

Nov. 15, 1938.

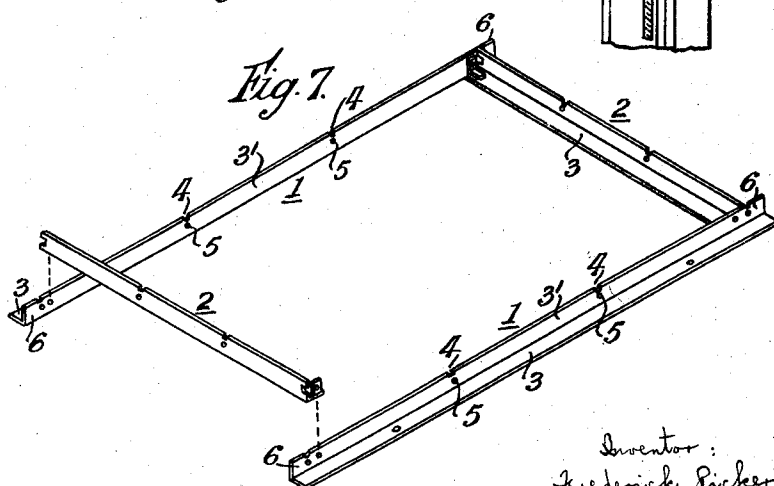
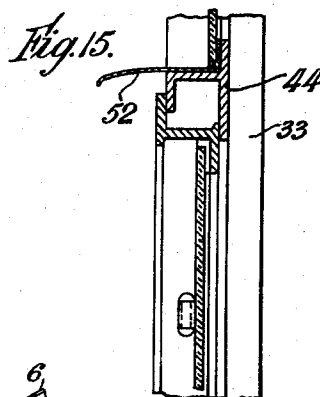
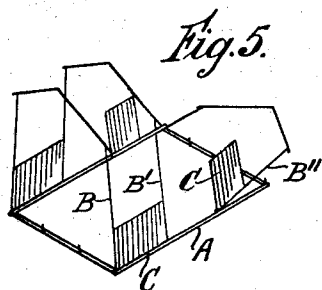
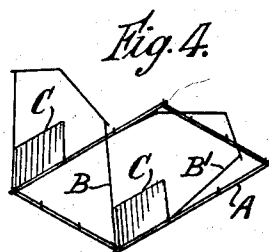
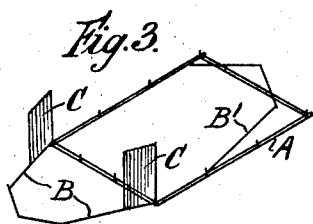
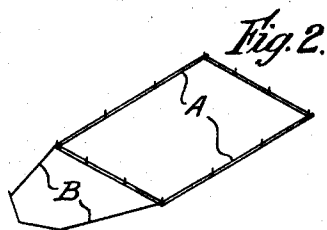
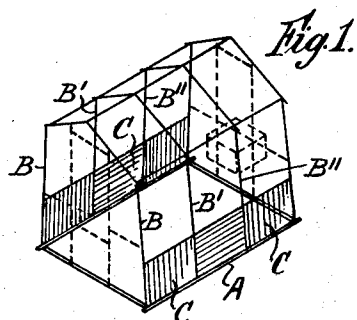
F. P. WALKER

2,136,987

GREENHOUSE AND OTHER PORTABLE BUILDINGS

Filed July 23, 1936

4 Sheets-Sheet 1



Inventor:
Frederick Pickering Walker,
By his attorneys,
Baldwin & Wright

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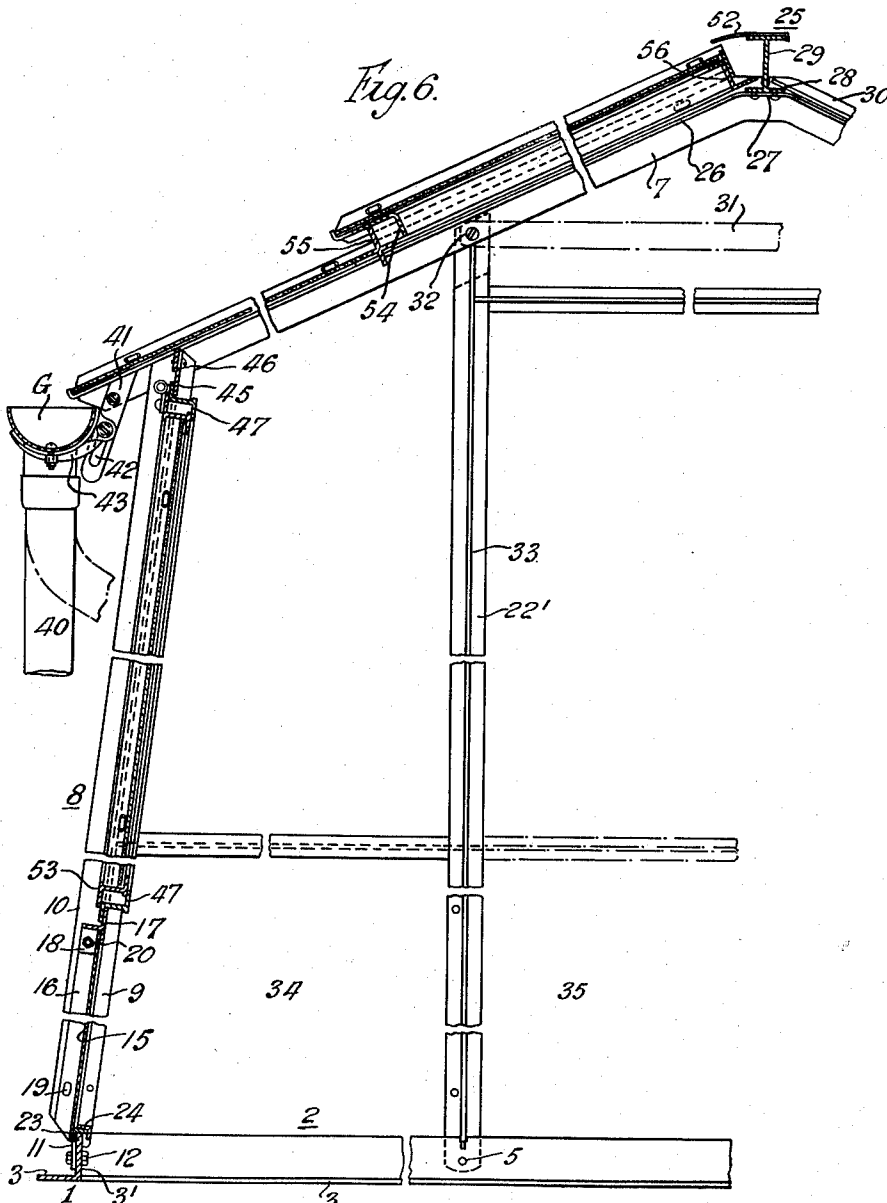
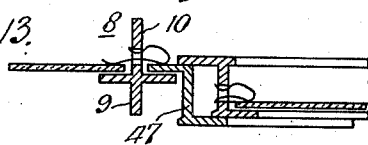


Fig. 13.



Inventor:
Frederick Pickering Walker
By his attorneys,
Baldwin & Wright

Nov. 15, 1938.

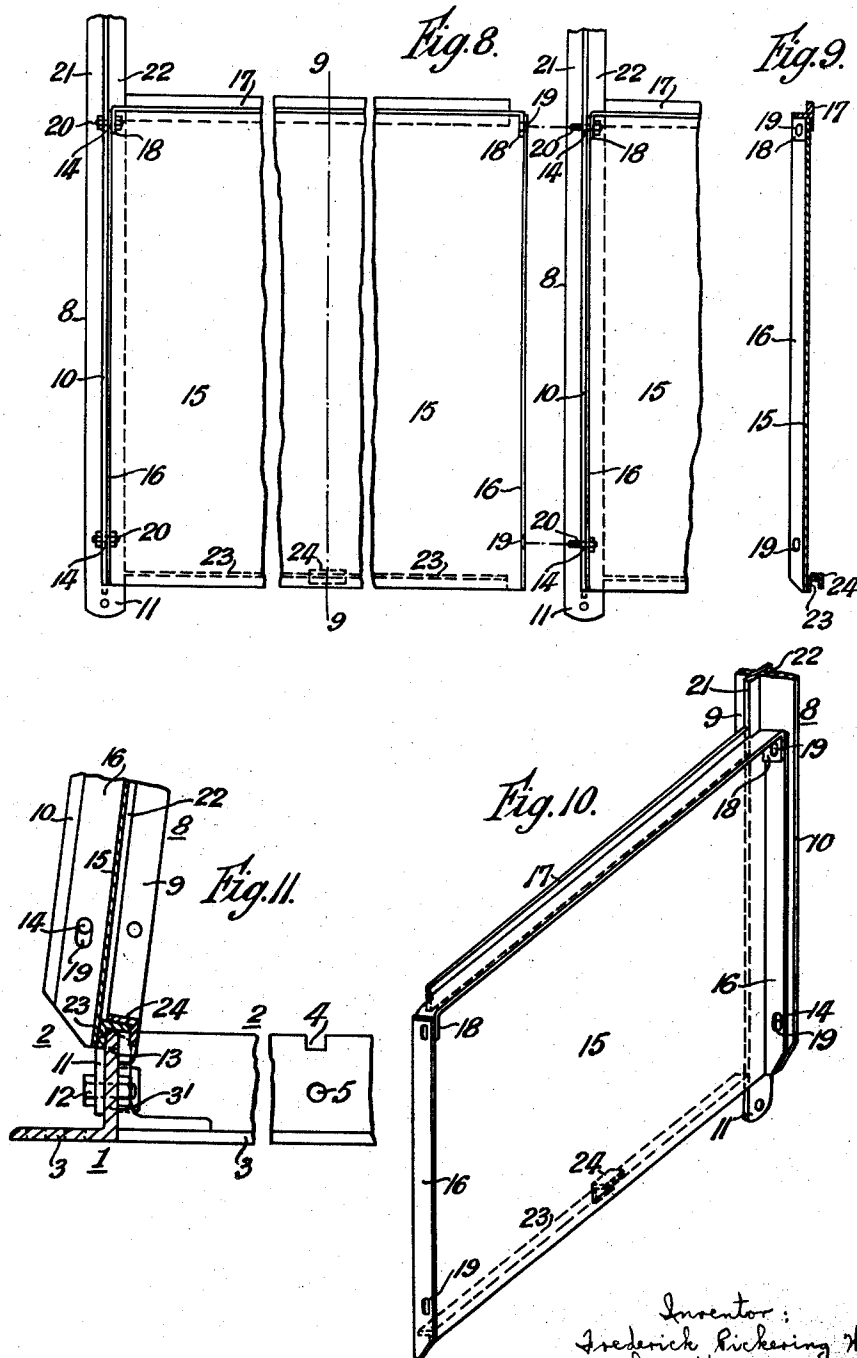
F. P. WALKER

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GREENHOUSE AND OTHER PORTABLE BUILDINGS

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4 Sheets-Sheet 3



Inventor:
 Frederick Pickering Walker
 By his attorneys,
 Baldwin & Wright

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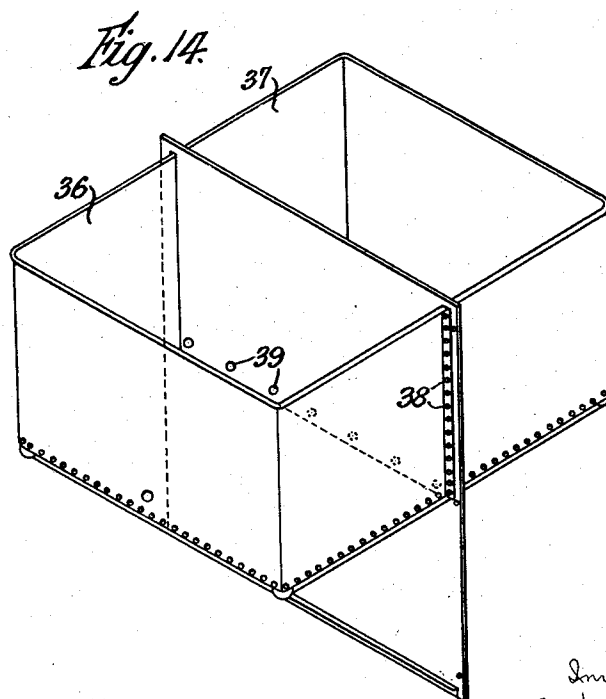
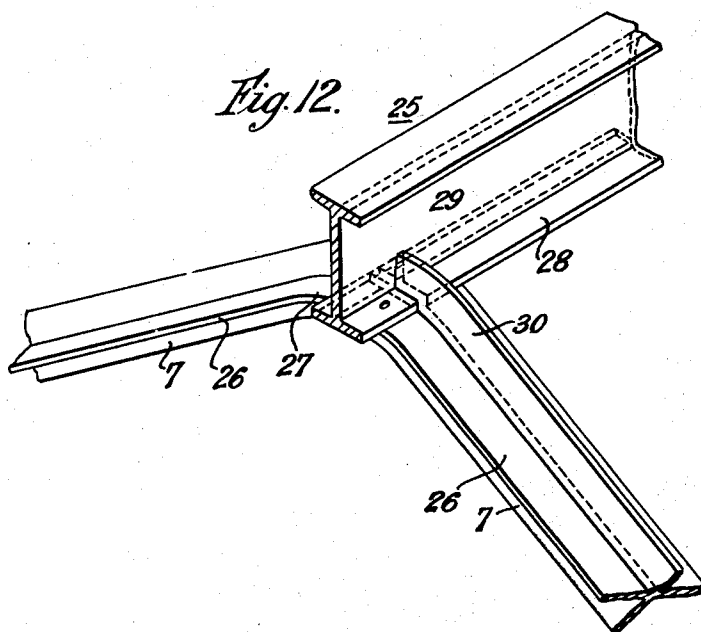
F. P. WALKER

2,136,987

GREENHOUSE AND OTHER PORTABLE BUILDINGS

Filed July 23, 1936

4 Sheets-Sheet 4



Inventor:
Frederick Pickering Walker,
By his attorneys,
Baldwin & Wright

UNITED STATES PATENT OFFICE

2,136,987

GREENHOUSE AND OTHER PORTABLE BUILDINGS

Frederick Pickering Walker, London, England, assignor to Crittall Greenhouses Limited, London, England

Application July 23, 1936, Serial No. 92,243
In Great Britain July 31, 1935

3 Claims. (Cl. 189—2)

This invention relates to improvements in metal building constructions particularly greenhouses and it has for its object to provide a design constructed from units which are handy and readily identifiable and which therefore will enable the greenhouse to be assembled by the purchaser under his own labour and without outside assistance.

Another object of the invention is to provide a design the units of which will lend themselves to an extension of the greenhouse in an endwise or sideways direction.

In accordance with the invention a metal building construction suitable for use as a greenhouse comprises base members and a series of arch units adapted to support the roof and walling and means on the base members for co-operation with means on the arch units for setting them up in spaced relationship.

Preferably the arch units are held in spaced relation by walling panels which extend between and are secured to the uprights of adjacent arches.

Each arch unit may be formed of an inverted V-shaped roof piece integral with which are downwardly extending and preferably spreading uprights constituting the sides of the arch. The two limbs of the V piece preferably project beyond so as to overhang the uprights.

According to a further feature of the invention, the metal bars or members used in the construction of the glazing units of a greenhouse are of cruciform section since this enables the end or corner members of the house to receive glass or other walling panels in more than one plane. Thus the arch units and certain of the posts at the ends may be of cruciform section.

The internally projecting flange of the cruciform section also provides a ready means for the attachment of brackets by screws, rivets, or studs engaging with holes or slots in the flange. Such brackets may be used for various purposes, including the support of staging or shelves, of wire straining eyes, of shafts or levers for the operation of ventilators, of heating pipes, or electric heating elements.

According to a further feature of the invention the arch units and their spacing panels are supported upon a base comprising longitudinal and end or transverse kerb members having a base or sole flange which is capable of supporting the entire weight of the house with its contents.

It will be appreciated that any numbers of arch units may be used in the construction of

the greenhouse according to the length of house required and in order to enable the house to be extended by an additional arch unit or units, the kerb members at the sides are provided with an oversail that is an extension at each end which is prepared for the reception and fixing of extensions.

Preferably the house is braced along the roof by a ridge member which may conveniently consist of an I-section strip, this strip interengaging with the apices of the roof members. For this purpose the apex of each roof piece is formed with a horizontal portion and the projecting glazing flange of the cruciform section is slotted vertically while one flange and a part of the vertical web of the I-section is cut away to form a vertical slot whereby the two members interengage and provide a lock, the depth of the respective slots being such that the base of the flange of the I strip will rest upon the horizontal flanges of the cruciform arch section.

The invention is illustrated in the accompanying drawings in which:

Figure 1 is a diagrammatic perspective view on a reduced scale of a greenhouse assembly constructed in accordance with the invention;

Figures 2, 3, 4 and 5 are further diagrammatic perspective views illustrating successive stages in the assembly of the greenhouse shown in Figure 1;

Figure 6 is a part transverse sectional view of a greenhouse and showing part of a door frame;

Figure 7 is a perspective view showing the base frame separately and to which the upright framing is secured;

Figure 8 is a side elevation as seen from the outside of the greenhouse when assembled of the lower part of an arch with a panel attached and part of an adjacent arch and associated panel just prior to assembly.

Figure 9 is a sectional view on the lines 9—9 of Figure 8.

Figure 10 is a perspective view of part of an arch and its associated panel as illustrated in Figures 8 and 9, but on a different scale as seen from the exterior of the greenhouse.

Figure 11 is a detail view to an enlarged scale showing the joint or attachment between the foot of the arch and the side curb of the base.

Figure 12 is a perspective view on an enlarged scale of the roof ridge and arch joint.

Figure 13 is an enlarged sectional view illustrating the construction of a ventilator fitting and showing also a glazing clip.

Figure 14 is an enlarged perspective view of a water tank.

Figure 15 is a sectional view of the door and door frame.

Referring now to Figures 1-5 of the drawings, the greenhouse is built up from a metal foundation indicated generally at A and which is shown separately in Figure 7. After assembly of the pieces forming the base, an end arch indicated generally B, and a detail view of which is shown in Figure 6, is laid flat on the ground, as shown in Figure 2 with its feet outside and opposite the ends of the kerb. Side panels indicated generally at C are then secured to the uprights of the arch (see Figure 3) when the whole is raised to a vertical position as shown in Figure 4.

The next stage in the method of assembly is to lay down a second arch, preferably on the slant, as shown in Figure 4 and then to raise it to the vertical (see Fig. 5) and so on until the complete assembly is obtained as illustrated by Figure 1.

It will be observed, therefore, that the greenhouse of this invention comprises a series of arch units B, B', B'' spaced apart from each other by panels C, these arch units being secured to a kerb or base member preferably a rectilinear foundation such as A.

The foundation may conveniently be built up of L-section girders as clearly shown in Figure 7, and which comprises side kerb members I united at their ends by end members 2.

A further feature of the invention consists in so dimensioning the base of the sole flanges of the kerb members I together with the end members 2 when provided, that they are capable of supporting the entire weight of the house with its contents. As shown in Figure 7 the sole flanges indicated at 3 are preferably provided with bolt holes for attaching the same to a concrete or other foundation (not shown). Each of the kerb members in its upstanding flange or leg 3' is formed with a series of spaced notches 4 and corresponding bolt holes 5 according to the size of the greenhouse, i. e. the number of arches used in its construction. It is further to be observed that the kerb members at the sides are provided with an oversail, that is an extension, as indicated at 6 for the purpose of fixing extensions should it subsequently be desired to enlarge the size of the greenhouse.

Each arch unit B comprises an inverted U-shaped roof piece 7 (see Figure 6) of cruciform section as can be seen in Figure 12. Attached to the roof piece 7 are uprights 8 also of cruciform section, the uprights being secured to the roof pieces by bolting or welding. The lower ends of the roof piece extend beyond the uprights and have attached to their outer ends a guttering indicated at G. The uprights it is to be noted are set at an angle to the vertical so that when several greenhouses are separately arranged alongside each other there is a space between each sufficient to accommodate the guttering. Provision has also been made to extend the greenhouse laterally as well as longitudinal.

To extend a greenhouse laterally a second house is erected alongside with the two kerb members running contiguously or a single channel section kerb member may be employed. In the space occupied by the guttering, a single guttering or closing piece is secured between the adjacent uprights. This guttering piece may conveniently take the form of a shallow tank and if used to store water is provided with an overflow pipe leading to waste or to the usual storage tank.

If desired junction pieces having turn cocks may be fitted to the bottom of the tank for the connection of hose pipes for use in the greenhouse. The side walls of the tank may conform to the angular set of the uprights, and when in position the tank is secured to the glazing flanges thereon so that the glazing will overlap externally with the end wall of the tank. The panel C will be modified in shape to fit the V at the base of the uprights.

The inwardly and outwardly projecting flanges of the uprights are indicated respectively at 9 and 10 and at their lower ends they are cut away to provide a downwardly projecting locating tongue 11 (see also Figure 11). In the tongue 11 is a bolt hole for securing bolt 12, the hole 11 being positioned to mate with the holes 5 in the kerbs. The inner flange 9 of the upright is also cut away as at 13 to provide a recess adapted to interengage with the notches 4 in the vertical flanges of the kerbs. Bolt holes 14 are formed in the outer flange 10 of the upright for securing in position the connecting panels C.

Each panel (see Figures 8 and 9) comprises a rectangular sheet 15, whose vertical edges are bent outwardly to form attaching flanges 16. Secured by welding to the upper edge of the plate 15 is a T-section strip 17 so arranged that the head of the T lies flush with the inner face of the plate, the head of the strip which functions as a glazing flange being cut back at its ends to accommodate the upright and so that the stem projects beyond the flanged edge 16 of the plate, this extended portion then being bent inwardly as at 18 where it is secured to the flange 16. Elongated bolt holes 19 are provided in the flange 16 in positions corresponding to the bolt holes 14 in the flanges 10 of the uprights for the passage of double ended securing bolts 20.

It is to be observed that the horizontal limb of the T-section strip 17 is cut away at its ends so that when the panel is in position between adjacent uprights the strip at its ends abuts against the other flanges, indicated respectively at 21, 22, of the upright, and which flanges constitute the glazing flanges. Secured along the lower edge of the panel 15 is an inverted L-section strip 23 which, when the panel is in position, has its horizontal edge resting in engagement with the vertical web of the kerb, this strip being provided with depending brackets 24 adapted to engage behind the said vertical web so as to hold the plate 15 firmly thereto.

Referring now to Figure 2 in order to assemble the house, assuming that the foundation has been built up of the kerb members as shown in Figure 7, an arch unit as just described in reference to Figure 6 is placed with the feet of the upright adjacent the locating holes 5 and associated notches 4 at one end of the kerb I and then raised vertically when the recesses 14 will enter the notches 4. Care should be taken at this time that the tongues 11 of the uprights lie outside the vertical legs or flanges 3'. Previous to this operation the panel 15 is bolted to the upright in the lie flat position by the bolts 20.

When the arch units have been assembled they are secured by means of a roof or ridge tie 25, see Figures 6 and 12, which is preferably of I-section. The ridge tie 25 extends the entire length of the roof and is directly supported by the horizontal flanges 26 of the roof piece of the arch, each of which is provided with a flat portion indicated at 27. In order positively to locate the arch tie the lower flange 28 of the latter, see

Fig. 12, together with a part of the web 29 thereof is cut away, while the upstanding flange 30 of the roof piece is slotted so that the various parts interengage. As shown in dotted lines in Figure 6, the roof pieces may be braced by cross ties indicated at 31, the latter being secured by bolts 32 to the inwardly projecting flanges of the roof pieces. The bolts 32 in the case of the outer or end arch also serve for fastening the door or end posts indicated at 33 which also are cruciform section. The end posts 33 are connected to the uprights 8 of the arch by panels as indicated generally at 34 and to each other by a central panel 35 except at that end where the door is fitted.

The guttering G, see Figure 6, is supported by means of arms 41 attached to the arch pieces, these arms having slots 42 to which are secured brackets 43 directly supporting the guttering.

Referring to Figures 6 and 13 it will be seen that the cruciform cross section of the uprights of the greenhouse besides lending itself to a simple method of glazing, enables ventilators and doors readily to be fitted. In the case of the door, a fixed frame is fitted within the glazing flanges of the end posts, one of which is indicated at 22. At the top of the fixed door frame a special crosspiece as shown at 44 in Figure 15 is preferably fitted, this bar being of rail section so as to provide two weathering flanges for contact with the flanges of the fixed door frame and a glazing flange. In the case of a side ventilator as shown in Figure 6 a horizontal supporting bar 45 is attached to the glazing flanges at the upper ends of the adjacent uprights by screws 46, and to this bar 45 is attached a fixed ventilator frame 47, the lower edge of this frame being seated on the T-piece 17 surrounding the upper edge of the adjacent panel 15. The moving frame is indicated at 53.

In the case of a roof ventilator it is not necessary to support it by means of a hinge, the moving frame, which is of T-section except along its lower edge 54 where it is of inverted L section, resting on a fixed frame supported between adjacent roof pieces. The fixed frame along its lower edge is of cruciform section as indicated at 55 so as to provide a glazing flange while the upper edge is of L-section as indicated at 56, the L-section piece functioning as the first.

Guard strips 52 may be attached to the ridge piece of the roof and also above the top of the door (see Figure 15).

Referring to Figure 14 the greenhouse in accordance with a further feature of the invention is fitted with a water tank which is formed in two portions 36, 37 united to each other and the panel rivets indicated at 38 the portions being located on opposite sides of a panel of the greenhouse so that part of the tank will project on the exterior, the remaining lying within the interior. Holes 39 are cut in the panel so as to permit the flow of water between the two portions. The tank may be supplied with water from the guttering by means of a pipe 40 which passes to the exterior portion 37 of the tank. The advantage of this arrangement is that it enables the tank to be supplied with water without the necessity of cutting a hole in the walling for the passage of the feed pipe. An overflow pipe not shown may be fitted.

What I claim is:—

1. A building construction having a base comprising upstanding legs, said upstanding legs having notches, arch units comprising members of cruciform cross-section having inner flanges received in said notches, and panels spacing said members apart, said panels being secured to said members and disposed between the outer flanges thereof.

2. A building construction having a base comprising upstanding leg members, arch units having members of cruciform cross-section, certain of the members being cut away so that flanges of the cruciform members flatwise engage said leg members, fastening means securing the leg members and cruciform members together, and panels spacing said cruciform members apart, said panels being secured to the cruciform members and disposed between the outer flanges thereof.

3. A building construction having a base comprising upstanding leg members, arch units having members of cruciform cross-section, certain of the members being cut away so that flanges of the cruciform members flatwise engage said leg members, fastening means securing the leg members and cruciform members together, panels spacing said cruciform members apart, said panels being secured to the cruciform members and disposed between the outer flanges thereof, and means carried by the panels adjacent their lower edges in overlapping engagement with the leg members.

FREDERICK PICKERING WALKER.