRUCTURE FORMED THEREWITH**

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[22] Filed: **May 25, 1972**

[21] Appl. No.: **256,680**

[52] **U.S. Cl.** **52/702,** 52/289, 52/721

[51] **Int. Cl.** **E04c 5/16,** E04b 1/38

[58] **Field of Search** 52/283, 285, 289, 702, 52/721, 715, 703; 287/20.94

[56] **References Cited**

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770,050	9/1904	Dreyer	52/702
832,133	10/1906	Lanz	52/703
1,055,329	3/1913	Karas	52/289
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FOREIGN PATENTS OR APPLICATIONS

247,812	11/1963	Australia	52/283

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Assistant Examiner—James L. Ridgill, Jr.
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[57] **ABSTRACT**

A novel structural device is constructed to hold a building joist in position while at the same time serving to tie the joist into a reinforced concrete wall structure by combining with a steel reinforcing bar therein. The device further provides for positive joining to a masonry or brick wall and especially a hollow concrete block construction to greatly enhance the strength and rigidity of the entire structure. Fabrication from a single piece of sheet metal utilizing spot welding greatly adds to the ease of manufacture, strength, and rigidity of the device as well as the resulting structure.

8 Claims, 4 Drawing Figures

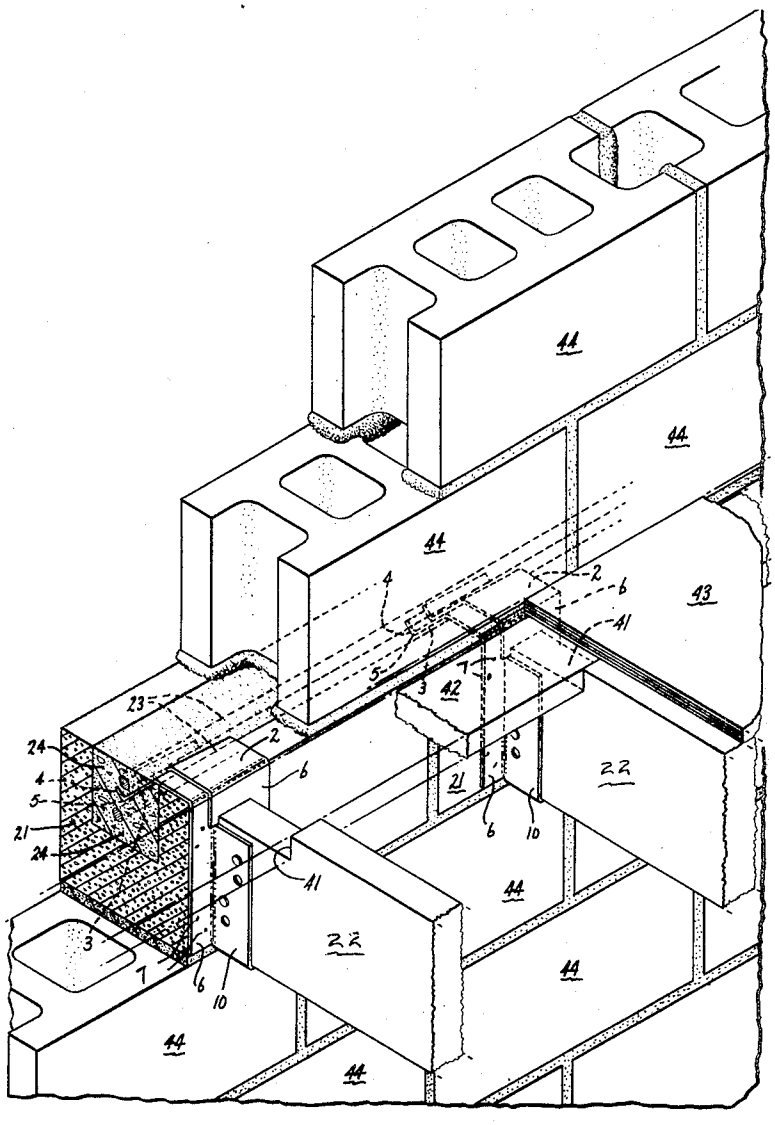


Fig. 1

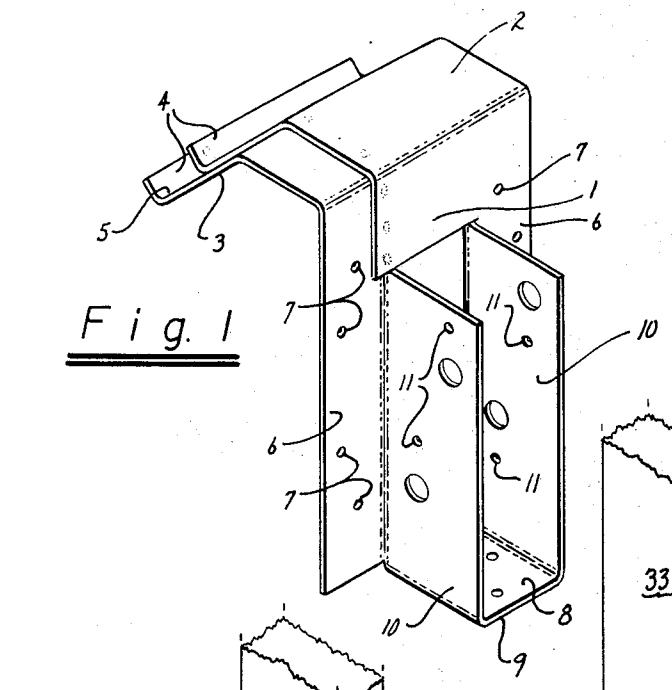


Fig. 3

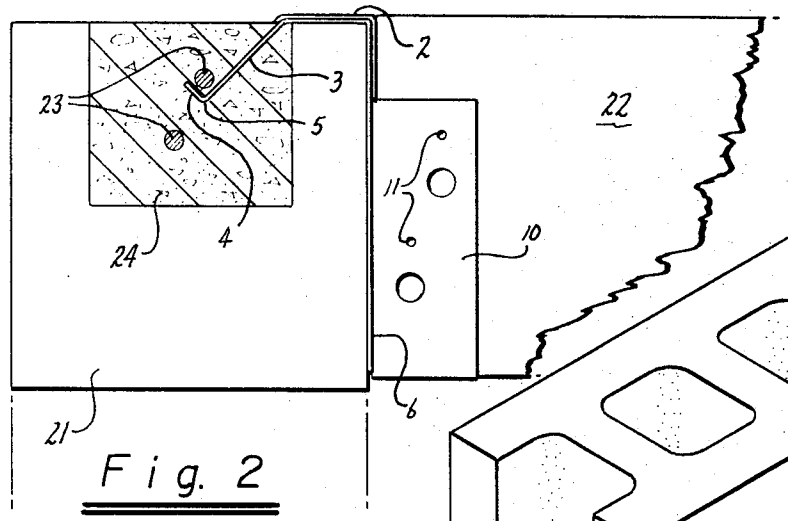

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Fig. 2

Fig. 4

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COMBINED JOIST AND REINFORCING BAR HOLDER AND STRUCTURE FORMED THEREWITH

BACKGROUND OF THE INVENTION

Hangers, supports and similar devices for floor or ceiling joists are quite old in the art of building construction.

Thus the patent of Eberhardt U.S. Pat. No. 753,053 teaches a simple saddle arrangement which represented some novelty at the time it was applied for in 1903, but teaches no unusual combination features.

Tuteur, U.S. Pat. No. 858,838 is also an early and simple device (1907) and the only novelty seems to reside in its method of construction.

Walker, U.S. Pat. No. 859,471 (1907) teaches primarily a window lintel construction and utilizes a simple saddle joist support having no claim to novelty in itself.

Price, U.S. Pat. No. 1,097,934 is strictly adapted to steel construction.

Heath, U.S. Pat. No. 1,568 teaches primarily fireproofing construction of hollow block structures. It shows a provision for joist supports which in themselves present no novelty.

Ropp, U.S. Pat. No. 1,692,351 discloses a special joist hanger incorporating a novel method to facilitate its insertion in a concrete wall.

Findleton, U.S. Pat. No. 3,036,347 discloses a specially constructed hanger facilitating connecting of a joist to a horizontal beam or girder.

Helfman, U.S. Pat. No. 3,537,221 discloses and features a novel construction for separating a ceiling from an upper floor to effect soundproofing and utilizes special joist hangers constructed to make this possible.

None of the foregoing devices are especially constructed for the tying of floor joists to a hollow concrete block wall construction. Moreover, none of the prior art patents provide for combined support of a joist and of a reinforcing rod to produce the unusual results of strength and rigidity. Likewise, none of the prior art patents provide side wings and methods of fastening of a joist support to a wall to provide superior torque resistance. The latter is extremely important in connection with complying with modern building codes.

Finally, none of the prior art discloses or teaches a vastly superior structure resulting from the use of the novel hanger of the applicant in combination with hollow concrete block or reinforced concrete wall construction and wooden floor or ceiling joists.

SUMMARY OF THE INVENTION

I have discovered that by utilizing the hanger or holder of my invention I am able to accomplish what has hitherto been impossible in the prior art. Namely, I am able to produce a superior structure from the standpoint of strength and rigidity, where hollow concrete blocks or reinforced concrete wall construction is utilized in combination with wooden floor or roof joists. The heart of my invention is a metal fabricated holder, some of the elements of which resemble conventional joist holders or supports as disclosed in the prior art, on one side thereof. In combination with the holder side there is a member which is constructed to protrude or project into a reinforced concrete wall or the grout inserted in a hollow concrete block to support a reinforcing bar therein and thus combine to produce an unusually strong structure as well as to facilitate the construction process itself. Suitable side wing members form a part of my basic holder and serve to permit secure fastening of the holder to a concrete or brick wall.

As thus combined I have discovered that my device produces an unusually strong structure of the general type herein described and overcomes the objections previously encountered on structures of this general type and not solved by any of the prior art. It has been found highly superior by building inspector tests insofar as strength, rigidity and earthquake resistance is concerned.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is an isometric view of the holder of my invention.

FIG. 2 is a side view showing my holder in combination with a joist, hollow concrete block, and reinforcing bar with cement mix.

FIG. 3 is an isometric view showing my invention adapted to a structure utilizing wooden stud wall construction.

FIG. 4 is an isometric showing my invention adapted to a structure utilizing concrete block wall construction.

DESCRIPTION OF A PREFERRED EMBODIMENT

Referring now to the drawings and particularly first to FIG. 1, there is seen first a frame section 1 of my holder. A flat upper portion or top section 2 is shown combining with a projecting section 3. At the outer extremity of projecting section 3 there is seen a bent-up or lip section 4 which forms a "V" groove section 5.

Wing sections 6 which form an integral part of my holder are equipped with holes 7 to provide for fastening means to the wall structure as disclosed more fully below.

The joist support portion of my holder 8 has a bottom section 9 and side sections 10 thereby forming a "U". The side sections 10 are equipped with holes 11 to provide for fastening means for the joist, also as more fully described below.

Referring now more particularly to FIG. 2, the holder of my invention is shown positioned on hollow concrete block or what is sometimes termed a cement block 21 and retains joist 22. A steel reinforcing bar of the conventional type 23 is shown imbedded in a cement mix or grout poured into the hollow section of block 21 and retaining not only the reinforcing bar 23 but also the elements 3, 4, and 5 of my holder described above.

Referring now more particularly to FIG. 3, there is seen a nailing plate or board 31 positioned on top of cement or concrete block 21 to which it may be secured by nut and bolt means 32 and serves to accommodate vertical wall studs 33. A plywood sub-floor 34 may be utilized in combination with the other features of my structure as shown.

Referring now more particularly to FIG. 4, there is seen the adaptation of my invention to a structure utilizing entirely hollow concrete or cement block wall construction. In this combination I may provide notches 41 in my joists 22 to accommodate nailing plate or board 42. In this combination my plywood sub-

floor 43 may be applied as shown when utilizing the concrete or hollow cement blocks 44.

I have discovered that the construction described above when utilizing my novel hanger makes possible an extremely superior construction, particularly with regard to its resistance to torque caused by eccentric or unbalanced loads. The torque test is now required by many modern building codes and heretofore structures of this class utilizing concrete blocks and wooden floor joists have been unable to withstand the requirements and specifications of such codes, whereas my construction disclosed above has been able to do so.

I may utilize concrete or masonry nails for securing the wing members 6 of my holder through holes 7 to the wall. The action of these wing members so fastened, together with the action of my projecting member 3 in combination with the reinforcing bars produces an unusually high resistance to torque stresses.

With regard to conventional stresses using conventional sizes of joists, my tests have shown that a single holder may withstand a load of as high as 10,000 pounds.

Insofar as rigidity is concerned, I have found that my construction as disclosed above is far superior insofar as earthquake resistance is concerned and, in fact, renders concrete or cement block construction acceptable in many instances where this has been heretofore impossible.

I claim:

1. A building structure comprising the combination of hollow concrete block wall members and wooden joist members, said wall members and said joist members being joined by means of holders, each holder comprising:
- a pocket section disposed for receiving and holding a joist member in position;
- a projecting section forming a part of said pocket section and disposed for insertion into the hollow portions of said wall members;
- said projecting section being further characterized by means for holding a reinforcing bar located within a cement mixture in the hollow portion of said wall members in position;
- said pocket section being further characterized by wing members disposed for positioning against the surface of said wall members;
- means for fastening said wing members to said wall members.

2. A building structure comprising the combination of hollow concrete wall block members and wooden joist members, said wall members and said joist members being joined by means of holders, each holder comprising:
- a pocket section disposed for receiving and holding a joist member in position;
- a projecting section forming a part of said pocket section and disposed for insertion into a wall member and forming a part therof;
- said projecting section being further characterized by means for holding a reinforcing bar in said wall member in position;
- said pocket section being further characterized by wing members disposed for positioning against the surface of said wall member;
- means for fastening said wing members to said wall member.

3. A combined structural joist and reinforcing bar holder comprising:
- a vertical U-shaped pocket section;
- a pair of vertical wing members connecting to and projecting horizontally outwards at right angles from either side of said pocket section;
- a flat horizontal top section connecting with the top edges of said wing members and said pocket section at right angles thereto;
- a projecting section connecting with an edge of said top section opposite to said wing members and said pocket section and forming an angle with said top section;
- said pocket section, said top section and said projecting section being disposed for combined engagement around a top edge of a hollow concrete building wall block;
- a lip section connecting with an edge of said projecting section opposite to said top section;
- said lip section projecting outwards from said projecting section and forming a groove therewith
- said top section being further adapted for positioning between two adjacent horizontal courses of wall blocks,
- whereby the torque produced by unbalanced loads on said holder may be resisted.

4. The device of claim 3 in which said U-shaped pocket section, said vertical wing members, said flat horizontal top section, said projecting section and said lip section comprise a single piece of sheet metal cut and bent to form said sections and said wing members.

5. The device of claim 3 in combination with:
- a hollow concrete block wall member of a building structure,
- said device being positioned so that its flat horizontal top section rests upon one horizontal upper edge of said block, its wing members being positioned against a vertical outer surface of said block and said projecting and lip sections and said groove being positioned within the hollow interior of said block;
- a steel reinforcing bar positioned in the groove of said device within said hollow interior of said block;
- a cement mixture introduced into said hollow interior and surrounding said reinforcing bar;
- a joist positioned in said pocket section;
- means for fastening said wing members to said block;
- means for fastening said pocket section to said joist.

6. The device of claim 3 including holes through said wing members adapted to receive fastening means whereby said wing members may be fastened to the wall of a hollow concrete wall block building structure.

7. The device of claim 6 including holes through the sides of said pocket section adapted to receive fastening means whereby said pocket section may hold the end of a joist of a building structure in position.

8. The device of claim 7 in which said groove formed between said lip section and said projecting section is adapted to support a reinforcing bar comprising an element of a reinforced concrete portion of a hollow concrete wall block building structure.

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