May 6, 1952 N. S. BLACK 2,595,633

BUILDING FOUNDATION

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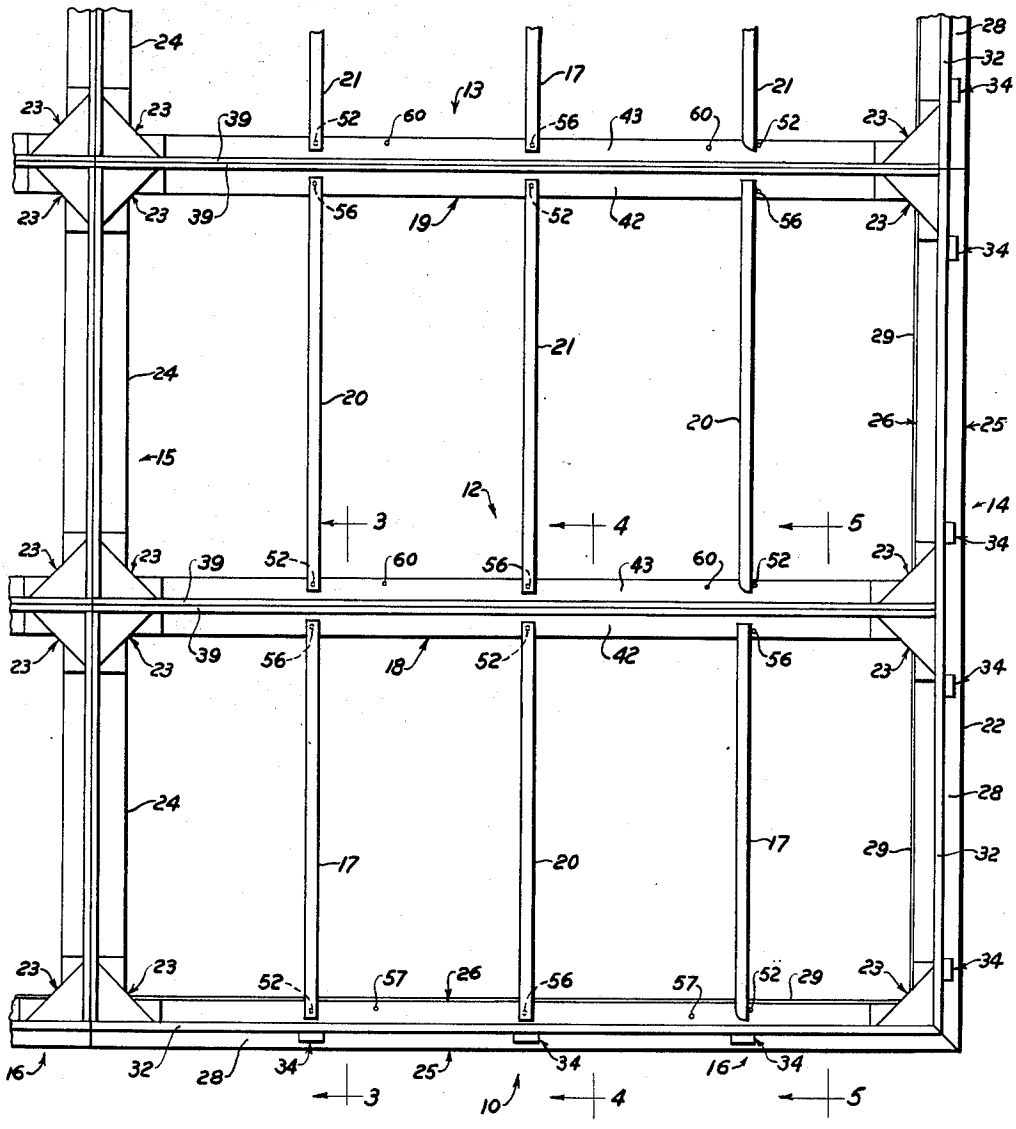


Fig. 1

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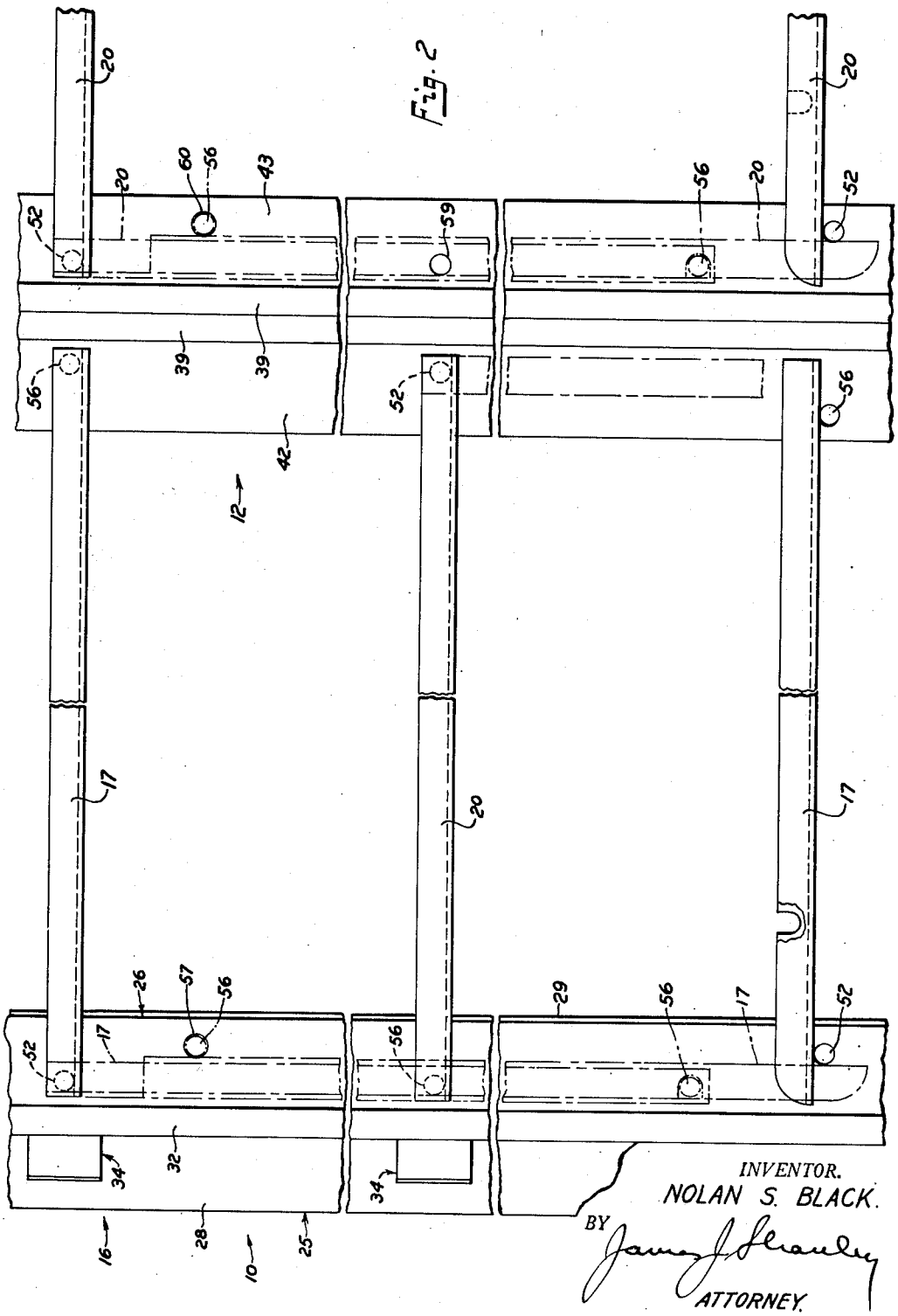
BY James J. Scanlon
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BUILDING FOUNDATION

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Fig. 2



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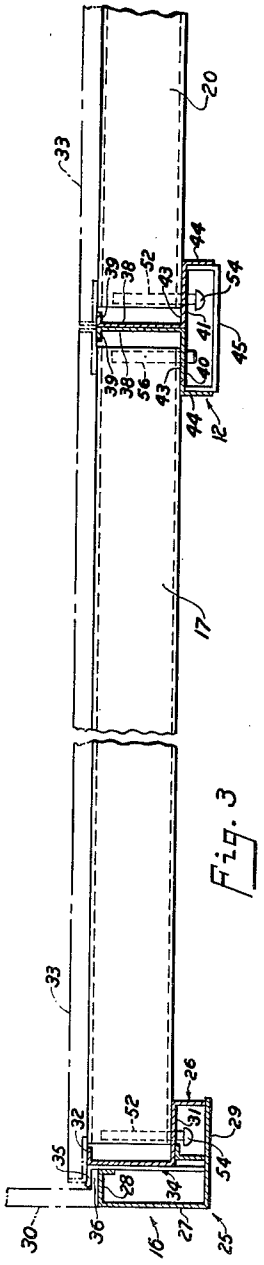


Fig. 3

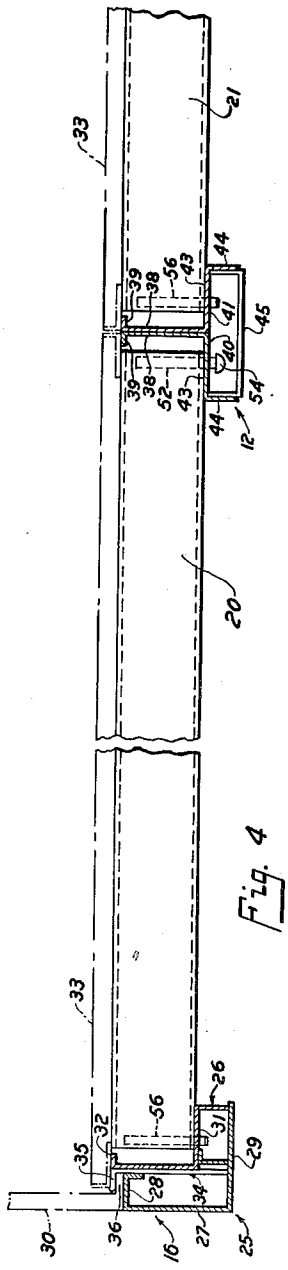


Fig. 4

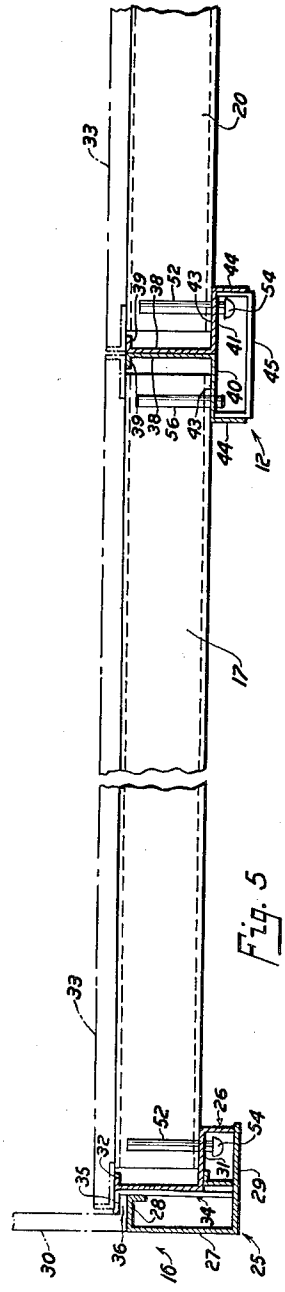


Fig. 5

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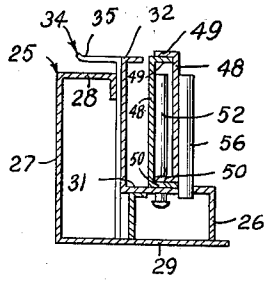


Fig. 12.

Fig. 6.

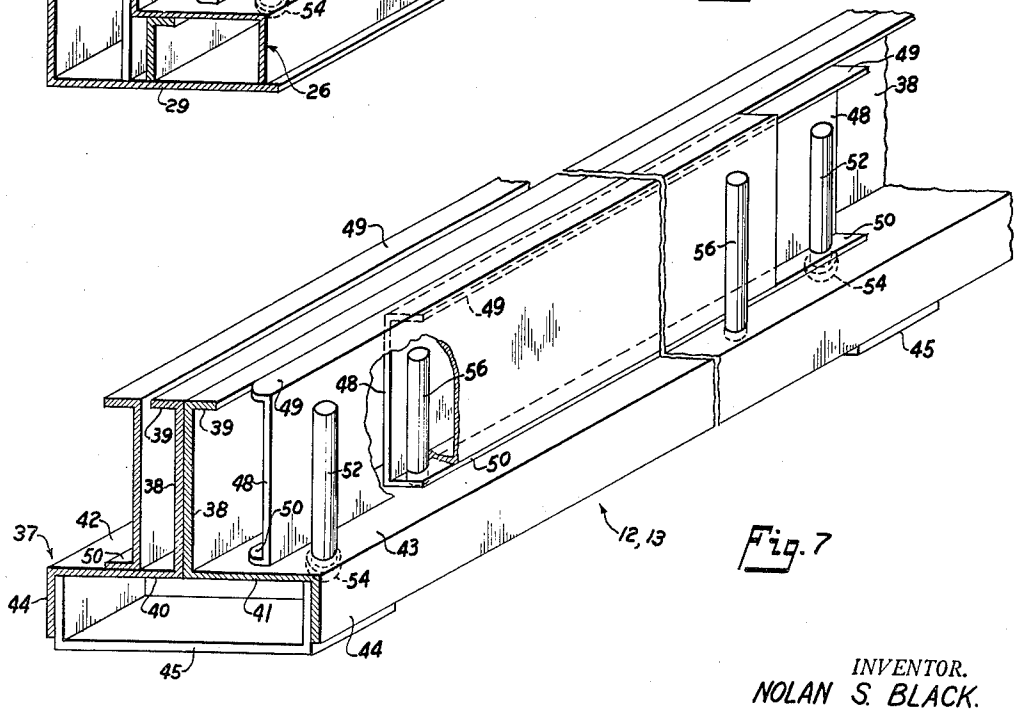


Fig. 7

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BUILDING FOUNDATION

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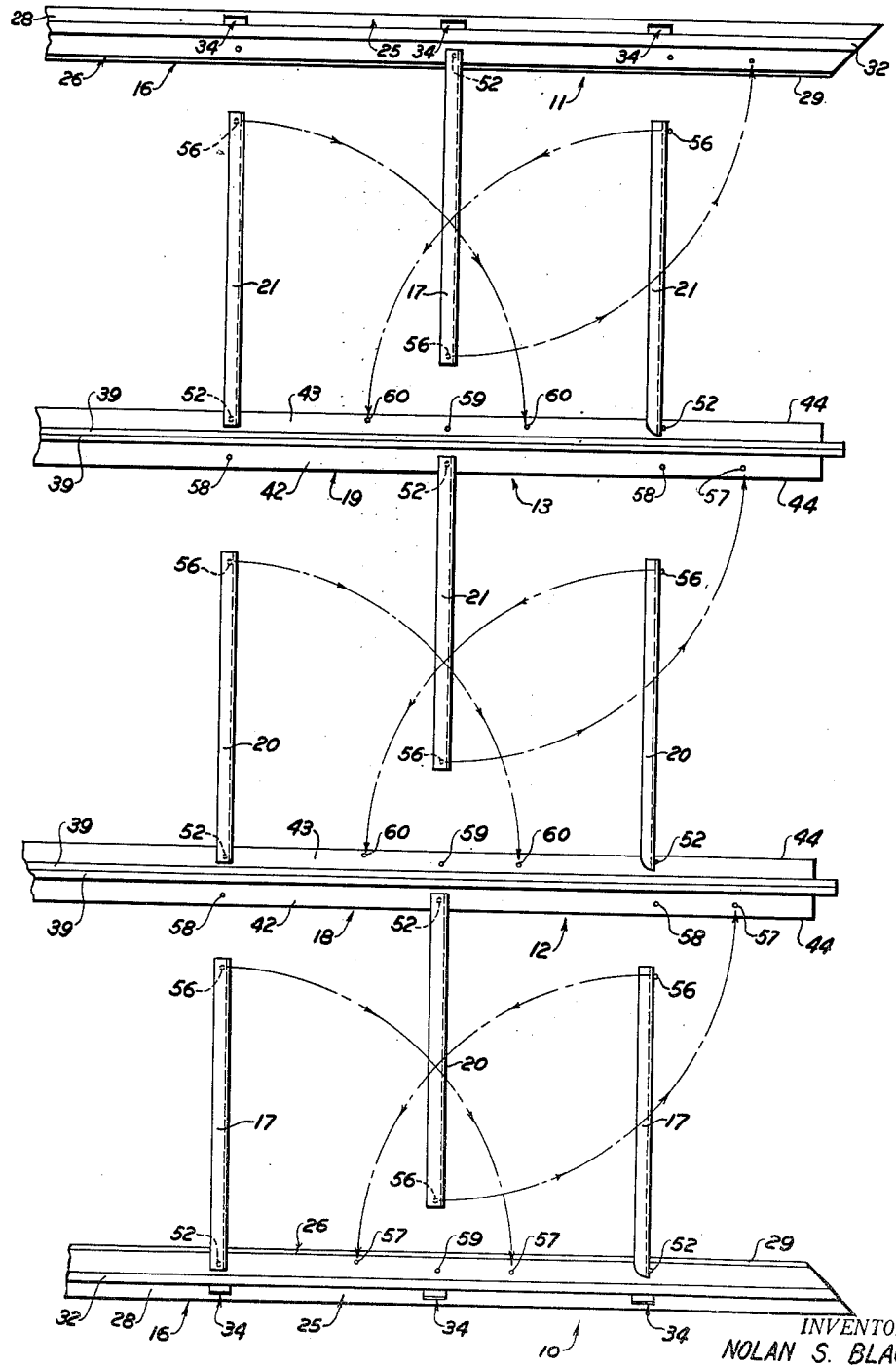


Fig. 8

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BUILDING FOUNDATION

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Fig. 9

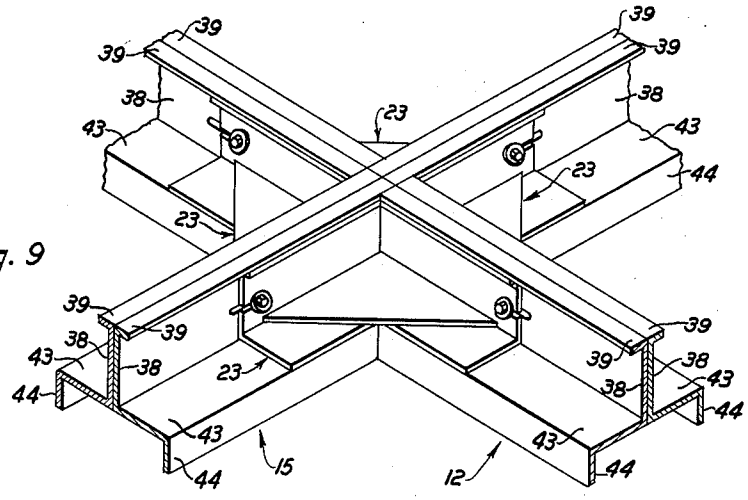
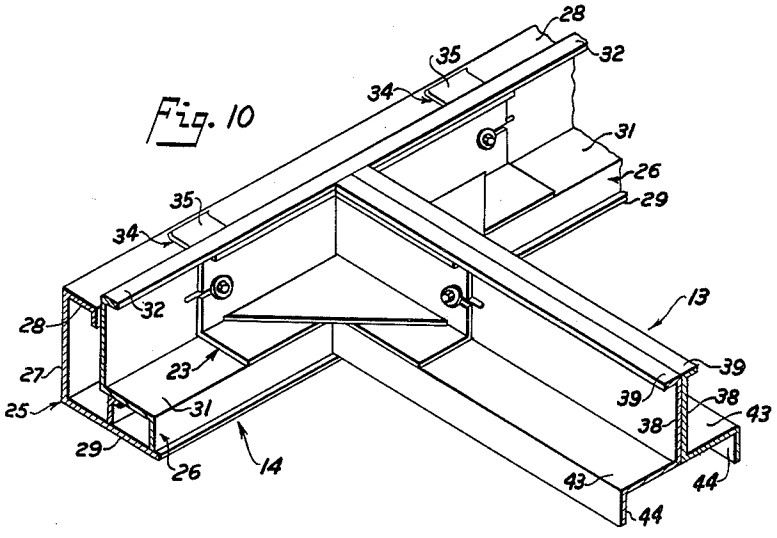


Fig. 10



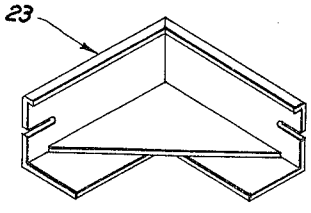


Fig. 11

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Patented May 6, 1952

2,595,633

UNITED STATES PATENT OFFICE

2,595,633

BUILDING FOUNDATION

Nolan S. Black, Highland Park, Mich., assignor to National Steel Corporation, a corporation of Delaware

Application February 21, 1946, Serial No. 649,163

3 Claims. (Cl. 189—34)

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This invention relates generally to building foundations and more particularly to structural framework foundations.

It is an object of the present invention to provide a new and improved framework foundation including factory pre-assembled sections of a character to facilitate assembly at a building site.

Another object of the invention is to provide a new and improved structural framework foundation including assembled sections foldable into compact units which may be conveniently handled and shipped to building sites.

Another object of the invention is to reduce construction costs of foundations by supplying erection crews with easily handled pre-assembled framing sections which readily go together to make up the framework foundation without need of skilled workmen.

Other objects of the invention will become apparent from the following detailed description and accompanying drawings in which:

Figure 1 is a fragmentary plan view of a structural framework foundation for buildings, embodying features of the present invention;

Figure 2 is an enlarged fragmentary plan view of part of the structure of Figure 1 illustrating how certain sections of the foundation are folded;

Figures 3, 4 and 5 are sectional views of the foundation taken respectively along the lines 3—3, 4—4 and 5—5 of Figure 1;

Figure 6 is an isometric view of an outer, pre-assembled section of the foundation shown folded;

Figure 7 is an isometric view of an intermediate, pre-assembled section of the foundation shown folded;

Figure 8 is a plan view of the foldable foundation sections shown unfolded and removed from the foundation;

Figure 9 is a fragmentary isometric view of the framework foundation showing how certain of the foundation members may be secured together;

Figure 10 is a fragmentary isometric view of the framework foundation showing how certain other of the foundation frame members may be together; and

Figure 11 is an isometric view of a corner tie bracket used to connect the frame members of Figures 9 and 10 together.

Figure 12 is a cross sectional view of the folded outer pre-assembled foundation section shown in Figure 6, and is taken along the line 12—12 of Figure 6.

In the drawings which illustrate a preferred form of the invention, the present framework

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foundation is constructed in part of several pre-assembled, foldable sections including outer, opposite side sections 10, 11 and intermediate sections 12, 13. Also, the foundation includes outer, opposite end sill members 14 between which there may be one or more intermediate sill members, designated generally by the numeral 15. It will be readily seen that the number of intermediate sections 12, 13 and sill members 15 required will depend upon the size of the foundation desired. The outer, foldable side sections 10, 11 of the foundation each comprise in general, a frame or sill member 16 and a plurality of spanning members or joists 17 carried thereby as an assemblage or unitary structure. Similarly, the intermediate, foldable sections 12, 13 each comprises, in general, a frame or sill member 18, 19 respectively and a plurality of spanning members or joists 20, 21 carried respectively by the sill members 18 and 19. The opposite, outer end sill members 14 may be the same in form and construction as the side sill members 16.

As shown in Figure 1, the outer, side sill members 16 and the intermediate sill members 18, 19 of the foldable foundation sections are laterally positioned in spaced, substantially parallel relation with the joints carried thereby inter-connecting the sill members. The opposite ends of the side, sill members 16 and of the intermediate sill members 18, 19 are connected together by and to the opposite, end sill members 14. At the corners of the framework foundation, the side and end sill members may be mitered, as shown in Figure 1, and may be secured together by corner tie bracket 23, bolted or otherwise suitably secured thereto. Also, this type of corner tie bracket 23 may be used to secure the opposite ends of the intermediate sill members 18, 19 to the end sill members 14. The intermediate sill member 15, of which there is only one shown, is in spaced parallel relation with the opposite end sill members 14 and extends from one to the other of the opposite side sill members 16. Preferably, the intermediate sill member 15 comprises a plurality of individual frame members 24 arranged in end to end alignment, connecting adjacent sill members together to give added rigidity and strength to the foundation. Corner tie brackets 23 of the type used at the outer corners of the frame foundation may also be used to connect the individual frame members 24 to the joists 18, 19 and to the side sill members 16, as shown in Figure 9, for example.

The opposite, side sill members 16 are each preferably constructed of an outer, elongated

structural member 25 and an inner elongated structural member 26 which may be welded or be otherwise suitably secured together. As shown, the outer structural member 25 is of general channel form having an upright web 27, an upper inturned flange 28 and a lower inturned flange 29. The upper flange 28 of the outer structural member 25 provides a seat for the lower edges of wall panels 30, while the lower inturned flange 29 is preferably of greater width than the upper flange and provides a large area seating surface for support of the framework foundation on the ground or other support. Seating on the lower flange 29 of the outer, sill structural member 25, the inner, sill structural member 26 is formed with an offset or step providing a horizontal seating surface 31 for end portions of the joists 17 and of the joists 20 of the adjacent frame. The inner structural, sill member 26 extends upwardly from the seat 31 above the upper flange 28 of the outer, structural sill member 25 and is provided with an upper inturned flange 32 for supporting flooring 33.

The form and construction of the end sill members 14 are the same in the present disclosure as the above described side sill members 16 and therefore like parts of the sill members have been given like numerals to avoid repetitious description. Carried by each of the side and end sill members 16 and 14, a plurality of upstanding retainer members 34 are provided for the panels 30, these retainer members 34 being arranged in spaced relation along the lengths of the sill members. Each of the panel retainer members 34 comprises a plate disposed between and welded to the inner and outer members 25, 26 respectively of the sill members. An upper, outturned flange 35 of the retainer member 34 is spaced sufficiently above the upper flange 28 of the outer sill member to receive thereunder an inwardly directed flange 36 carried by each of the panels 30 and extending along the lower edges thereof.

Each of the intermediate sill members 18, 19 may comprise a pair of elongated, laterally positioned structural members 37 having upstanding webs 38 welded or otherwise suitably secured together with their outer surfaces in opposed relation. Upper, outturned flanges 39 extending along the webs with the upper surface substantially co-planar, provide a supporting surface for the flooring 33. Lower outturned oppositely directed flanges 40, 41 respectively of the pair of webs extend along the webs in co-planar relation providing horizontal seating surfaces 42, 43 on opposite sides of the pair of webs for supporting end portions of the joists carried by the sill members 18, 19 and by adjacent sill members. At their outer edges, the lower flanges 40, 41 of the sill members have downturned flange portions 44 and between these flange portions, spaced channel members 45 are preferably provided along the sill members to give additional bearing surface for resting on the ground or other surface on which the present framework foundation may be supported. These channel members 45 may have their upwardly directed side flanges welded or otherwise suitably secured to the downturned flange portions 44 of the sill structural members 37.

With particular reference to Figures 1, 2 and 8, it will be seen that between the end sill member 14 and the intermediate sill member 15, the side sill member of section 10 carries two of the joists 17, the intermediate sills 18 and 19 each carry three of the joists 20, 21 respectively and the

opposite, side sill member of section 11 carries one of the joists 17. The joists 17 of the side section 10 are spaced apart along the length of the grade beam 16, extending laterally therefrom to the adjacent joist 18. Of the three spaced joists 20 carried by the sill member 18, the center joist is arranged to extend toward the adjacent side sill member 16 of section 10, between the spaced apart joists 17 thereof. The spacing of these three joists 17 and 20 is preferably substantially equal, as shown, to distribute the load equally thereon. The other two joists 20 of the sill member 18, extend from the side of the sill member 19 to the adjacent joist 19 and are spaced apart, preferably such that they will align with the joists 17 when the sections are assembled. Between the joists 20 extends one of the three joists 21 carried by the sill member 19 in alignment with the intermediate joist 20, the other two joists 21 extending in the opposite direction for connection to the next adjacent joist. Thus, the joists carried by the side sill members 16 and by the joists 18, 19 are arranged such that for any pair of these sill members, the successive parallel joists connecting them are alternately carried thereby. In other words, the joists carried by a sill member are in staggered relation to the joists carried by the adjacent sill member. This not only provides for alignment of the tie joists to obtain equal load distribution thereon but, also makes it possible to package the sections or pre-assembled units compactly for handling and shipment by permitting the sections to be foldable into compact units.

The joists 17, 20 and 21 are preferably elongated channel members each having a web 48, an upper, side reinforcing flange 49 and a lower, side reinforcing flange 50. The lower flanges 50 of the joists rest on the seats of the sill members and the upper flanges serve to support the flooring. As previously mentioned, the framework foundation sections 10, 11, 12 and 13 are foldable into compact, easily handled units, the joists thereof being movable to positions in which they extend longitudinally of their sill members. To this end, each of the joists 17, 20 and 21 is provided adjacent one end thereof with a pivot pin 52 to connect the joist to its sill member. The pivot pins 52 are arranged with their longitudinal axes extending vertically and are preferably welded to one side of the joist web 48. With particular reference to the outer, side sections 10, 11, the pivot pin 52 of each of the joists 17 extends below the lower joist flange 50 to engage in an aperture provided in the sill flange or seat 31 on which the joists rest. Below the sill seat 31, the pivot pins 52 are each preferably provided with an abutment member or head 54 to prevent disengagement of the joists 17 from the sill member 16. Although the depths of the joists 17 of the section 16 are preferably the same in the interests of mass production and for properly supporting the flooring 33, it will be seen that when the sections are folded (Figure 6) the pair of joists 17 are arranged on their sill member 16 with the corresponding joist flanges 49, 50 in overlapping relation in the interests of compactness. To this end, the pivot pin heads 54 are in spaced relation to the underside of the sill flange or seat 31 when the joist is seated thereon so as to permit one or the other of the joists to be raised or lifted sufficiently to allow the corresponding flanges 49, 50 to overlap. The opposite, side frame section or assemblage 11 is the same as the above described section 10,

except for the location and number of joists carried thereby, and therefore like parts of these frame sections have been given like numerals to avoid unnecessary repetitious description.

Carried by each of the joists 17, adjacent the outer or free ends thereof, is a locking pin 56 and in the sill member seat 31 are spaced apertures 57 for respectively receiving the pins 56 to prevent the joists from accidentally swinging out from the sill member. These locking pins 56 are arranged with their longitudinally axes disposed vertically, the pins 56, like the pivot pins 54, preferably being welded to the joist webs 27. A lower end portion of the locking pins 56 projects below the lower flange 31 of the joists for insertion in the corresponding apertures in the joist seat 42 on which end portions of the joists rest. When the frame foundation is assembled, these locking pins 56 engage respectively in apertures 58 provided in the joist supporting flange or seat 42 of the adjacent sill member 18 to connect the joist and sill members together. The connection between the pivoted ends of the joists 17 and their sill member 16 which permits the joist 17 to be lifted relative to the sill member 16 allows the locking pins 56 to clear the joist seat 42 for insertion in the apertures 58 therein.

The joists 20, carried by the sill member 18, are preferably the same as the previously described joists 17 carried by the sill member 16. Two of the joists 20 are pivoted adjacent ends thereof to the seat flange 43 of the sill member 18 by pivot pins 52 secured thereto, the other ends of the joists 20 carrying the connecting or locking pins 56 engaging in apertures in the seat flange 42 of the adjacent sill member 19. The third or center joist of the three joists 20 is pivoted adjacent one end thereof to the seat flange 42 of sill member 18 intermediate the joists 20, the other end of this third joist having a connecting pin 56 engaging in an aperture 59 in the sill member seat 31 betwen the joists 17, like the outer sill members 16, the intermediate sill members 18 and 19 are each provided with apertures 60 to receive the locking pins 56 of the joists 20 to prevent the joists from accidentally swinging away from their sill members. The other intermediate foldable section 13 is the same as the previously described foldable section 12. Thus, it will be seen that alternate joists are carried by adjacent sections which, when connected together, form a frame foundation in which the side and intermediate sill members are connected together by rows of aligned joists.

In assembling the above described framework foundation, the ground at the building site is first usually cleared and leveled. The sections 10, 11, 12, 13, 14 and 15 may then be set on the level ground in their approximate positions relative to each other with the joists of each of the foldable sections still locked in folded position. The corner brackets 23 may now be applied and the nuts tightened down to secure rigidly the side and end sill members, the intermediate sill members 18, 19 and the intermediate sill members 15 together. Then, each of the joists 17, 20, and 21 is lifted to disengage the locking pin 56, swung out or around on its pivot pin 52 and lifted slightly so that the locking pin 56 clears the seating flange of the adjacent section to engage in the aperture therein.

From the foregoing description, it will be seen that I have provided a new and improved framework foundation including pre-assembled, foldable sections which facilitate assembly. Also, by constructing these pre-assembled foundation sections in a manner such that they can be folded, it will be appreciated that these sections can be conveniently handled and shipped as compact building units.

I claim:

1. The folded section of buiding framework comprising, an elongated frame member having a longitudinally extending lower seat for joists and means extending upwardly above the lower seat and presenting a longitudinally extending upper seat laterally outwardly offset above the lower seat, the frame member having a first pair of apertures in and spaced longitudinally of the lower seat, a pair of parallel inner and outer joist members on the lower seat and extending longitudinally thereof adjacent the upwardly extending means, each joist member having a height equal to the vertical distance between the upper and lower seats of the frame member, a first pin carried by each joist member adjacent one end thereof engaging a respective one of the first pair of apertures, each first pin being pivotal in the respective aperture, a second pin connected to the outer joist member adjacent the other end thereof extending into another aperture in the frame member located in the lower seat and holding the joists in place on the lower seat, said outer frame member being bodily movable upwardly away from the lower seat to free said second pin from said other aperture so that each joist member can be swung outwardly away from the other joist member and about the axis of the first pin to extend laterally outwardly from the frame member, and means on the first pin carrid by the outer joist member limiting such bodily movement of the joist member so as to retain the first pin carried by the outer joist member in the respective aperture.

2. A folded section of building framework comprising an elongated frame member having an upper seat for flooring and a lower seat laterally outwardly offset below the upper seat, the framework having a first pair and a second pair of apertures in the lower seat, each pair of apertures being spaced apart longitudinally of the lower seat, a pair of parallel inner and outer joist members supported on the lower seat and extending longitudinally thereof, each joist member having a height equal to the distance between the upper and lower seats of the frame member, a first pin carried by each joist member adjacent one end thereof engaging a respective one of the first pair of apertures, each first pin being pivotal in the respective aperture, a second pin carried by each joist member adjacent the other end thereof engaging a respective one of the second pair of apertures and holding the joist member in position on the lower seat, each joist member being bodily movable upwardly away from the lower seat to free said second pin from its respective aperture so that each joist member can be swung outwardly away from the other joist member about the axis of the first pin to extend laterally outwardly from the first member, and means on each first pin limiting such bodily movement of the joist member so as to retain the first pin in the respective aperture.

3. The folded section of building framework claimed in claim 2 in which the pair of joist members are channel members each having upper and lower flanges extending toward each other from respective upper and lower edges of

the joist members and in which the upper and lower flanges of one joist are in overlapping relationship with the respective upper and lower flanges of the other joists.

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