

Sept. 29, 1964

J. A. NEARING ETAL
GREENHOUSE

3,150,463

Filed Dec. 19, 1960

2 Sheets-Sheet 1

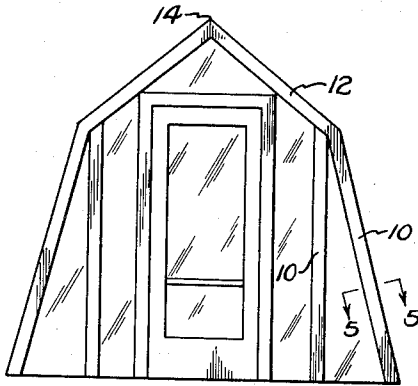


Fig. 1

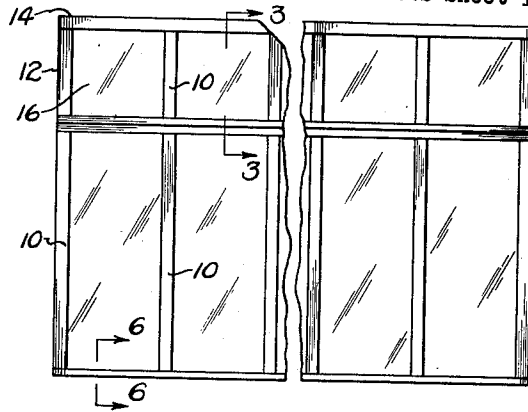


Fig. 2

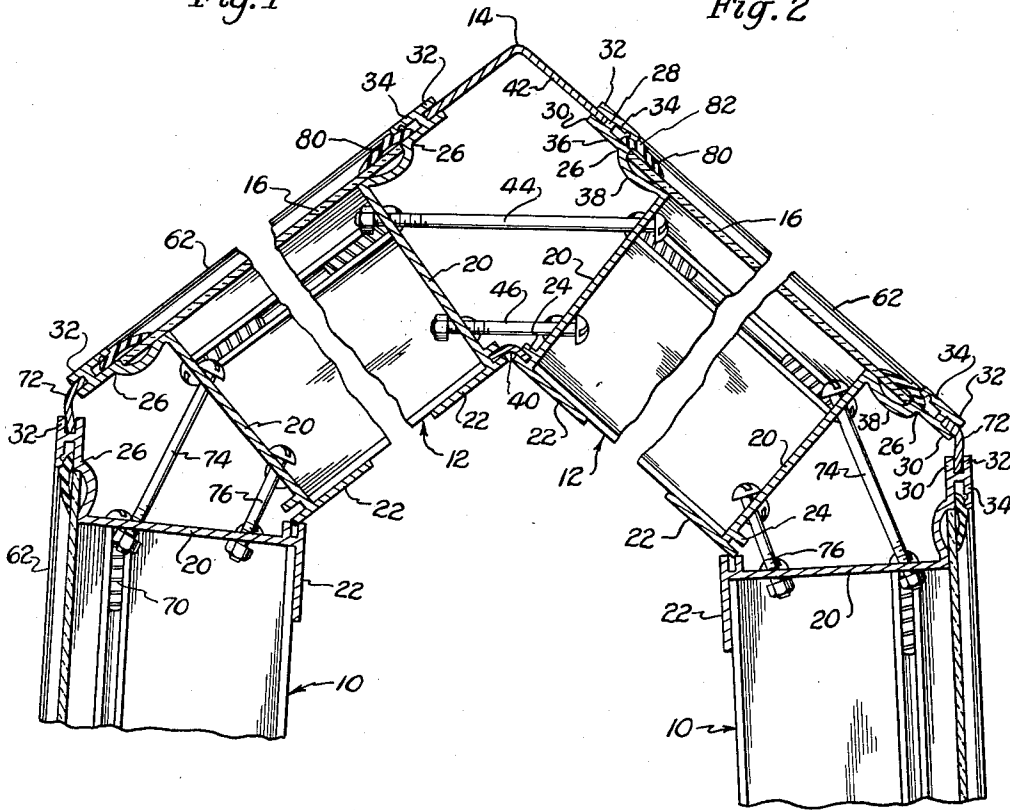


Fig. 3

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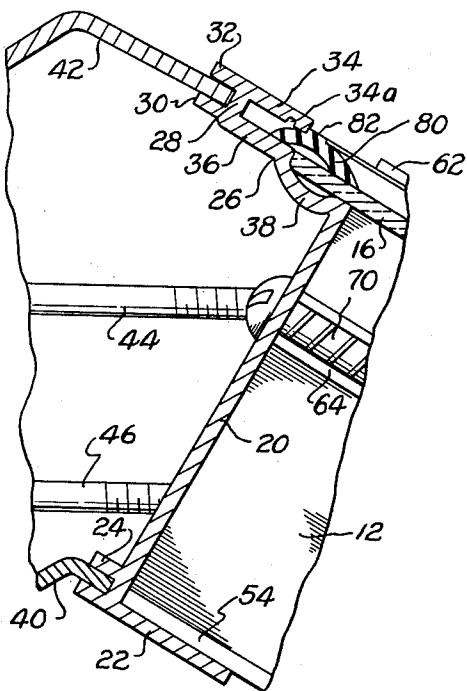


Fig. 4

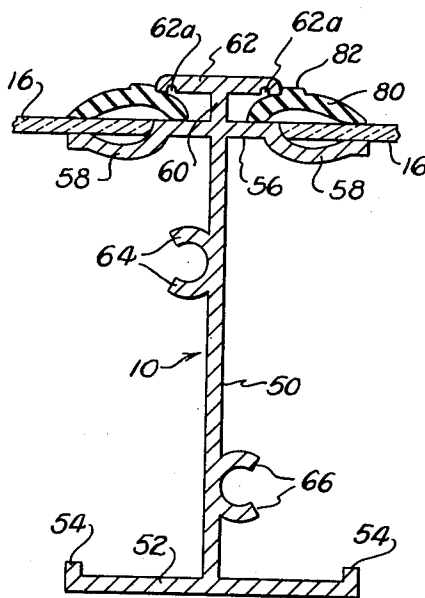


Fig. 5

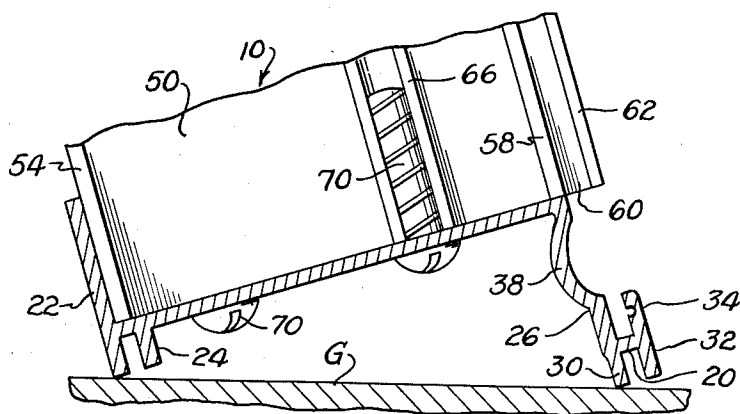


Fig. 6

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1

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Filed Dec. 19, 1960, Ser. No. 76,927

3 Claims. (Cl. 50-202)

This invention relates to a greenhouse and, in particular, is directed to the framework for a greenhouse.

The objects of this invention are to produce a greenhouse in which the framework is composed of beams and rafters having only two basic shapes, and to produce these beams and rafters as extruded metal sections composed of a lightweight metal, such as aluminum.

In general, these and other objects of the invention are obtained by having a first extruded section utilized as a ridge beam and a second extruded section utilized as a rafter and/or a side wall post. The ridge beam has flanges which serve as a support for the panes of glass, means for applying the glazing strips, a gutter, and a connecting means for the ridge plate. The rafters also have flanges which function as glazing supports and gutters, and in addition, have ribs extending along the web of the rafter forming sockets for receiving fastening screws by means of which the framework is put together. The construction is such that, with but a few standard parts, a greenhouse of any size and with any pitch angle can be quickly and easily assembled.

The means by which the objects of the invention are obtained are described more fully with reference to the accompanying drawings, in which:

FIGURE 1 is an end elevational view of a completed greenhouse;

FIGURE 2 is a side view of FIGURE 1;

FIGURE 3 is a cross-sectional view taken on the line 3-3 of FIGURE 2;

FIGURE 4 is an enlarged detail view of a portion of FIGURE 3 showing the ridge beam construction;

FIGURE 5 is a cross-sectional view on the line 5-5 of FIGURE 1; and

FIGURE 6 is a cross-sectional view on the line 6-6 of FIGURE 2.

As shown in FIGURES 1 and 2, the greenhouse is composed of either vertical or inclined posts 10 connected at the eaves to rafters 12, with the rafters being joined together at the ridge 14. The spaces between the rafters are filled in with panes of glass 16.

The ridge is composed of a pair of ridge beams, each of which has a web 20. As shown in FIGURES 3 and 4, the lower end of web 20 has a transversely extending flange 22 crossing the end of the web to form a long portion on one side and a short portion on the other side of the web. A second flange 24 extends from the web parallel to the short portion of the flange 22 in order to form a groove therebetween. The other end of web 20 has a flange 26 extending therefrom in a direction opposite to the larger portion of flange 22. The free end of flange 26 has an H-shaped cross-section so as to produce a small web 28, a first pair of spaced flanges 30 and 32 forming a groove therebetween, and a second pair of flanges 34 and 36 forming a second groove for the reception of a glazing strip. The outer end portions of flange 34 are provided with grooves 34a serving as drip grooves for condensate. The portion 38 of flange 26 adjacent web 20 is curved inwardly so as to form a gutter and is depressed with respect to flange 36 so as to form a seat for a glass pane 16.

The entire ridge beam is assembled by connecting the groove formed by the flanges 22 and 24 with the bottom ridge plate 40, and connecting the flanges 26 together by

2

an upper ridge plate 42 seated in the grooves provided between flanges 30 and 32. The two ridge beams are held together by means of bolts 44 and 46 fastened to the webs of the two respective ridge beams. Each rafter or post member 10, note FIGURE 5, is of I-beam cross-section with a web 50. The lower flange 52 has upwardly turned ends 54 so as to form a gutter. The upper flange 56 has a downwardly curved outer end portion 58 forming a seat and a gutter for the glass pane 16. The web 50 is extended upwardly in a T-shaped section composed of a web 60 and a flange 62 so that flange 62 is parallel to and spaced from flange 56 and forms a groove for receiving a glazing strip. The outer end portions of flange 62 are provided with grooves 62a serving as drip grooves for condensate. Web 50 has integral therewith a pair of curved ribs 64 mounted on one side of the web adjacent flange 56 and a second similar pair of ribs 66 on the opposite side of web 50 adjacent flange 52. These ribs serve both to stiffen the web and also to function as sockets for the reception of fastening screws.

The framework is assembled by first, as shown in FIGURE 6, using one of the ridge beams as a sill. The ridge beam is laid with its flanges 22 and 30 resting on the ground G. The post 10 is connected at right angles to the web 20 of the ridge beam and fastened in place by means of grooves 70 which are threaded into the sockets formed by the ribs 64 and 66, respectively. As shown in FIGURE 3, a similar ridge beam is fastened to the other end of the post 10 or rafter 12. A plurality of posts are thus assembled as shown in FIGURE 2 to form the side wall of the greenhouse of any length and of any height according to the length at which the posts 10 are cut. No matter what length is used, the ribs 64 and 66, respectively, always form sockets for the reception of the fastening screws.

The roof is assembled by similarly forming panels of the rafters 12 resting between the ridge beam sections. The roof panel has its lower edge formed by the flange 22 set in the groove formed by the corresponding flange extending along the upper edge of the side panel. This eaves portion is completed by means of an eaves plate 72 set in the grooves formed between the flanges 30 and 32 of the ridge beam, and the adjacent beams being fastened together by bolts 74 and 76 extending through the facing webs 20. The ridge is then completed by means of the ridge plates 40 and 42 as hereinbefore described. The width of the frame can be varied by changing the length or width of the roof panels and the pitch angle is fixed by the angle given the aluminum ridge plates 40 and 42 and of the eaves plates 72.

Finally the panes of glass 16 are laid on the flange portions 38 and resilient rubber sealing strips 80 pressed into the glazing grooves between flanges 34 and 36 and extending over a portion of the flange 62. These sealing strips 80 are arcuate in shape and have a rib 82 running centrally of the convex side of the arc, which rib abuts the outer edge of flange 34. The other sides of the glass panes 16 are seated on the grooved flange portion 58 of the rafters 12 or posts 10 and a similar sealing strip 80 pressed into the groove formed between the flange portion 56 and the flange 62.

The ridge beams have a cross-section such that various flanges serve to stiffen the beams and because of the angle at which the beams are placed, various drainage gutters are created for removing the condensate formed in a greenhouse. In particular, the curved portion 38 of the flanges 26 act as gutters beneath the edges of the glass panes to drain away rain water. The same advantage is achieved by the curved portions 58 of the flanges 56 on the rafters 12 and posts 10. These are also stiffened by the secondary flanges.

3

The posts 10, rafters 12 and the ridge beams are preferably composed of extruded aluminum shapes so dimensioned that the rafters or posts will fit snugly in and in alignment with the ridge beams. Thus the frame is constructed of two basic shapes. The other elements used are of conventional shape and all of the elements, such as the bolts, screws, ridge and eaves plates, are composed of aluminum. The materials therefore will not deteriorate under the humid greenhouse atmospheric conditions. The framework pieces can be quickly cut to any dimensions and then quickly and easily assembled to the desired greenhouse size by simply using screws, bolts, and nuts.

Having now described the means by which the objects of the invention are obtained, we claim:

1. A greenhouse frame comprising a pair of ridge beams, each beam having a web, a first flange on one end of said web having a long portion on opposite sides of said web, a second flange extending from said web spaced from and parallel to the short portion of said first flange and forming a groove between the first and second flanges, a glazing flange on the other end of said web and extending in a direction opposite to the long portion of said first flange, said glazing flange having an H-shaped cross-section at its free end portion for forming a pair of oppositely directed grooves, said ridge beams being coextensive with the glazing flanges extending toward each other, bolt means extending through the adjacent webs for holding said beams in position, a top ridge plate seated in the grooves in the free end portion of said glazing flange, and a bottom ridge plate seated in the grooves of said first and second flanges; a rafter of I-beam cross-section and having a web and an upper and a lower flange, said lower flange having ends turned toward said upper flange for forming a gutter, said upper flange having an inwardly curved outer end portion forming a glazing seat and a gutter, a T-shaped section extending said web beyond said upper flange and forming with said upper flange a sealing strip groove, and a pair of ribs on each side of said web, respectively; said rafters being mounted

4

perpendicular to the ridge beam webs, fastening screws extending through said ridge beam webs and seated in said pairs of ribs, respectively; and eave beams similar to said ridge beams and connected to said rafter beams, and side wall beams similar to said rafter beams and connected to said eave beams.

2. A beam for a greenhouse frame comprising a web, a first flange on one end of said web to form a long portion on one side and a short portion on the other side of the web, a second flange extending from the same side of said web as said short portion and spaced from and parallel to said first flange short portion and forming a groove between said first and second flanges, a glazing flange on the other end of said flange of greater length than said first flange short portion and extending in a direction opposite to the long portion of said first flange, and said glazing flange having an H-shaped cross-section at its free end portion with its sides perpendicular to said web for forming a pair of oppositely directed grooves.

3. A beam as in claim 2, said glazing flange further comprising a gutter forming a depressed curved portion between said H-shaped end portion and said web and providing a seat for a pane of glass.

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