

Dec. 17, 1968

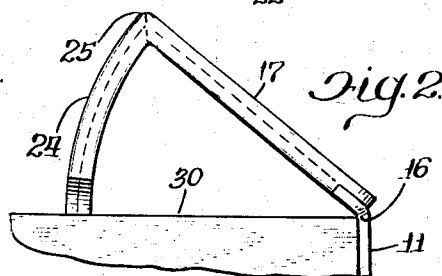
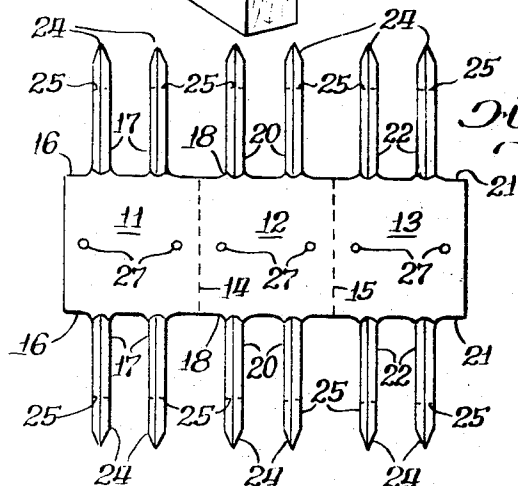
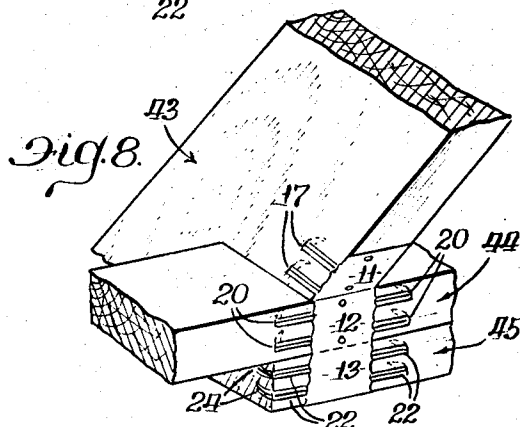
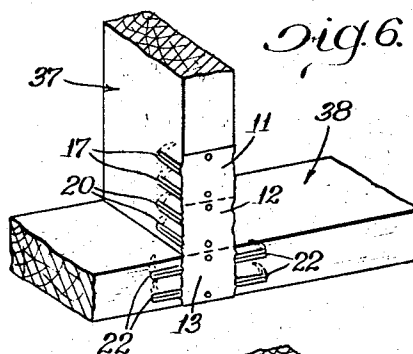
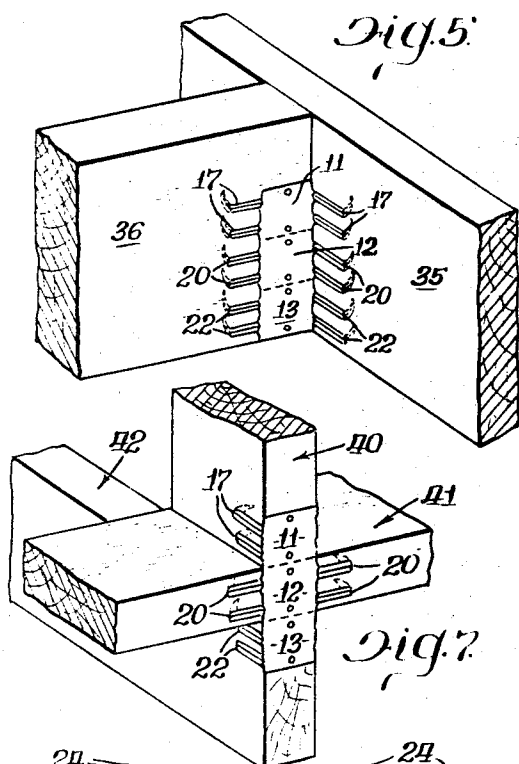
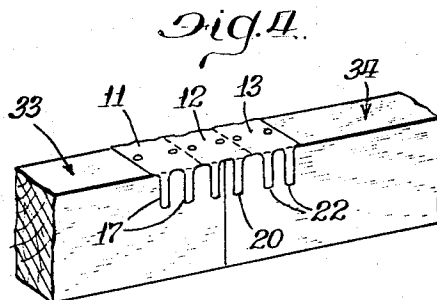
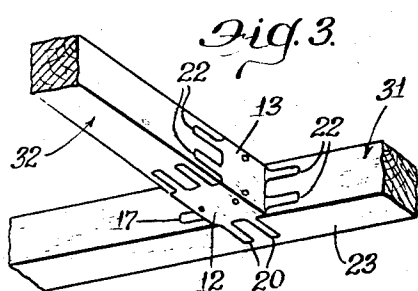
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3,416,821

MULTI-PURPOSE BUILDING BRACKET

Filed Sept. 29, 1964

2 Sheets-Sheet 1



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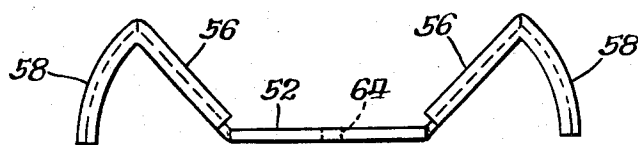
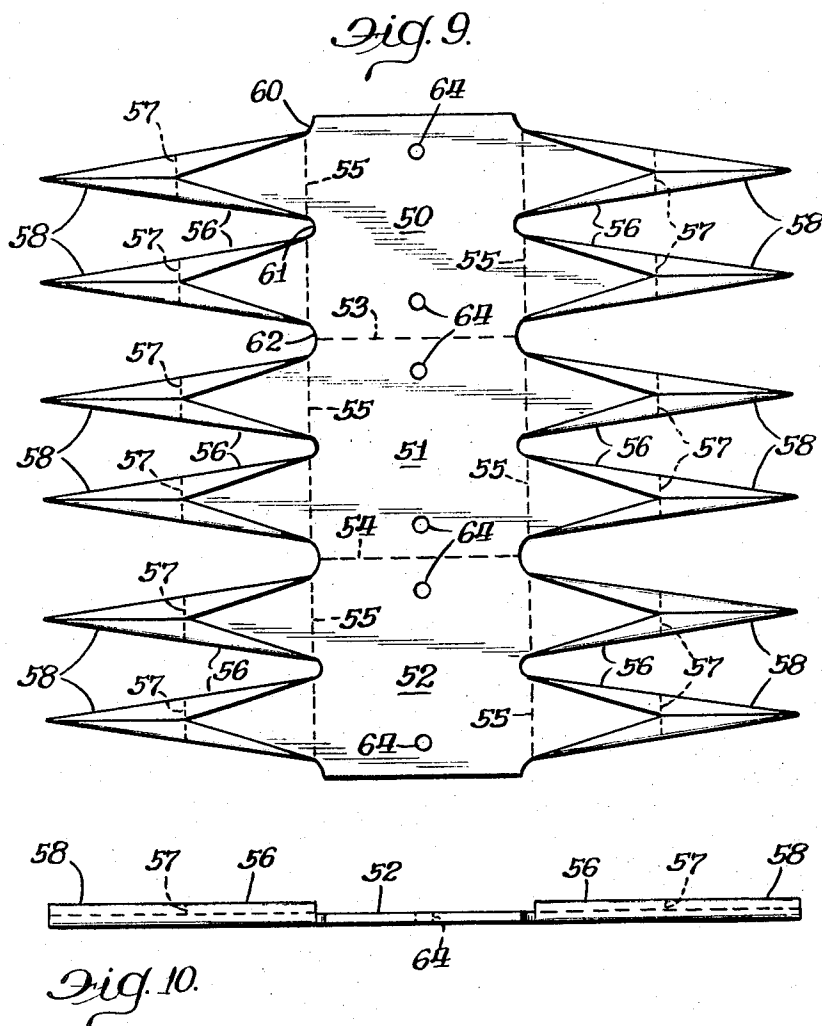
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MULTI-PURPOSE BUILDING BRACKET

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2 Sheets-Sheet 2



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MULTI-PURPOSE BUILDING BRACKET**Edward L. Benno, Skokie, Ill., assignor to Ray Laboratories, Inc., a corporation of Illinois****Filed Sept. 29, 1964, Ser. No. 400,187****1 Claim. (Cl. 287—20.92)**

This invention relates generally to multi-purpose building brackets and more particularly to such brackets having integral nails.

The primary object of the present invention is to provide a novel multi-purpose bracket arrangement which may be easily and quickly applied to join or otherwise secure standard lumber members.

Another object of the present invention is to provide a novel construction for a bracket of the foregoing paragraph in which the material cost is low, the manufacturing process therefore is economical, and in which the packing or shipping of the bracket may be done in compact arrangements.

Other objects and features of the invention will be apparent upon a perusal of the following specification and drawings in which:

FIGURE 1 is a plan view of one embodiment of the bracket of the present invention;

FIGURE 2 is an enlarged side elevational view of the nail and shank sections of the bracket of FIGURE 1 in one bent position relative to the plate section and a lumber member preparatory to nailing;

FIGURES 3 through 8 are a few examples of the many different wood joint arrangements in which the bracket of the present invention is usable;

FIGURE 9 is a plan view of another embodiment of the bracket of the present invention;

FIGURE 10 is an edge elevational view of the bracket shown in FIGURE 9; and

FIGURE 11 is a view similar to FIGURE 10 but showing the bracket in one pre-bent position.

Although the present embodiments are the preferred embodiments, it is to be understood that changes can be made in the present embodiments by one skilled in the art without departing from the spirit and scope of the present invention.

Generally, the invention comprises a building bracket of a plate section with the plate section being substantially square and with the length of a side of the plate section substantially conforming to the thickness of a standard lumber building member. Such standard building lumber is often referred to as two inch lumber, and in its various sizes is often denoted as 2 x 4's, 2 x 6's, 2 x 8's etc. It is of course well known that such standard lumber is generally not of the exact dimension that it is denoted. For example a 2 x 4 is generally actually 1 and 5/8 by 3 and 5/8 inches in dimension.

From two opposite sides of the plate section of the bracket a plurality of integral shank members are formed to extend outwardly in opposite directions. At the extending ends of the shank members integral nail members are formed. The bracket may be made with a plurality of the foregoing described plate sections integrally formed together. One such unique arrangement is shown in FIGURE 1 wherein three plate sections are provided. Another embodiment is shown in FIGURE 9. Although not shown in the drawings it is contemplated that the bracket may have any desired number of plate sections. For example if the bracket is to be used to join substantially wide lumber such as shown in FIGURE 5, one such embodiment of the bracket may include four plate sections. A further embodiment can comprise six plate sections with a score line between two groups of three sections so that it can be used as a long six section bracket or sep-

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arated by repeated back and forth bending into two three-section brackets.

In use the shank members are bent relative to the plate section to any desired angle. In embodiments such as shown in the drawings the bending of the shank members can easily be done manually. Further the nail members are bent in either direction of the shank members. Such bending or forming of the bracket may occur immediately preparatory to some wood joining application or a number of brackets may be partially or completely formed in any number of different desired configurations for rapid multiple application to a repetitive wood joining application. In FIGURES 1, 9 and 10 the brackets are shown with the plate sections and the shank and nail members all lying in substantially the same plane. In such an arrangement a plurality of brackets may be stored and shipped in a compact stacked arrangement. A partially pre-bent bracket arrangement which still provides for a relatively compact storage and shipping arrangement may be one in which the nail members are all bent in the same direction relative to the shank members for nailing but with the shank members substantially coplanar with the plate sections or bent in the opposite direction of the nail members. The latter configuration is shown in FIGURE 11.

In detail, the embodiment of the invention shown in FIGURES 1 through 8 comprises three plate sections 11, 12 and 13. The three plate sections 11, 12 and 13 are integrally formed together as a rectangular unit with the dotted line 14 defining the dividing line between plate sections 11 and 12 and with the dotted line 15 defining the dividing line between plate sections 12 and 13. The bracket is formed of a metal which is sufficiently malleable to permit relatively sharp bending of the plate sections relative to each other along the dotted lines 14 and 15. A material which was successfully used in a reduction to practice of the invention was a 20 gauge galvanized steel material.

Each of the plate sections 11, 12 and 13 is substantially square with the lengths of all sides being substantially equal to the thickness of a standard lumber building member. Assuming that the bracket is to be used with standard 2 inch lumber, the length of each side of the sections 11, 12 and 13 would be substantially 1 and 5/8 inches.

From the opposite edges 16 of the section 11, pairs of oppositely outwardly directed shank members 17 are formed. From the opposite edges 18 of the plate section 12, pairs of oppositely outwardly extending shank members 20 are formed. From the opposite edges 21 of the plate section 13, pairs of oppositely outwardly extending shank members 22 are formed. The shank members 17, 20 and 22 are all of the same length which length is less than the length of a side of one of the plate sections 11, 12 and 13. The shank members 11, 12 and 13. The shank members 11, 12 and 13 are preferably long enough to carry a nail member of substantial length at an adequate angle for nailing into a wood member and yet short enough so as not to carry a nail member too close the opposite edge of a wood member when the nail is inserted with the shank member transversely of the thickness of the wood member such as on the side 23 of the wood member shown in FIGURE 3. The shank members 17, 20 and 22 are substantially equally spaced along the respective edges 16, 18 and 21 of the plate sections 11, 12 and 13 so that a secure nail holding arrangement of the nail members in any wood member to which the bracket is applied is adequately provided.

Nail members 24 are integrally formed on the extending ends of the shank members 17, 20 and 22. In the flat bracket shown in FIGURE 1, the nail members 24 are joined to the shank members 17, 20 and 22 at the

dotted lines 25. In the embodiment of the invention shown in the drawing, the shank members 17, 20 and 22 and the nail members 24 are substantially twice as thick as the plate sections 11, 12 and 13 because of the particular manner in which those members have been shown as formed by a folding over of the material from which the bracket has been made. As may be seen in FIGURE 1, the bracket material had been slit, blanked or otherwise formed wider than the shank and nail members, and the opposite longitudinal edges have been folded over to provide shank and nail members of substantial strength enabling the nail members 24 to be folded relative to the shank members 17, 20 and 22 and thereafter driven by a hammer into a wood member. The strength of the shank members 17, 20 and 22 must be sufficient to provide rigid struts or connections between the nail members 24 and the plate sections 11, 12 and 13. The load carrying ability of the shank members 17, 20 and 22 of FIGURE 1 is believed to be enhanced by the fillets between the shank members 17, 20 and 22 and the respective edges 16, 18 and 21 of the plate sections 11, 12 and 13. It is further believed that the folded thickness of the shank members 17, 20 and 22 substantially tangent to the respective edges 16, 18 and 21 of the plate sections 11, 12 and 13 provides an arrangement by which the shank members 17, 20 and 22 may be easily manually bent relative to the plate sections 11, 12 and 13 for use in any desired wood joining arrangement.

The tips of the nail members 24 may be provided with any suitable point configuration for easy and secure driving of the nail members 24 into a wood member.

Each of the plate sections 11, 12 and 13 is further provided with a pair of nail holes 27. The holes 27 are positioned on a line midway between the edges 16, 18 and 21. Each hole 27 is further positioned outwardly toward the edge of the plate section from a line through a pair of oppositely extending shank and nail members. This arrangement of the nail holes 27 minimizes any interference between any nail driven through the nail holes 27 and any nail member 24 driven into a wood member.

FIGURE 2 shows a plate section 11 greatly enlarged and in side elevation against one side of a wood member 30 with the shank member 17 bent over an adjoining side of the wood member 30 with the nail member 24 bent at an appropriate angle to shank members 17 for driving the nail member 24 into the wood member 30 by appropriate hammer blows on the junction of nail member 24 with shank member 17 at dotted line 25. The slightly curved shape of nail 24 shown in FIGURE 2 is an ideal shape and need not necessarily be used in every nailing arrangement to provide a firm joint. In some applications, the nail member 24 may be substantially straight or partially bent rather than curved as shown in FIGURE 2. As shown in FIGURE 2, the nail member 24 is curved to lie on the arc of a circle having its center at edge 16 of plate section 11. In a reduction to practice of the invention it has been found that if the tip of the nail member 24 such as shown in FIGURE 2 is caused to enter the wood member 30 at a point slightly further from the edge 16 than the length of the shank member 17, the nail member 24 in being hammered into the wood member 30 will longitudinally draw the shank member 17 to securely pull the plate section 11 against the wood member 30.

Because of the unique arrangement of the bracket of the invention, the bracket is ideally suited for use in a great number of different wood joining applications. FIGURES 3 through 8 by way of example show a small number of the many possible applications.

As may be seen in FIGURE 3, two wood members 31 and 32 are joined by the bracket. The wood member 31 may be a light header while the wood member 32 may be a light joist member or vice versa. The bracket has been bent into a U-shape by right angle bends along the lines 14 and 15. The shank members 17, 20 and 22 on one side of each of the plate sections 11, 12 and 13 are disposed

substantially coplanar with their respective plate sections, and the nail members 24 carried thereby have been driven into three sides of the wood member 32. The shank members 20 on the other side of the plate section 12 are also substantially coplanar with the plate section 12, and the nail members 24 carried thereby have been driven into side 23 on the underside of the wood member 31. The shank members 17 and 22 on the other side of the plate sections 11 and 13 have been bent substantially at right angles to their respective plate sections 11 and 13, and the nail members carried thereby have been driven into the vertical side of the wood member 31 against which the end of the member 32 abuts to complete the wood joining arrangement. The arrangement of the bracket in FIGURE 3 may be called a joist hanger. It may be seen that the wood members 31 and 32 need not be limited to shallow depth shown in FIGURE 3 but may be substantially deeper.

FIGURE 4 shows the end-to-end joining of wood members 33 and 34, wherein for example the wood members may be a pair of joists which at the junction thereof rest on a wall plate. The plate sections 11, 12 and 13 of the bracket are substantially coplanar, and the shank members 17, 20 and 22 on each side thereof have all been bent in one direction and substantially at a right angle to the plate sections 11, 12 and 13. The bracket has been placed over the top of the two wood members 33 and 34 with the plane of their abutting surfaces intersecting the plate section 12. The nail members carried by the shank members 17, 20 and 22 have been driven in the opposite vertical sides of the wood members 33 and 34 to complete the joining arrangement. In such a joining arrangement the bracket may be called a splice bracket.

In FIGURE 5 the wood joining example is that of a joist 35 and a header 36 or vice versa. The bracket is arranged with all of the plate sections 11, 12 and 13 and the shank members 17, 20 and 22 on one side thereof substantially coplanar. The nail members 24 carried by those shank members 17, 20 and 22 are driven into the wood members 36 with the plate sections 11, 12 and 13 vertically aligned at the end of the wood member 36 abutting the wood member 35. The shank members 17 and 20 and 22 on the other side of the plate sections 11, 12 and 13 are bent at substantially a right angle to the plate sections 11, 12 and 13 and the nail members 24 carried thereby have been driven into the wood member 35 to complete the wood joining arrangement. If desired, another bracket may be secured on the opposite side of the wood member 36 to further secure the wood members 35 and 36 together. The bracket in that arrangement may be called a joist hanger.

In FIGURE 6 the joining of a wood stud member 37 to a wood plate member 38 is shown as a further example of the possible wood joining applications of the invention. In this arrangement the plate sections 11, 12 and 13 and the shank members 22 are all aligned substantially coplanar. The bracket is vertically disposed with the plate section 13 against one edge of the wood member 38 and with the plate sections 11 and 12 extending thereabove and against one edge of the stud 37. The nail members 24 carried by the shank members 22 are driven into the wood member 38 to secure the bracket to the wood member 38. The shank members 17 and 20 on each side of the plate sections 11 and 12 are bent at substantially right angles to plate sections 11 and 12 to project on each side of the wood member 37. The nail members 24 which are carried by the shank members 17 and 20 of the plate sections 11 and 12 are driven into opposite sides of the wood member 37 to complete the joining arrangement. In such an arrangement the bracket may be called a framing anchor.

In FIGURE 7 the example is a joining of a wood stud 40 to a wood plate 41 which in turn rests upon a wood joint 42. In this arrangement the plate sections 11, 12 and 13 and the shank members 20 of the plate section

12 are all arranged substantially coplanar. The bracket is positioned against the wood members so that the plate section 11 abuts one side of the wood joint 40, the plate section 12 is disposed vertically therebelow and abuts one side of the wood plate 41, and the plate section 13 is further downwardly disposed and against the end of the wood joist 42. The nail members 24 carried by the shank members 20 of the plate section 12 are driven into the side of the wood plate 41 against which the plate section 12 is disposed. The shank members 17 are bent at substantially a right angle to the plate section 11 in a U-shape on each side of the wood joist 40 and the nail members 24 carried by the shank members 17 are driven into the opposite sides of the wood stud 40. The shank members 22 of the plate section 13 are bent in a substantially similar arrangement on each side of the wood joist 42, and the nail members 24 carried thereby are driven into the opposite sides of the wood joist 42 to complete the wood joining arrangement. Again, the bracket may be called a framing anchor.

The last example in FIGURE 8 displays the use of the bracket in joining a double plate and roof rafter arrangement in which the roof rafter comprises the wood member 43 and the wood plates are designated with the numerals 44 and 45. In this arrangement the plate sections 12 and 13 and the shank members 20 and 22 carried thereby are all disposed substantially in one plane. The plate section 13 is disposed against one edge of the wood member 45 and the plate section 12 is disposed above the plate section 13 and against the wood member 44. The nail members 24 carried by the shank members 20 of the plate section 12 are driven into the side of the wood member 44 against which the plate section 12 is disposed. The nail members 24 carried by the shank member 22 of the plate section 13 are driven into the side of the wood member 45 against which the plate section 13 is disposed. The section taken in FIGURE 8 of the wood member 45 shows the manner in which the nail members 24 are disposed in the nailed condition. The plate section 11 is bent relative to the plate section 12 along the line 14 through an angle which substantially conforms to the angle of the roof rafters 43 to the vertical. The shank members 17 of the plate section 11 are bent at substantially right angles to the plate section 11 so that the shank members 17 extend along opposite sides of the wood rafter 43. The nail members 24 carried by the shank member 17 are driven into the opposite sides of the wood rafter 43 to complete the wood joining arrangement. The bracket in FIGURE 8 may also be called a framing anchor.

In none of the foregoing descriptions of the various examples have any nails been described as driven through the holes 27 of the various plate sections of the bracket. The number and distribution of nails through the holes 27 will depend upon the particular wood joining arrangement and the directions and applications of loading forces across the wood joint. In most instances nails through the holes 27 into the wood members against which the plate sections 11, 12 and 13 are disposed will substantially strengthen the joints.

Although all of the foregoing described examples of some uses of the invention involved the bracket embodiment shown in FIGURE 1, it should be understood that bracket embodiments of other than three plate sections may be used in various wood joining applications. For example, a bracket embodiment of four plate sections may be used in a joining arrangement such as in FIGURE 3 with the fourth plate section disposed over the top of the wood members 31 and 32. Such a four-plate section bracket may also be used in FIGURE 4 with two plate sections attached to each of the wood members 33 and 34. Such a four-plate section bracket may also be used in an arrangement as shown in FIGURE 5 with the fourth plate section disposed above the three plate

sections shown therein. Similar bracket embodiments may be used in the other examples, and bracket embodiments of even more plate sections or less plate sections may be used.

The nail members 24 and the shank members 17, 20 and 22 need not always be bent in the same direction from the planes of the plate sections 11, 12 and 13. In FIGURES 3 and 4 the nail and shank members are bent relative to the plate sections 11, 12 and 13 so that the bent over portions of the nail and shank members lie beneath those members. In FIGURES 5 through 8 the other side of the plate sections 11, 12 and 13 has been disposed against the wood members and the folded over portions of the shank members are disposed outwardly.

The embodiment of the invention shown in FIGURES 9 through 11 involves a formation of the shank members and the nail members which is different from that of the first embodiment. In all of the previously described applications for the first embodiment the second embodiment may also be used. The three plate sections in the second embodiment are designated 50, 51 and 52. The three plate sections 50, 51 and 52 are integrally formed together as a rectangular unit with the dotted line 53 defining the dividing line between plate sections 50 and 51 and with the dotted line 54 defining the dividing line between plate sections 51 and 52. The side edges of the plate sections 50, 51 and 52 are defined by the dotted lines 55. The dotted lines 55 determine the side edges of the plate sections 50, 51 and 52 because when the shank members are bent relative to the plate sections the bend lines will occur along the dotted lines 55. Each of the plate sections 50, 51 and 52 is substantially square with the side length being substantially equal to some predetermined lumber dimension. If the bracket is to be used with standard 2 inch lumber, the side length would be substantially 1 and 5/8 inches.

From the opposite edges of the plate sections 50, 51 and 52 as defined by the dotted lines 55, pairs of oppositely outwardly directed shank members 56 are formed. The outer end of each shank member 56 is defined by the dotted line 57. The shank members 56 are all of the same length which length is less than the side length of the plate sections 50, 51 and 52.

Nail members 58 are integrally formed on the extending ends of the shank members 56. The nail members 57 are joined to the shank members 56 at the dotted lines 57. In the second embodiment the shank members 56 and the nail members 58 are formed by a folding of the side edges of each integrally provided shank and nail member blank along diagonal lines which converge to substantially a nail point at the tip of each nail member 58. The shape of the blank from which the shank and nail members are formed may easily be understood from FIGURE 9. The form of the shank members 56 shown in FIGURE 9 provides high strength in the bracket against loading forces on the bracket which tend to shear the shank members 56 from the plate sections 50, 51 and 52 along the dotted lines 55.

The notched out portions such as those designated 60, 61 and 62 prevent any undesirable tearing or fracturing of the shank members 56 along the dotted lines 55 when the side edges are folded over as shown therein. Because the portion of each shank member 56 indicated by the dotted lines 55 is a minimum width for a single thickness of material, the shank member 56 may easily be bent on the line 55 to any desired angle relative to the plate sections 50, 51 and 52 for rapid and accurate positioning of the bracket preparatory to its application to a wood joining arrangement.

It is contemplated that in the forming process the nail members 58 may be provided with barbs which will aid in the holding power of the nail members 58 in wood.

Each of the plate sections 50, 51 and 52 is further provided with a pair of nail holes 64.

Having described the invention what is considered new and desired to be protected by Letters Patent is:

1. In a multi-purpose building bracket, a plate section, a plurality of integrally formed shank members extending from said plate section, a plurality of nail members extending from the extending ends of said shank members, said nail members being curved substantially on the circumference of a circle and the distance from the extending tips of said nail members to the point of said plate section at which a respective shank member is attached is greater than the length of each of said shank members, so that said nail members exert a longitudinal pulling force on each of said shank members

contemporaneously with the driving of said nail members when said plate section is fixed against movement.

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U.S. Cl. X.R.

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