ANTIRACKING SUPPORT BRACE FOR A BUILDING WALL

ABSTRACT: Apparatus applicable to the frame of a building and adapted to brace such frame and thereby stabilize and strength the frame to prevent racking while permitting either exterior or interior siding to be applied. The apparatus includes a sheet metal channel member having multiple openings arranged in a pattern which will insure that several of such openings are in alignment with each portion of the frame that the brace crosses to permit multiple fasteners to connect the brace to each upright frame member as well as to the upper and lower plates of the frame.
ANTIRACKING SUPPORT BRACE FOR A BUILDING WALL

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates generally to building construction of various kinds and relates particularly to a brace for adding strength to a frame structure to prevent racking thereof without interfering with the application of siding to such frame.

2. Description of the Prior Art

Hereinafter many efforts have been made to provide an angular brace for a wall frame which would prevent racking or lateral movement between the upper and lower plates. Previously this has been accomplished by nailing a board or other structural member across the wall frame at an angle so that the board overlay several upright studs to which the board also was nailed. The board remained on the frame until sheathing or siding could be applied to portions of the frame not covered by the board and thereafter the board was removed so that the sheathing could be applied over the remaining portions of the frame. With the advent of sharply increased prices for lumber, as well as the demand exceeding the supply, sheathing has been substantially eliminated and replaced by a relatively soft insulating panel or sheet which has not had the inherent strength to prevent racking of the wall. In order to prevent racking some efforts have been made to attach structural members such as angle irons or the like to the framing of the wall. However, structural members which were strong enough to serve the purpose for which they were intended have been too thick and large and have interfered with the application of the insulating sheet as well as the siding. Also the fasteners by which the structural members were connected to the frame have had a tendency to work loose and back out of the wooden framing so that not only was the brace ineffective, but the head of the fastener tended to displace the siding on the building.

SUMMARY OF THE INVENTION

The present invention is a channel-shaped brace constructed of relatively thin metal having a high strength and with a relatively wide central web portion terminating in a relatively short flange portion at each side. The flange portions are received within relatively shallow saw kerfs so that the central web portion is flush against the upper and lower plates and the upright studs which the brace crosses. The brace includes a multiplicity of openings of a predetermined size and arranged in a pattern such that several openings will be in alignment with each of the side edges of a stud so that the brace can be connected to each of the studs and to the upper and lower plates by multiple fasteners. The openings are of a size slightly smaller than the diameter of the shank of a fastener such as a nail so that when the fastener is driven through the opening into the underlying wood, the edges of the opening will be curled downwardly and will frictionally engage the shank of the nail to help prevent retraction of the nail from the wood. Also if desired each of the flanges at opposite sides of the brace may have protrusions generally triangular shaped teeth adapted to bite into the wood of the stud and prevent withdrawal of the flanges from the saw kerfs.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a perspective illustrating one application of the device in use as a corner brace.

FIG. 2 is an enlarged fragmentary plan view of one end of the brace connecting the top plate with multiple studs.

FIG. 3 is an enlarged vertical section on the line 3-3 of FIG. 2.

FIG. 4 is an enlarged fragmentary perspective of the brace per se.

FIG. 5 is an enlarged fragmentary perspective of a modified form of the brace.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

With continued reference to the drawing, a building 10 has wall-framing structural elements including upper and lower plates 11 and 12, respectively, connected at opposite ends by corner posts 13 and connected intermediate the corner posts by a plurality of upright studs 14. Normally, an insulation sheet or panel 15 of relatively soft absorbent material is mounted on the exterior of the wall framing elements and a wall board or plaster wall (not shown) is mounted on the interior of the same. An exterior siding (not shown) usually is applied over the insulation sheet 15 to provide a finished appearance as well as to protect the same.

In order to prevent lateral moving or racking of the wall frame, a brace 18 is provided having a central web portion 19 with a flange 20 along each side forming a U-shaped channel member. Preferably, the brace 18 is constructed of relatively thin rust-resistant sheet metal such as 20-gauge sheet steel which may be hardened if desired for increased strength. The web portion 19 is relatively wide, while the flange portions 20 are relatively narrow, being of a width substantially less than half the width of the web portion 19. The web portion has a multiplicity of openings 21 arranged in longitudinal rows indicated by the line 22 and transverse columns indicated by the line 23. The openings 21 may be at any desired spacing, however, a spacing of 1 inch center to center along the longitudinal row 22 and ¾-inch center to center along the transverse column 23 has been found satisfactory. It is noted that if desired alternate rows and columns of openings could be staggered to provide a slightly different pattern of openings, as illustrated in FIG. 5.

As illustrated in FIGS. 6 and 7, each of the openings 21 is of a diameter A which is slightly smaller than the diameter B of the shank portion 24 of a nail of other fastener 25 having an enlarged head 26. As an example, an 8d common nail has been found satisfactory, however, any size nail or other fastener could be used as long as the openings 21 are smaller than the shank of the fastener.

As illustrated in FIG. 3, a pair of spaced generally parallel saw kerfs or cuts 27 are provided in each of the structural members of the wall framing. Each of the cuts 27 is slightly deeper than the width of the flange portions 20 of the brace and in a position to accommodate such flanges so that the inner surface of the web portion 19 is in engagement with each of the upper and lower plates 11 and 12, corner posts 13 and studs 14.

It has been found through extensive tests that at least three fasteners 25 should be driven into each of the upper and lower plates as well as in each of the studs 14 which the brace crosses. Due to the angle of the brace relative to the upright studs and the particular arrangement of the openings 21, at least three of such openings will be in alignment with the edge of each 2×4 stud which, in reality, are approximately 1 13/16 inches wide.

With reference to FIGS. 5 and 8, a modified form of the invention is disclosed in which each of the flanges 28 has a plurality of inwardly struck generally triangular fingers or teeth 29 with one of such teeth being substantially in alignment with each of the transverse columns 23. Due to the triangular shape of each tooth, a penetrating point 29 is provided at the closest point of the tooth to the web portion 19 of the brace. When the flanges 20 are inserted within the saw kerfs 27, at least one of the teeth will be disposed within the saw kerf in such a position that the penetrating point 29 will engage the material of the stud and retain the brace within the saw kerf.

The brace 18 can be provided in any desired length, although lengths of 9⁵/₈ feet, 10 feet, and 11¹/₈ feet have been
found satisfactory for use where conventional 8-foot walls are used. The 9½-foot brace is used where unobstructed wall space is limited and this length will cross a minimum of three wall studs set at a conventional spacing of 16 inches center to center. The 11½-foot brace is used where a true 45° angle is possible and this brace will afford maximum strength. The 10-foot brace has proved to be the most popular length since it crosses a minimum of four wall studs at an angle sufficient to support the wall and to prevent substantially all racking motion thereof. It is noted that any of the braces could be cut to a desired length to fit substantially any existing conditions of the wall framing. Preferably, the opposite ends of the brace 18 are cut at an angle of approximately 45° from the centerline to the sides so that the brace can be used as either a right-hand brace of as a left-hand brace.

In the operation of the device, either the brace 18 of a desired length or a template corresponding to such brace is placed against a section of the wall framing and spaced marks are made on each of the upper and lower plates 11 and 12, the studs 14 as well as corner posts 13, if the brace is to serve as a corner brace. Thereafter the brace of template is removed and a saw which is set to a predetermined depth of cut is used to provide spaced slots or kerfs in each of the elements. The brace 18 then is positioned so that the flanges 20 are located within the saw kerfs 27 so that the web portion 19 of the brace is in contact with each of the elements which the brace crosses. Preferably at least three nails 25 are driven through openings 21 into each of the elements. Since the openings 21 are slightly smaller in diameter than the shank of the nail, the material of the brace surrounding the opening will be bent downwardly and slightly embedded within the wood. The material surrounding the opening will remain in frictional engagement with the nail 25 to resist any outward movement of the nail.

In the modification disclosed in FIGS. 5 and 8, the insertion of the flanges 20 into the saw kerfs 27 causes the penetrating points 29 of the fingers 28 to slide over the wood at the side of the kerf; however, any outward movement of the brace 18 will cause the penetrating points to become embedded within the wood and resist such outward movement.

We claim:

1. In a building wall having upper and lower plates connected by corner posts and having a plurality of substantially equally spaced generally upright studs between said posts, at least certain of said corner posts and studs having a pair of spaced saw kerfs aligned with saw kerfs of adjacent posts and studs, and at an angle to said upper and lower plates, an anchoring support brace connected to at least three of said posts and studs, said brace including an elongated generally U-shaped member having a relatively wide web portion with a relatively narrow flange extending entirely along each side thereof, each of said flanges being of a width less than half the width of said web portion and seated within said saw kerfs, each of said flanges having a plurality of spaced instruck generally triangular teeth, each of said teeth having a penetrating point located out of the plane of the flange and engaging the wood adjacent to said saw kerf and resisting outward movement of the brace, said elongated member being constructed of approximately 20-gauge sheet metal having high tensile strength, said web portion having a multiplicity of spaced openings arranged in longitudinal rows and transverse columns, said openings being spaced apart a short distance whereby at least three openings are in alignment with each of the posts and studs which the brace crosses, fastening means having a shank portion and a head portion securing said brace to said posts and studs, each of the openings of said web portion being initially of a diameter slightly less than the diameter of the shank portion of the fastening means, the walls defining the openings being deformed by and gripping the fastening means and the head portion preventing the fastening.