

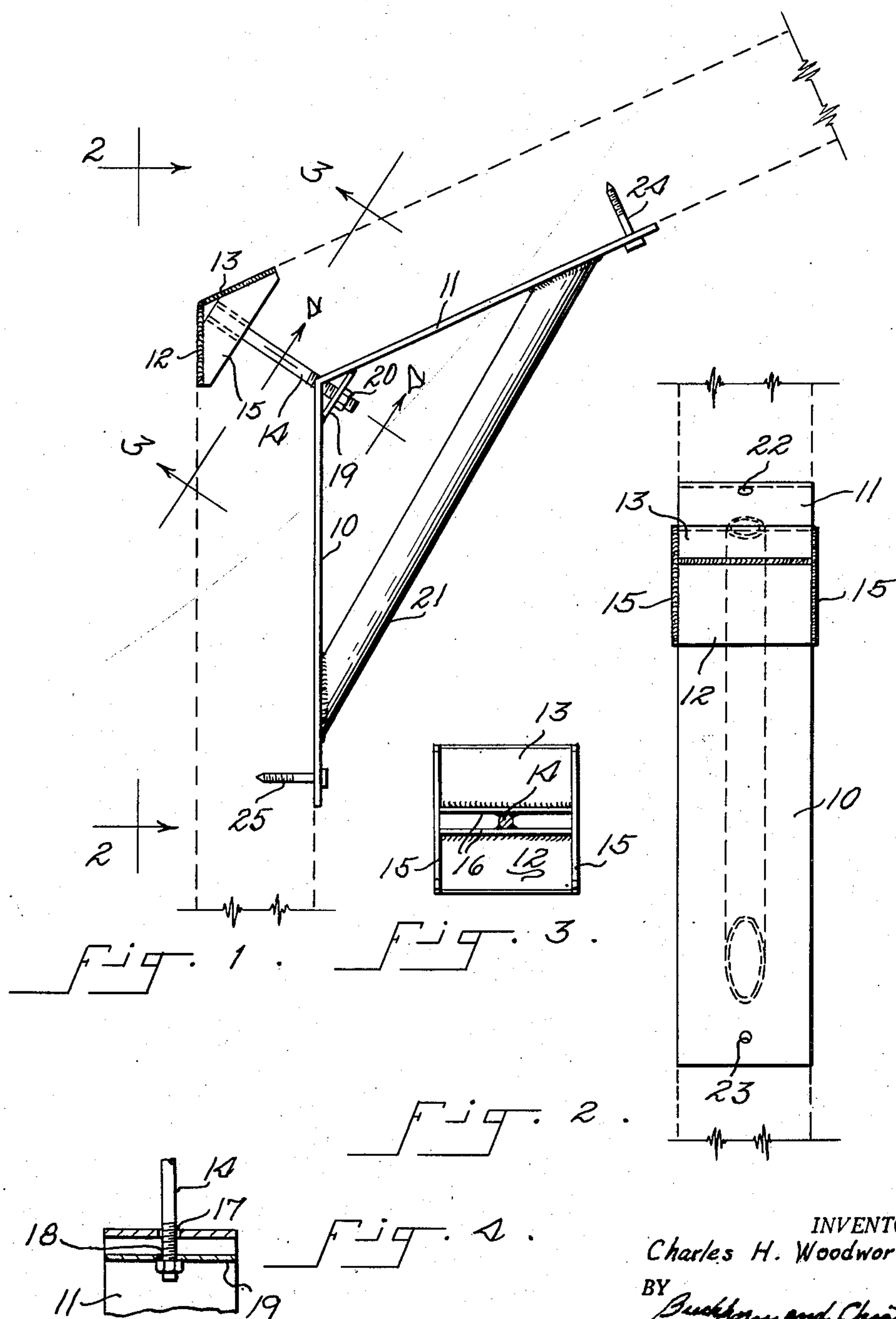
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KNEE FOR RIGID FRAMES

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## KNEE FOR RIGID FRAMES

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The present invention comprises a knee for joining an upright post to a beam disposed at an angle to the top of the post and having an end surface engaging an end surface of the post in miter-joint fashion, the knee being of such character that no supplementary fastening members are required to provide a rigid frame or bent. The present invention comprises a plurality of plate members joined together to provide a knee into which the ends of a beam and a post may be slipped, and which will maintain the beam and post in perfect alignment against all thrusts to which such frame members are subjected. The principal object of the present invention is to provide a prefabricated knee member which will eliminate a great deal of the time and labor involved in erecting frame structures and which will provide a sturdy, durable construction.

The foregoing and other objects and advantages of the present invention will be more readily ascertained from inspection of the following specification taken in connection with the accompanying drawing wherein like numerals refer to like parts throughout, while the features of novelty will be more distinctly pointed out in the appended claims.

In the drawing,

Fig. 1 is a view in side elevation of a knee formed in accordance with the present invention and illustrating the use thereof in connection with a beam and a post indicated in dash outline;

Fig. 2 is a view in elevation taken from the plane of line 2—2 of Fig. 1;

Fig. 3 is a section taken substantially from the plane of line 3—3 of Fig. 1; and

Fig. 4 is a section taken substantially along line 4—4 of Fig. 1.

The knee comprises an elongated underplate consisting of a vertical portion 10 adapted to lie flush against the inner surface of a post and an inclined portion 11 adapted to lie flush against the lower surface of an abutted beam, the two portions extending at the angle to provide the desired roof pitch. A short kneecap consisting of a vertical portion 12 adapted to lie flush against the outer surface of the post and an inclined portion 13 adapted to lie flush against the outer surface of the beam is maintained with the portion 12 parallel to the portion 10 and the portion 13 parallel to the portion 11 by a connecting rod 14. Preferably the underplate is of such width as to have its vertical edges flush with the side edges of the beam and post for which it is intended so as to provide the maxi-

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mum surfaces for taking the thrusts to which the underplate is subjected. The kneecap is welded to a pair of longitudinally extending gussets 15 which are welded to the side edges of the kneecap to engage the side surfaces of the adjacent portions of the post and beam. As illustrated in dash lines, the cap plate is preferably set into suitable rabbets in the outer surfaces of the post and beam so that wall and roof members may be applied flush with the post and beam, and the mitered ends of the post and beam are notched to receive the rod 14. The end of rod 14 is anchored within the internal dihedral angle of the kneecap as by welding it to crossbars 16 which are welded to the kneecap. The rod 14 is provided with a threaded end which projects through an opening 17 at the apex of the dihedral angle of the underplate and an aligned opening 18 in a plate 19 welded to the underplate within the internal dihedral angle of the underplate. A nut 20 is mounted on the free end of the rod and bears against the plate 19 to provide adjustable means for joining the kneecap to the underplate.

A brace extends diagonally across the space between the end areas of the underplate portions 10 and 11, the brace preferably comprising a section of tube 21 having its end edges welded throughout to the underplate, thereby providing a light, sturdy structure of extreme strength. The extreme end of the portion 11 is preferably provided with a small opening 22 and the extreme end of the portion 10 is preferably provided with a similar small opening 23 for reception of lagscrews 24 and 25 respectively. The lagscrews are provided merely for the purpose of preventing lateral slippage of the extreme ends of the underplate.

In utilizing the invention a mitered beam and post having suitably rabbeted ends may be laid on the ground with their ends somewhat separated and the end of one driven into the appropriate space in the knee, whereupon the end of the other may be inserted and the nut 20 tightened. When the lagscrews are inserted the structure may be raised as a unit. It is to be appreciated that an opposite beam and post may be raised and connected to the first when the two have been raised into position, or the two may be connected together to provide a complete bent which is then raised.

Having illustrated and described a preferred embodiment of the invention, it should be apparent to those skilled in the art that the invention permits of modification in arrangement and detail. I claim as my invention all such



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modifications as come within the true spirit and scope of the appended claims.

I claim:

1. A knee for joining an upright post to a beam disposed at an angle to the top of the post and having an end surface engaging an end surface of the post in miter-joint fashion, comprising an elongated underplate consisting of a vertical portion adapted to lie against the inner surface of the post and an inclined portion adapted to lie against the lower surface of the beam, said underplate having an opening therethrough at the apex of the dihedral angle formed by said portions, a kneecap comprising a vertical portion adapted to lie against the outer surface of the post, an inclined portion adapted to lie against the upper surface of the beam, a gusset extending across the internal dihedral angle formed by the vertical and inclined portions of the kneecap at each side of the kneecap in position to engage adjacent portions of the sides of the post and beam, a pair of crossbars extending laterally between said gussets and lying in planes parallel to a plane dividing said internal dihedral angle into two dihedral angles, a bolt welded to said crossbraces and extending through said opening in the underplate adjustably to join said kneecap to said underplate, and a brace extending across the internal dihedral angle of the underplate and fastened at its ends to end portions of said underplate.

2. A knee for joining an upright post to a beam disposed at an angle to the top of the post and having an end surface engaging an end surface of the post in miter joint fashion, comprising an elongated underplate consisting of a vertical portion adapted to lie against the inner surface of the post and an inclined portion adapted to lie against the lower surface of the beam, said underplate having a central opening therethrough at the apex of the dihedral angle formed by said portions, a kneecap comprising a vertical portion adapted to lie against the outer surface of the post, an inclined portion adapted to lie against the upper surface of the beam, a gusset extending across the internal dihedral angle formed by the vertical and inclined portions of the kneecap at each side of the kneecap in position to engage adjacent portions of the sides of the post and beam to prevent relative lateral movement thereof, bolt anchoring means secured to said kneecap comprising a plate extending laterally between said gussets and welded to said kneecap, said

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plate lying in a plane parallel to said end surfaces, and a bolt welded to said bolt anchoring means centrally thereof and extending from said kneecap in a plane dividing the internal dihedral angle formed by the vertical and inclined portions thereof and through said opening in the underplate adjustably to join said kneecap to said underplate.

3. A knee for joining an upright post to a beam disposed at an angle to the top of the post and having an end surface engaging an end surface of the post in miter joint fashion, comprising an elongated underplate consisting of a vertical portion adapted to lie against the inner surface of the post and an inclined portion adapted to lie against the lower surface of the beam, said underplate having a central opening therethrough at the apex of the dihedral angle formed by said portions, a kneecap comprising a vertical portion adapted to lie against the outer surface of the post, an inclined portion adapted to lie against the upper surface of the beam, a gusset extending across the internal dihedral angle formed by the vertical and inclined portions of the kneecap at each side of the kneecap in position to engage adjacent portions of the sides of the post and beam to prevent relative lateral movement thereof, bolt anchoring means secured to said kneecap comprising a plate extending laterally between said gussets and welded to said kneecap, said plate lying in a plane parallel to said end surfaces, a bolt welded to said bolt anchoring means centrally thereof and extending from said kneecap in a plane dividing the internal dihedral angle formed by the vertical and inclined portions thereof and through said opening in the underplate adjustably to join said kneecap to said underplate, and a tubular brace extending across the internal dihedral angle of the underplate and welded at its ends to end portions of said underplate.

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