

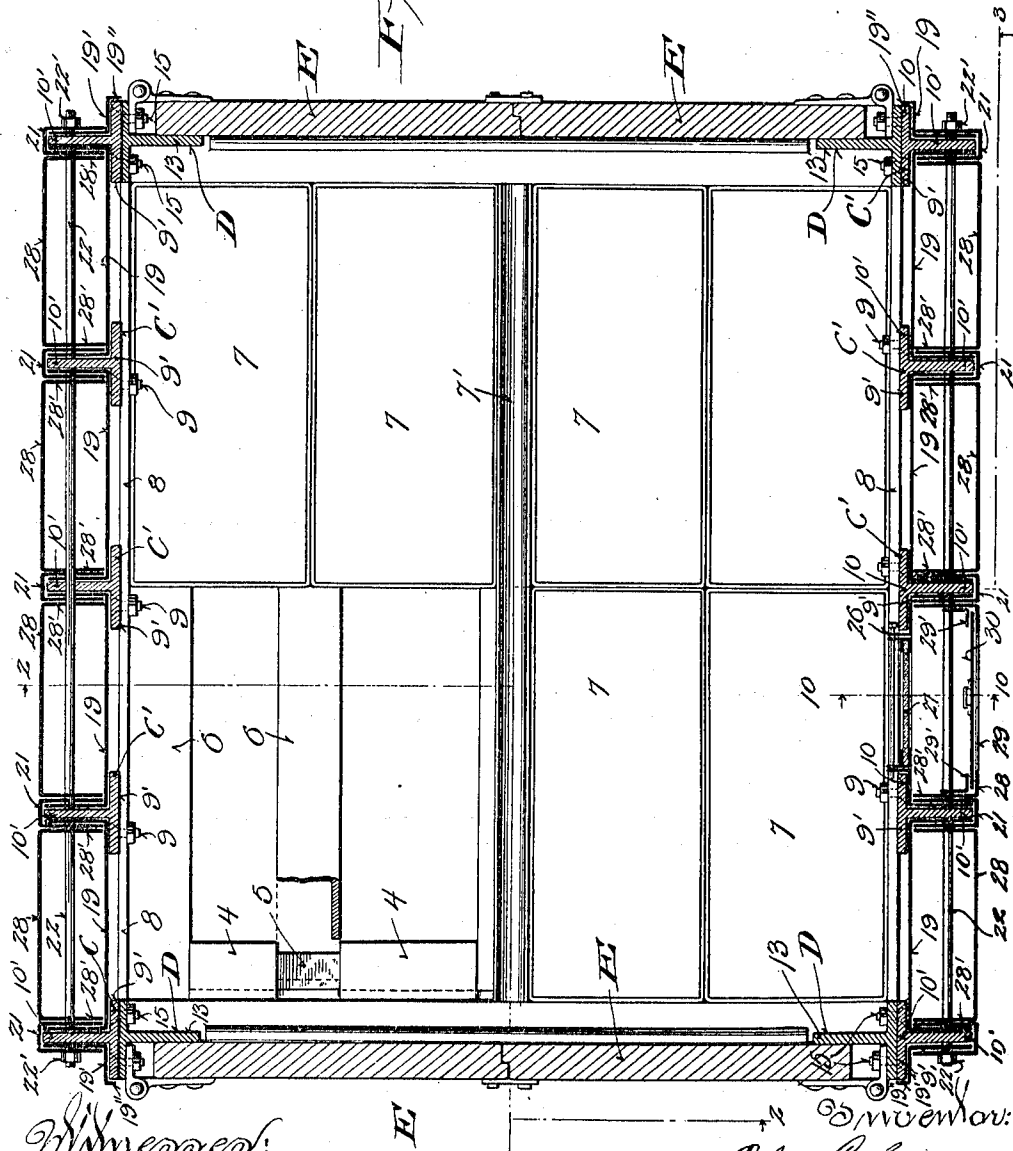
J. LOEHNER.
FIREPROOF KNOCKDOWN HOUSE.
APPLICATION FILED APR. 11, 1912.

1,051,842.

Patented Jan. 28, 1913.

5 SHEETS—SHEET 1.

Fig. 1.



*Witnessed:
Cassius J. Young,
May Downey*

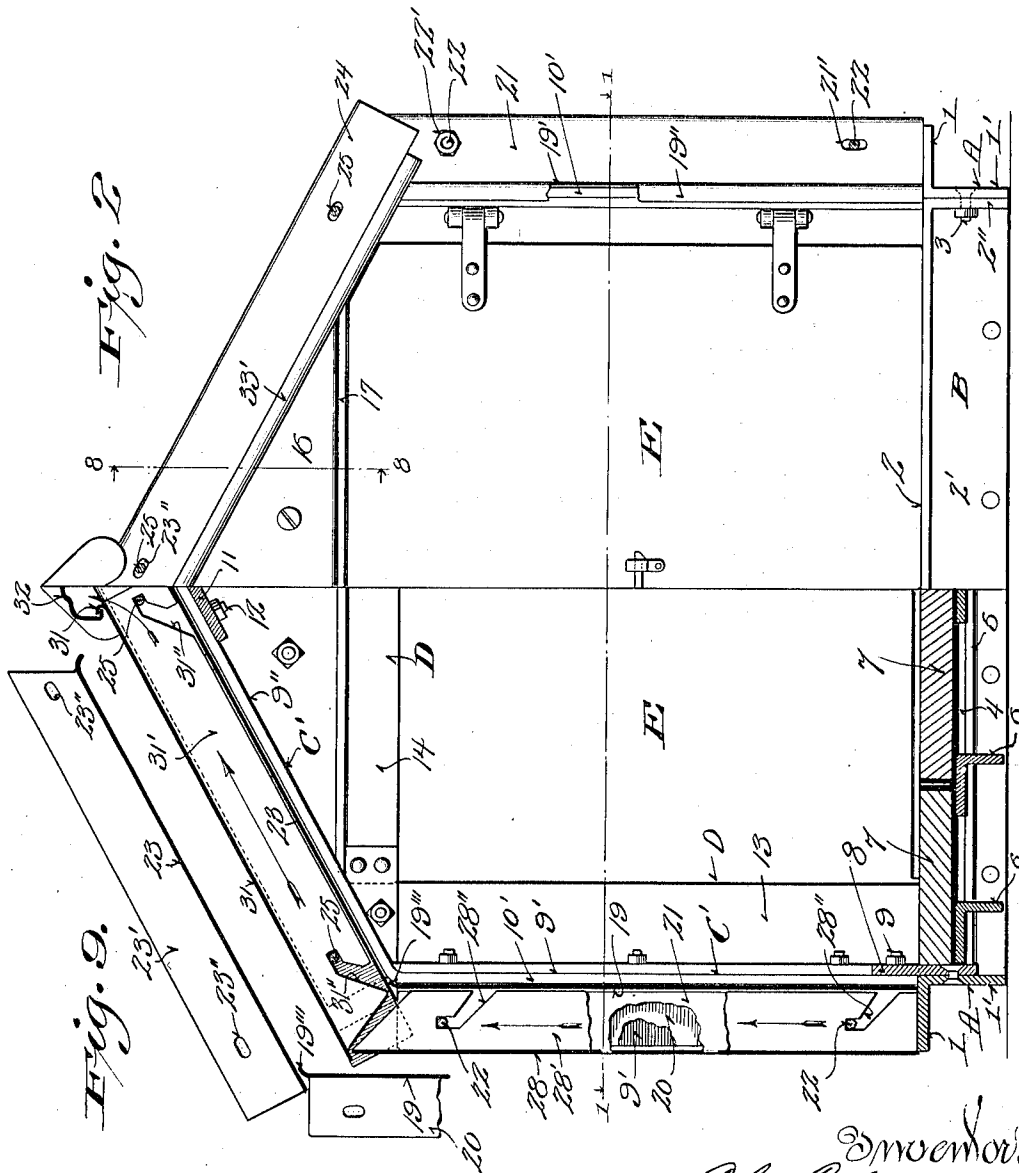
*John Loehner
By Chapman & Young
Attorneys.*

J. LOEHNER.
FIREPROOF KNOCKDOWN HOUSE.
APPLICATION FILED APR. 11, 1912.

1,051,842.

Patented Jan. 28, 1913.

5 SHEETS—SHEET 2.



Witnessed
Curran & Spring
May Downey

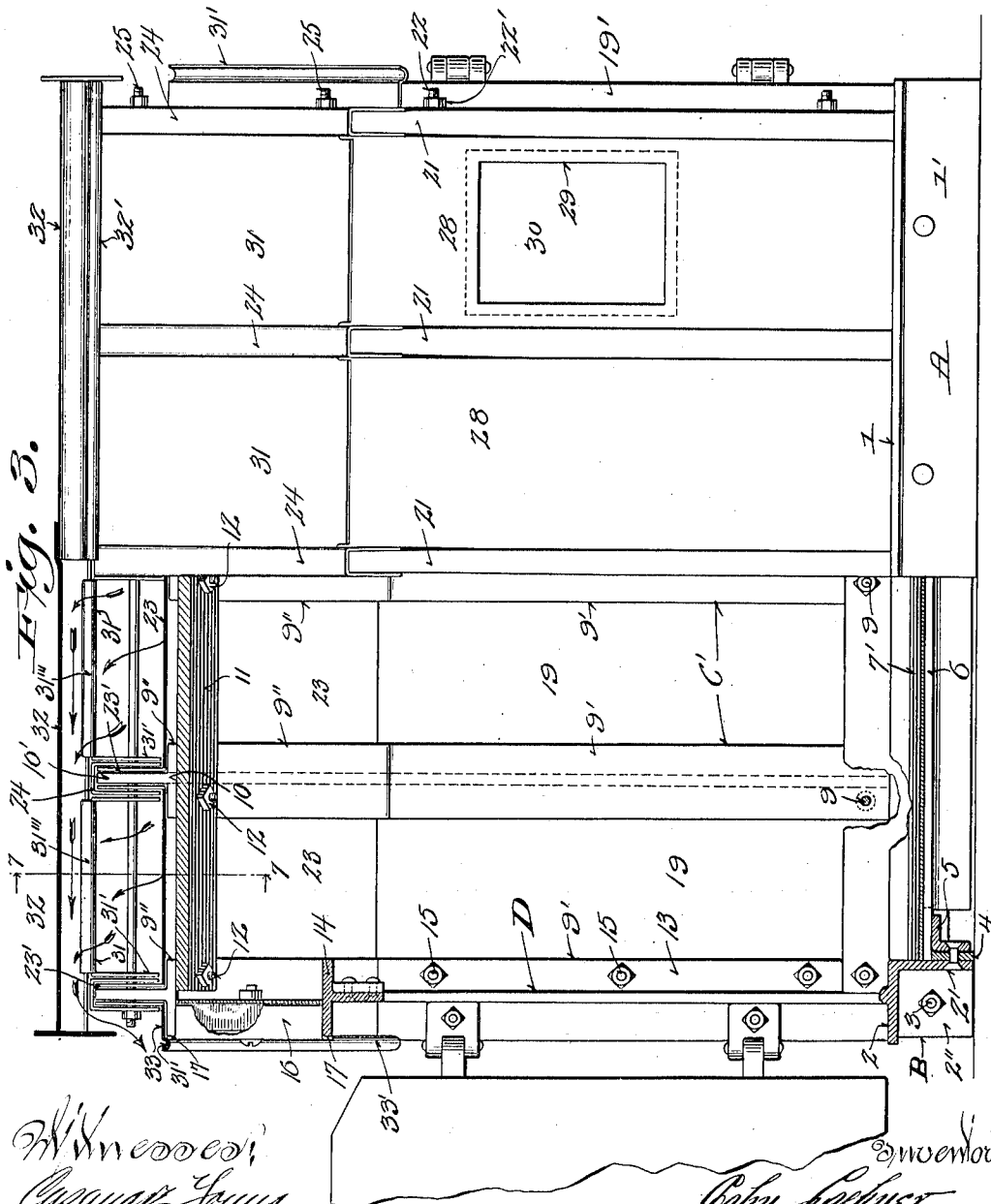
Inventor:
John Loehner
By *Clifford Young*
Attorney.

J. LOEHNER.
FIREPROOF KNOCKDOWN HOUSE.
APPLICATION FILED APR. 11, 1912.

1,051,842.

Patented Jan. 28, 1913.

5 SHEETS—SHEET 3.

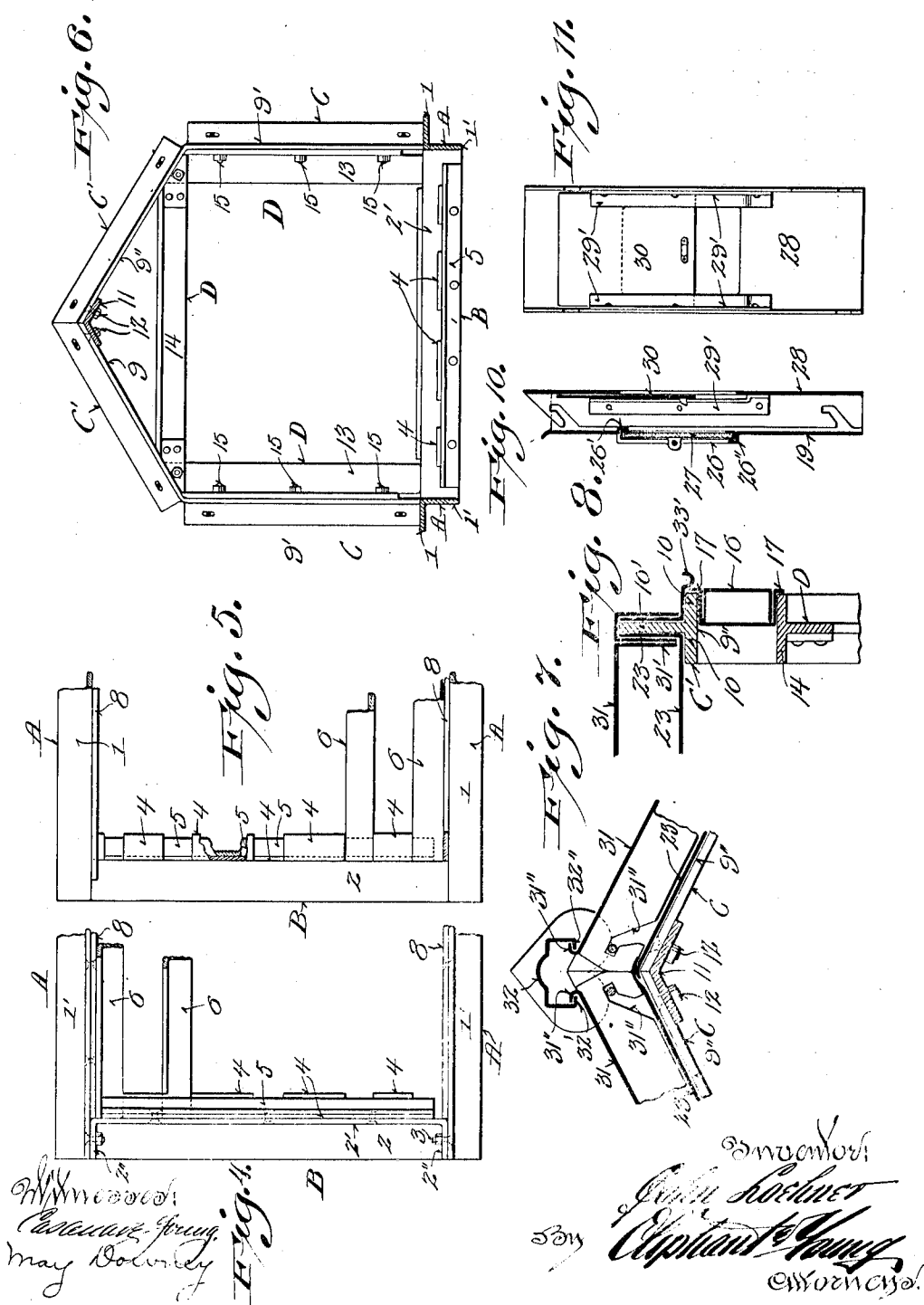


Witness:
C. W. Young,
may Downey.

Inventor:
John Loehner
C. W. Young
Attorneys.

1,051,842.

5 SHEETS—SHEET 4.



J. LOEHNER.
FIREPROOF KNOCKDOWN HOUSE.
APPLICATION FILED APR. 11, 1912.

1,051,842.

Patented Jan. 28, 1913.

5 SHEETS—SHEET 5.

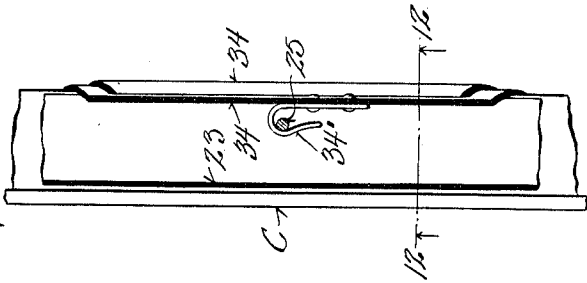


Fig. 13.

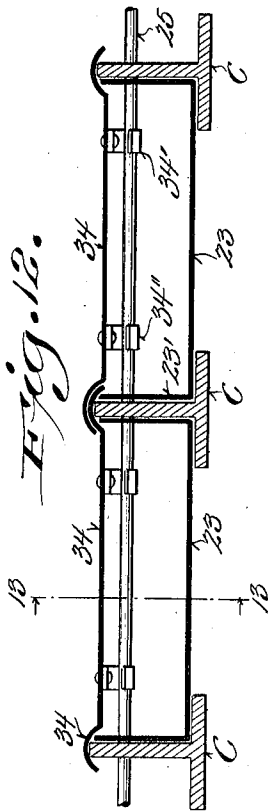


Fig. 12.

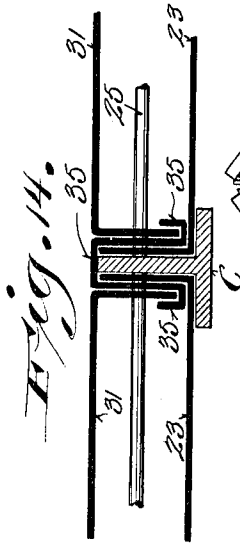


Fig. 14.

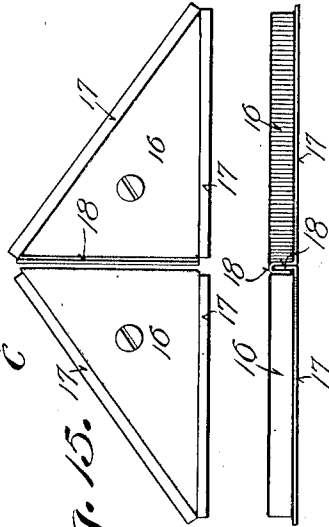


Fig. 15.

Fig. 16.

*Witnessed:
Casimir Young
May Downey.*

*Inventor:
John Loehner
By Captain Young
Attorney.*

UNITED STATES PATENT OFFICE.

JOHN LOEHNER, OF MILWAUKEE, WISCONSIN, ASSIGNOR TO NATIONAL STEEL HOUSING COMPANY, OF MILWAUKEE, WISCONSIN.

FIREPROOF KNOCKDOWN HOUSE.

1,051,842.

Specification of Letters Patent.

Patented Jan. 28, 1913.

Application filed April 11, 1912. Serial No. 690,142.

To all whom it may concern:

Be it known that I, JOHN LOEHNER, a citizen of the United States, and resident of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Fireproof Knockdown Houses; and I do hereby declare that the following is a full, clear, and exact description thereof.

The primary object of my invention is to provide a simple, economical double walled sanitary knockdown metallic house, the construction and arrangement being such that the frame and the several groups of units comprising wall-plates, roofing plates, wall panels and roofing panels being readily assembled into a complete rigid structure without the aid of skilled labor or special tools, the same being also capable of being quickly dismembered and packed in a compact mass for shipment.

Another object of the invention is to provide the structure with double walls throughout whereby air spaces are formed to more effectually resist variations in temperature, it being understood that certain of the plates and panels are provided with window openings and that the proportions of the house can be readily varied as to length by the simple addition of the wall and roof units to the skeleton frame which can be added to or shortened as the case may require.

With the above and other minor objects in view the invention consists in certain peculiarities of construction and combination of mechanical elements as fully set forth hereinafter with reference to the accompanying drawings and subsequently claimed.

In the drawings Figure 1 represents an assembled plan sectional view of a house embodying the features of my invention, with parts broken away and removed to more clearly show structural features, the section being indicated by line 1—1 of Fig. 2; Fig. 2, an end view of the same partly in section as indicated by line 2—2 of Fig. 1; Fig. 3, a side elevation of the house with a portion in section, the section being indicated by line 3—3 of Fig. 1; Fig. 4, a bottom plan view of a portion of the sill frame; Fig. 5, a top plan view of a portion of the same; Fig. 6, a face view of one of the end casings; Fig. 7, a detailed cross-section of the ridge or cone miter-joint between the

ceiling plates and roof panels, as indicated by line 7—7 of Fig. 3; Fig. 8, a detailed cross-section showing the frame connections and gable filler blocks formed at the ends of the house, the section being indicated by line 8—8 of Fig. 2; Fig. 9, a detailed longitudinal section of the side wall and ceiling plates illustrating their lapped joint connection at the eaves point and arrangement of tie-rods; Fig. 10, a longitudinal sectional view through one of the side sheathing and ceiling plates, illustrating the provision for window and shutter mechanism in connection therewith, the section being indicated by line 10—10 of Fig. 1; Fig. 11, a detailed inner face view of one of the side sheathings having provision for the shutter; Fig. 12, a modified form of roofing panel illustrating a lap joint connection therebetween at the intersection points of the frame ribs, the roofing panels in this instance being shown provided with hooks for engagement with the tie-rods to be used in some instances as a substitute for the bayonet slot lock, it being understood that this modified form may be also utilized for side sheathings; Fig. 13, a longitudinal sectional view of the same, the section being indicated by line 13—13 of Fig. 12; Fig. 14, a sectional view of a modified form of U-shaped channel strips utilized in connection with effecting a joint between the frame rib-members for the roofing or side members, the channel strip being provided with upturned troughed ends to serve as drain channels at this point, the flanges of the outer side sheathings or ceiling members being fitted into said troughed ends; Fig. 15, a face view of one pair of the gable filler blocks detached, and Fig. 16, a plan view of the same showing their central interlocked joint.

Referring by characters to the drawings with especial reference to Figs. 1 to 5 inclusive, the house is supported upon the skeleton rectangular base which is primarily composed of longitudinal angle-iron side-sills A, A, having outwardly projecting horizontal webs 1 and vertical webs 1'. The ends of the vertical side-sill webs are secured to similarly arranged angle-iron end sills B, the latter being provided with horizontal webs 2 and vertical webs 2' which terminate with outwardly extending feet 2'' that are secured to the side-sill vertical webs by bolts 3. Thus the angle-iron members

form a rectangular skeleton base that can be readily disconnected for flat shipment.

As best shown in Figs. 1, 3, 4 and 5, the inner faces of the end sill vertical webs 2' have fitted thereto spaced angle-iron filler plates 4, which plates are permanently secured to the end sills by angle-iron strips 5 that are nested thereto and riveted to the vertical webs of the end sills together with the filler plates. The angle-iron strips 5 and filler plates 4 together form a series of sockets into which the ends of longitudinally disposed angle-iron floor beams 6 are loosely seated, the outer pair of which floor beams are nested adjacent to the inner face of the vertical side-sill webs. The elements comprising the base are completed by a plurality of floor blocks 7, which floor blocks are loosely seated upon the floor beams 6, the blocks being preferably composed of metallic shells having cement or other suitable non-combustible filler material.

As best shown in Figs. 1, 2, 3 and 5, the inner faces of the vertical side sill webs have permanently secured thereto upwardly extending web strips 8, it being understood that these web strips may, in some instances, be formed in one piece with the side sills.

The web-strips form anchor pieces to which the ends of transversely disposed end and intermediate ribs C, C', respectively are secured by bolts 9. These transversely disposed ribs are each formed from T-iron, in detachable half sections, the vertical or upright section of each rib constituting side joist sections 9', which are merged into roofing joist sections 9'' having their ends mitered, the same being arranged to receive side sheathing and roofing members to be hereinafter described.

The horizontal webs 10 of the ribs C, C', constituting the roofing and side joists are arranged to serve as seats for certain sheathing members, while the vertical webs 10' project therebetween, said vertical webs being mitered at the halving joint between the ribs that intersect the ridge joint of the building, while the lower ends of the webs abut and rest upon the horizontal webs of the side sills. The ridge joint of all of the roof joist sections are tied together by an angle-iron ridge beam 11, which beam is secured to the horizontal webs 10 by bolts 12. Hence it will be seen from the foregoing description that a complete skeleton frame is formed ready for the reception of the roofing and side sheathing members, the end ribs C, constituting the combined roof and side joists are further strengthened by separable metallic end casings D. These end casings are composed of upright T-iron sections 13 and a T-iron tie-beam 14, the horizontal webs of the upright section 13 being fitted and secured to the inner faces of the end side joist section by bolts 15, said

upright sections 13 of the end casings being provided with hinge doors E whereby the ends of the building are closed. It should be understood however that, in some instances, I may utilize metallic sheathing at one end of the building as a substitute for the doors without departing from the spirit of my invention.

The triangular gable openings between the end casing tie-beams and roof joist sections of the ribs are closed by metallic right-angle triangle filled gable blocks 16 having flanged edges 17 upon two sides that are adapted to abut the outer edges of the tie-beams and adjacent web 10 of the rafter joist section whereby a tight joint is formed. The vertical abutting edges of the gable blocks are formed with lips 18 that are in slip joint fit with each other as best shown in Fig. 16, the flanged edges 17 being clearly shown in Fig. 8.

The next step in the assemblage of the structure is to place the sheathing members in position. For this purpose a plurality of sheet-metal wall-plates 19 are provided having upturned outwardly extending flanges 20 that are apertured adjacent to their upper and lower ends, the wall-plates being seated upon the horizontal webs 10 of the side joists constituting part of the ribs C, C'. The upturned flanges 20 of the wall-plates are fitted snugly against the vertical webs 10' of said side joist sections. The lower end of each wall-plate rests upon the horizontal web 1 of the frame side-sills and the apertures in said flanges are arranged to register with corresponding apertures in the webs 10'. Thereafter U-shaped channel iron strips 21 are fitted over the vertical webs 10' of the rib-member webs 10', together with the adjacent flanges 20 of the wall-plates 19, whereby the longitudinal joints formed by these members are tightly sealed. Prior to inserting the channel strips 21 about the webs 10' of the end ribs C, there is inserted a sheet-metal apertured angle strip 19' which serves as a finishing plate in conjunction with the wall-plates 19. This angle strip 19' is also provided with a downturned outer lip 19'' which engages the adjacent edge of the rib web 10. The side walls of the inverted U-shaped channel-strips 21 are also provided with apertures 21' (see Fig. 2) that register with the wall-plate and web apertures of the ribs, previously mentioned. Thereafter the entire series of wall-plates 19 and channel strips 21 are secured to the webs 10' of the rib members C, C', by longitudinally disposed tie-rods 22, which tie-rods pass through the entire series of side joist sections and are drawn together at their ends by suitable nuts 22' that are in threaded engagement with the rod ends, the nuts being faced against the outer walls of the end channel

strips. Thus the structure in its entirety is effectually stiffened from end to end.

In order to provide an effective shedding joint in connection with the roof members (to be hereinafter described) and side-wall plates 19, the upper ends of said side-wall plates are provided with angularly disposed lips 19''' at the eaves end of said plates as best shown in Fig. 9.

10 The next step in the assemblage is to adjust a series of ceiling plates 23 to the horizontal webs 10 of the roof joist sections of the ribs, the same being similar in construction to the side wall-plates 19 having apertured side flanges 23' that about the vertical webs 10' of the ribs, which webs at this point are also apertured to register with the flange apertures of the ceiling plates 23''. The lower ends of the ceiling plates 23 overlap the lipped extensions 19''' to form an eaves joint, the flanges at the ridge end being mitered for matched union. The ceiling plates are also connected by apertured U-shaped channel strips 24, which channel strips overlap each other at the ridge and also overlap the side channel strips 19 at the eaves. These assembled ceiling plates and channel strips are then locked by pairs of tie-bolts 25 that are similar to the side-wall tie-bolts.

As shown in Figs. 1, 3, 10 and 11, one or more of the wall plates 19 may be provided with flanged openings 26 constituting window casings into each of which is fitted a window 27, the same being shown as of the butterfly type and is centrally suspended between the apertured flanges within the opening by a pivot bolt, the window aperture being provided with upper and lower jamb flanges 26', 26'', against which the sash rails impinge to form a tight joint when the window is closed. If desired it should be understood that windows or sky-lights of this general character may be provided in connection with the ceiling plates.

The next step in the construction is to assemble the side sheathing elements, which comprise a series of sheathing panels 28, each being provided with inturned flanges 28' having upper and lower bayonet joint slots 28'', the upper or eaves ends of the flanges being mitered as best shown in Fig. 2. The sheathing panels 28 are each inserted between the opposite walls of the pairs of side channel strips 21 as best shown in Fig. 1 with their flanges projecting inwardly and so positioned that the mouths of the slots 28'' will engage the tie-rods 22. The side panels are thereafter drawn downwardly whereby the cam-shaped edges of said slots in their engagement with the rods will cause the panels to be firmly seated and locked with their lower edges in snug abutting engagement with the side sill webs 1. As best shown in Figs. 1, 10 and 11 each of the

sheathing panels 28 opposite the windows are provided with openings 29 in register with said windows and the side flanges 28 of these sheathing panels carry angle strips 29', which, in conjunction with the body of the panel form ways for a slidable shutter 30 whereby the vent or light opening therein can be closed and opened when it is desired to swing the window fully open for ventilation purposes.

As best shown in Figs. 1, 2 and 3 roofing panels 31 similar to the sheathing panels are next inserted in position with relation to the ceiling plates 23 and roofing channel strips 24, the flanges 31' of said roofing panels being provided with bayonet-joint slots 31'' for locking engagement with the tie-rods 25 as shown. The ridge ends of the roofing panels are provided with upturned ridge beads 31''' (as best shown in Fig. 7) that are spaced apart to form a longitudinal vent-slot at the ridge of the roof and the lower or eaves end of said ceiling panels project so as to form overhangs in conjunction with the sheathing panels 28. The structure is then completed by the insertion from either end of the ridge section of a hollow combing 32 having lower beaded edges 32' that engage the ridge beads 31''' of the roof panels and thus constitute a water-tight shed which at the same time forms a continuous vent-channel for the air space between the several series of wall-plates and sheathing panels and also the ceiling plates and roofing panels. As best shown in Fig. 3, the inner ends of the hollow combings 32 are telescoped within each other to form a tight joint at this point and the outer ends are extended slightly beyond the roofing members and end ribs to form bent discharge openings, the combing ends being suitably capped to protect the vent openings from weather conditions and also serve to deflect the air discharged.

The roof joist sections of the end ribs C are also provided with sheet iron angle strips 33 which are fitted to the webs 10, and 10', said angle strips being apertured for the reception of the tie-rods in a similar manner to that described in connection with the ceiling plates 23. As shown in the detailed sectional view Fig. 8, the horizontal flanges of the strips 33 are formed with gutters 33' which serve as water-sheds at the ends of the building.

Referring to Figs. 12 and 13 of the drawings, I have illustrated a modified form of panel sections 34 which may be utilized in connection with the roof of sides of the building. These panel sections are provided with curved end beads 34' that are adapted to rest upon the vertical webs 10' of the rib members and lap each other whereby tight joints may be effected, in this instance the U-shaped channel strips being dispensed

with. These panels are provided with hook members 34'' which are arranged to engage the tie-rods whereby the panels are locked, the hook members serving as substitutes for the bayonet-slots in the flanges of the panel previously described.

Fig. 14 illustrates a modified form of U-shaped channel strip 35, in which instance the vertical walls of the channel strips are upturned to form troughs 35' into which the ends of the panel flanges extend. By utilizing this type of channel strip any moisture passing between the slip-joints of the members will be trapped in the trough and discharged from the roof down and out through the ends of the channel strips that are in connection with the wall-plates.

From the foregoing description it is apparent that the complete knockdown metallic house is formed from a series of sets of units which can be readily dismembered and assembled for shipment and that when the house is set up the same, owing to the dead air space between the wall-plates, ceiling plates and sheathings, will render the structure to a great extent impervious to exterior climatic conditions whereby an even temperature can be maintained within the structure, it being understood that the uses to which a structure of this character can be applied is indefinite. However it is particularly applicable to garages where fire-proof construction is essential and it is also particularly adapted to use in connection with housing gangs of laborers where portability is desirable and for all similar purposes.

As best shown in Figs. 1, and 3, I may, in some instances, utilize in connection with the flooring a drain trough 7', which drain trough is supported upon the central floor-beam 6, the floor blocks being fitted to either side thereof.

I claim:

1. A fire-proof knockdown house comprising a separable skeleton frame having webbed side and end sills, end and intermediate ribs having vertically disposed side and angularly disposed roof joist sections, means for securing the lower ends of the side joist rib section to the webs of the sills, a ridge-beam detachably secured to the abutting ridge ends of the roof joist sections, inner metallic wall and ceiling plates detachably fitted between the frame ribs, outer metallic sheathing and roofing panels detachably fitted between said frame ribs and spaced from the wall and ceiling plates whereby air spaces are formed, tie-rods in connection with the series of frame-ribs, wall and ceiling plates and sheathing and ceiling panels, a floor supported upon the sills of the frame, and end closures carried by the frame end ribs.

2. A fire-proof knockdown house comprising a separable skeleton frame having

webbed side and end sills, end and intermediate ribs having vertically disposed side and angularly disposed roof joist sections, means for securing the lower ends of the side joist rib sections to the webs of the sills, a ridge-beam detachably secured to the abutting ridge ends of the roof joist sections, inner metallic upturned flanged wall and ceiling plates detachably fitted between the frame ribs, outer metallic upturned flanged sheathing and roofing panels detachably fitted between said frame ribs and spaced from the wall and ceiling plates whereby air spaces are formed, tie-rods in connection with the frame ribs, wall and ceiling plate flanges, sheathing and roofing panel flanges, a floor supported upon the sills of the frame, and end closures carried by the frame end ribs.

3. A fire-proof knockdown house comprising a separable skeleton frame having webbed side and end sills, end and intermediate ribs having vertically disposed side and angularly disposed integral roof joist sections, means for securing the lower end of the side joist rib sections to the webs of the sills, a ridge beam detachably secured to the abutting ridge ends of the roof joist sections, inner metallic wall and ceiling plates detachably fitted between the frame ribs, outer metallic sheathing and roof panels detachably fitted between said frame ribs and spaced from the wall and ceiling plates whereby a series of air chambers are formed, and tie-rods in connection with a series of frame ribs, wall and ceiling plates and sheathing and ceiling panels.

4. A fire-proof knockdown house comprising a skeleton frame having a plurality of transverse T-iron ribs, each of which comprises a vertically disposed side and an angularly disposed roof joist section, a ridge beam connecting the sections, and a rectangular sill frame detachably secured to the ends of the side sections of said ribs, wall and ceiling plates fitted between the ribs, outer roof and sheathing panels fitted between said ribs and spaced from the wall and ceiling plates, means for effecting tight joints between the longitudinal edges of the sheathing and roof panels, the combing edges of said roof panels being provided with beaded edges spaced apart at their ridge ends, and a hollow comb provided with beaded edges for effecting an interlocking joint between the beaded edges of the roofing panels whereby a longitudinal vent is formed for the air spaces between the wall and roofing plates and sheathing and roofing panels.

5. In a fire-proof knockdown house having a frame provided with transversely arranged ribs, the same being T-shaped in cross-section and having alined apertures in their vertical webs, and a ridge-beam con-

necting the ribs; the combination of sheet-metal plates supported upon the horizontal webs of the ribs, the sheet-metal plates being provided with apertures in register with
5 the rib apertures, tie-rods arranged to pass through the entire series of rib and plate apertures whereby the latter are secured, means for clamping the tie-rods to the end ribs, and panels fitted over the plates be-
10 tween the ribs, the panels being spaced from the plates whereby air spaces are formed, a

comb connecting the plates at their ridge ends, and means for effecting a closed longitudinal joint between the panels.

In testimony that I claim the foregoing I 15
have hereunto set my hand at Milwaukee in the county of Milwaukee and State of Wisconsin in the presence of two witnesses.

JOHN LOEHNER.

Witnesses:

R. WURPE,

GEO. W. YOUNG.