May 28, 1929. J. F. LOUCKS 1,714,682

SHEET METAL FOUNDATION FOR BUILDING CONSTRUCTION

Filed Oct. 18, 1926 2 Sheets-Sheet 1

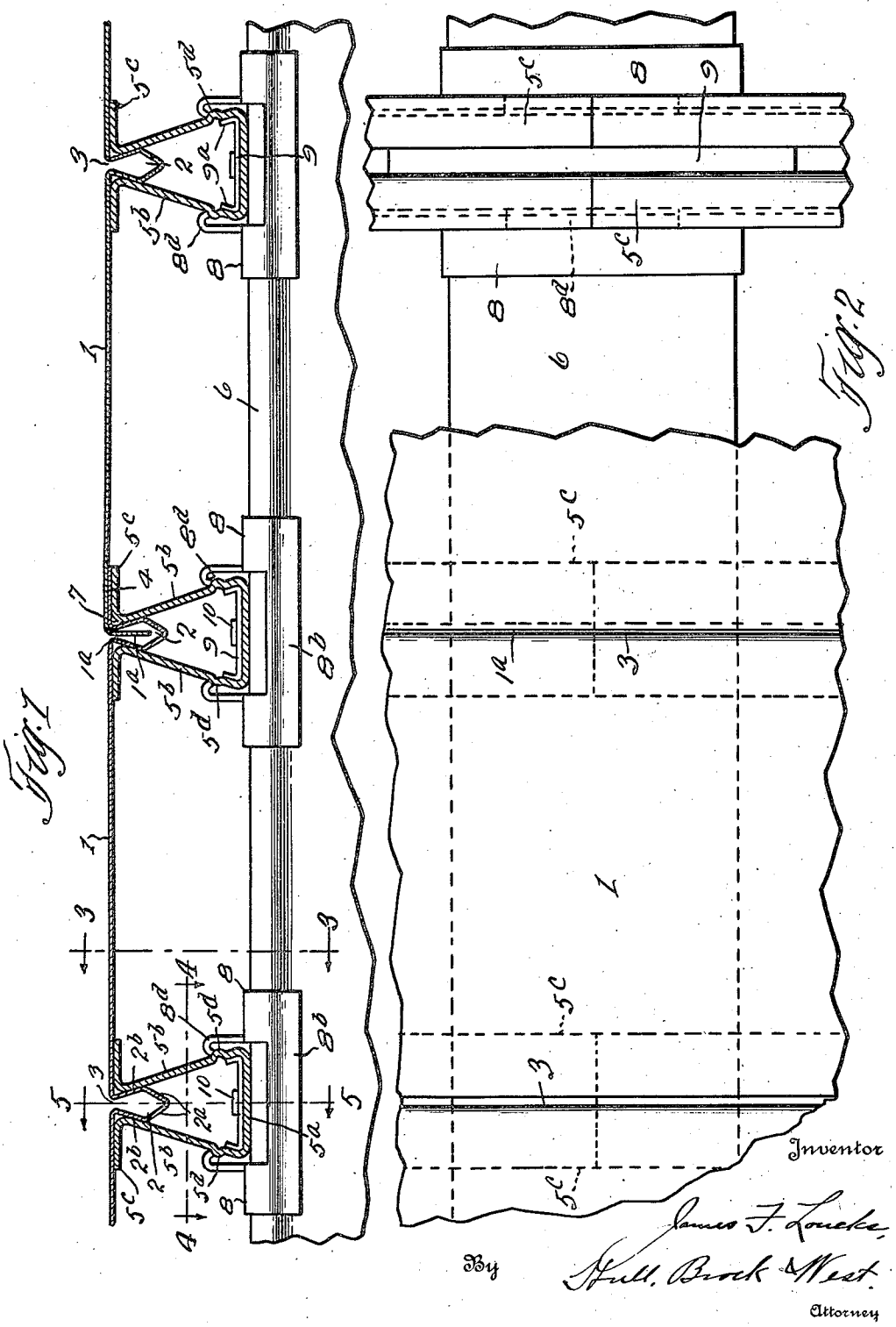


Fig. 1

Fig. 2

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SHEET METAL FOUNDATION FOR BUILDING CONSTRUCTION

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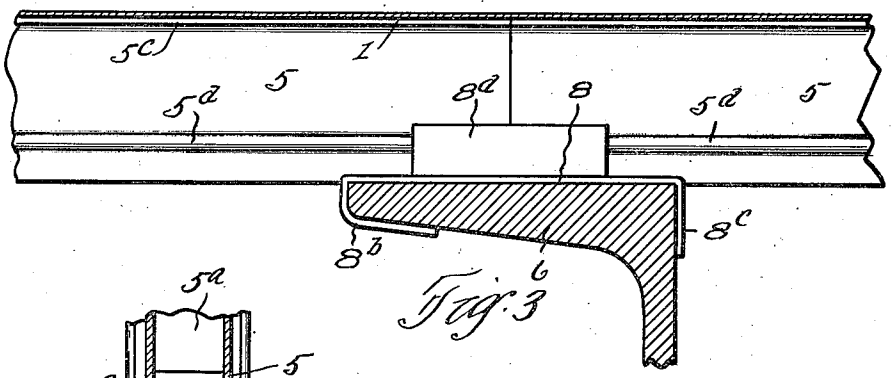


Fig. 3

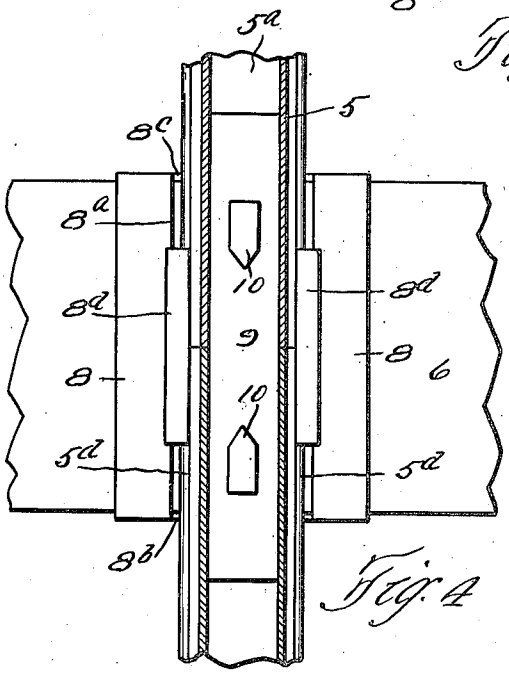


Fig. 4

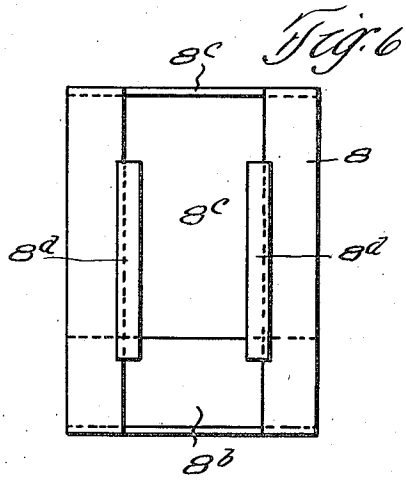


Fig. 6

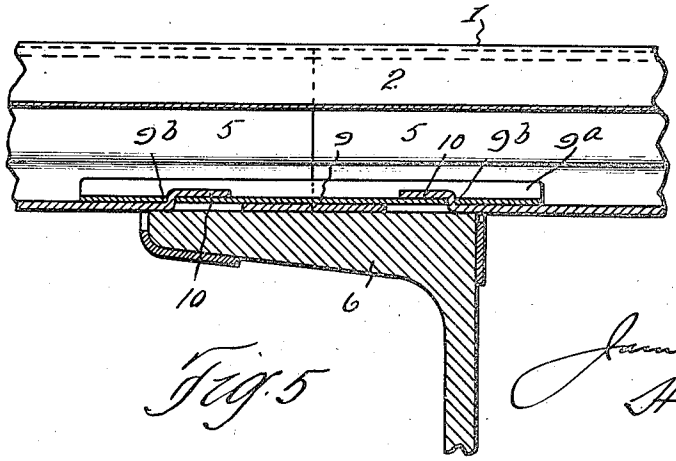


Fig. 5

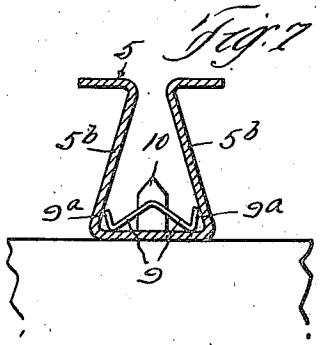


Fig. 7

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Patented May 28, 1929. 1,714,682

UNITED STATES PATENT OFFICE.

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SHEET-METAL FOUNDATION FOR BUILDING CONSTRUCTION.

Application filed October 18, 1926. Serial No. 142,321.

This invention relates to building constructions, and more particularly to sheet-metal foundations for roofs, floors, partitions, etc., the invention being of the type shown, described and claimed in the patent to Harry Gillett and myself issued February 23, 1926, No. 1,574,586.

It is the general purpose and object of the invention to provide a construction of the general character referred to which will enable sheet-metal foundations for the foregoing purposes to be produced at a relatively low cost; also to provide a construction the parts of which may be assembled quickly and conveniently; also to provide an extremely strong construction for such sheet metal structures. Further objects of the invention will appear hereinafter and will be realized through the combinations of elements embodied in the claims hereof.

In the drawing, Fig. 1 represents a detail in transverse section through the adjacent ends of two parts or units embodying my invention and showing the same applied to a joist or purlin; Fig. 2 a detail in plan, with parts broken away, of the construction shown in Fig. 1; Figs. 3, 4 and 5 are details in section corresponding respectively to the lines 3—3, 4—4 and 5—5 of Fig. 1; Fig. 6 is a detail in plan of one of the members for connecting the ribs to a beam; and Fig. 7 is a detail in cross section through a modified form of rib.

Describing the various parts by reference characters, 1, 1 denote two flat metal sheets, each of which may be of any desired extent and each having small ribs 2 formed therewith and projecting from one side thereof. Each of these ribs is substantially diamond shaped, having a beveled lower edge formed between the downwardly converging sides 2^a, the ribs 2^a merging with upwardly converging sides 2^b, there being a narrow slot 3 formed between the upper ends of the ribs 2^b. One lateral edge of each sheet 1 is downturned, as shown at 1^a, to provide a flange which may be inserted into the slot 3 at the adjacent end of the next sheet, while the opposite lateral edge of each sheet is provided with a short extension 4 beyond the last rib 2 thereon. The ribs 2 constitute means whereby the sheets 1 may be conveniently applied to the larger supporting ribs, indicated at 5, and each having a base 5^a adapted to rest upon and be secured to a joist or purlin 6 and upwardly convergent sides 5^b each having a horizontal flange 5^c at its upper end adapted to engage and support the lower surface of a sheet 1, there being a slot 7 provided between the upper ends of the sides 5^b into which one of the ribs 2 may be sprung, it being noted that the ribs 2 are so shaped and proportioned as to enable them to be "snapped" into place within the tapered seats provided therefor between the upper parts of the sides 5^b, the slots 3 and the resilience of the sides 2^b permitting this action.

With this construction and arrangement of parts, the sheets 1 may be quickly assembled upon the ribs 5, by placing the ribs at proper distances apart upon joists or purlins 6 and pressing the ribs 2 into the tops of the ribs 5. As will be evident from the drawings, the distance between the tops of the sides 2^a and the bottoms of the sides 2^b is greater than the distance between the tops of the sides 5^b of the large ribs 5. The inclination or tapering of the sides 2^a enables the small ribs to be inserted conveniently into the slots provided between the sides of the large ribs. The metal of which the ribs 2 is composed being resilient, the sides 2^a and 2^b spring toward each other as the ribs 2 are pressed downwardly and thus allow the smaller ribs to be inserted into the larger, this action being facilitated by the slots 3. When assembled, the sides 2^b will be in engagement with the inner faces of the sides 5^b of the large ribs.

The ribs 5 are secured upon the joists or purlins 6 by means of clamps, each clamp comprising a sheet metal base having side portions 8 adapted to rest upon and extend across the top of a joist or purlin 6 and provided with a slot 8^a intermediate such sides and of sufficient width to receive therein the base 5^a of a rib 5, the said sheet metal base having ends 8^b and 8^c which are adapted to be folded down into engagement with the opposite sides of the joist or purlin 6, there being integral upstanding hooks 8^d adapted to engage the sides 5^b of the rib. The sides 5^b may have rolled therein ribs 5^d adapted to be engaged by the upper ends of the hooks 8^d, thus insuring that the ribs 6 will be secured firmly in place by the clamps.

For convenience of description, the edges of each sheet 1 which carry respectively the flange 1^a and a rib 2 will be referred to as the sides of the sheet while the other edges will be referred to as the top and bottom of

the sheet. For the purpose of assembling the tops and bottoms of adjacent sheets and the abutting ends of ribs 5, I prefer to use the construction shown in Figs. 1, 5 and 7, wherein the ends of two ribs 5, 5 are shown as abutting above a joist or purlin 6, being secured thereto by one of the clamps hereinbefore described and being connected in abutting relation by a special resilient clamp having a base 9 which is arched or bent upwardly from the side edges thereof toward the middle, as shown in Fig. 7. This view shows a rib 5 identical with the ones shown in preceding views except that the longitudinal ribs 5^c are omitted, the base 9, when flattened, being of substantially the same width as the width of the base 5^a of the rib. Each side edge of the base 9 is provided with an upwardly extending flange 9^a which, when the base is sprung downwardly, will engage the sides 5^b of the ribs 5, as shown in Fig. 1, thus retaining the clamp in place. The clamp bridges the joint between the ends of the bases of adjacent ribs 5 and is secured in this position by inserting tongues 10 formed on the bases of said ribs through slots 9^b in the base 9 of the clamp and bending the tongues down into engagement with the upper face of such base, as shown in Figs. 1 and 5. This matter of connecting the abutting ends of the ribs may be availed of without the necessity for having the sheets of the same length as the ribs, as the sheets may, if desired, be made of a length equal to the combined lengths of several ribs and vice versa.

By reason of the construction and arrangement of parts shown herein, I am enabled to produce a sheet metal foundation, of the general type disclosed in the aforesaid patent, at a comparatively cheap cost and one possessing a wide range of adaptability for varying conditions. The ribs 5 can be rolled to any desired length and kept in stock, and the sheets 1 may be made of any desired length and width and provided with the small ribs 2 by a rolling operation, the ribs 2 being spaced apart on the sheets in accordance with the particular kind of installation with which the sheet metal foundation is to be used. The cost of making the supporting ribs 5 separate from the sheets 1 is less than the cost of making the same integral with such sheets, even when the cost of forming the small ribs 2 with said sheets is considered. The ribs 5 may be made of a different, and preferably heavier, gauge of metal than the sheets 1 and ribs 2, thus enabling me to use light and cheap metal for the said sheets and ribs 2 while using sufficiently heavy-gauge metal in the ribs 5 to enable them to form adequate supporting beams for the said sheets. The asembling of the sheets upon the ribs 5 is very quickly and easily accomplished; and the construction effected by assembling the sheets and ribs is extremely efficient for the purposes for which it is designed.

Where it is desired to provide a shingling effect between upper and lower sheets 1, this result can be readily accomplished by compressing the ends of the ribs 2 at one end of each such sheet, leaving the opposite ends open, so that the contracted ends of the ribs on one sheet may be slipped into the open ends of the ribs on the sheet above or below the same, thus allowing the lower ends of the upper sheets to ride over the upper ends of the lower sheets, in the same manner as shown in Patent 1,574,586, referred to hereinbefore.

Having thus described my invention, what I claim is:—

1. A sheet metal foundation for building constructions, the same comprising a metal sheet having spaced resilient diamond-shaped ribs projecting from a side thereof, and a plurality of hollow ribs each having a slot formed between converging sides thereof into which one of the first-mentioned ribs may be pressed, the said diamond-shaped ribs being of greater normal width than the said slots.

2. A sheet metal foundation for building constructions, the same comprising a metal sheet having resilient diamond-shaped ribs projecting from a side thereof, there being a slot provided between the junction of each of said ribs and the sheet, and a plurality of hollow supporting ribs each having a slot of less width than the width of the first mentioned ribs and into which such ribs may be pressed.

3. A sheet metal foundation for building constructions, the same comprising a metal sheet having resilient diamond-shaped ribs projecting from a side thereof and a plurality of hollow supporting ribs each having a slot of less width than the width of the first mentioned ribs and into which such ribs may be pressed, the second ribs being provided each with a surface on each side of the slot therein adapted to engage the said sheet on opposite sides of a rib carried thereby.

4. A sheet metal foundation for building constructions, the same comprising a metal sheet, a plurality of hollow triangular sheet-metal supporting ribs each having a slot provided between two of the sides thereof and each of said sides having a flange projecting therefrom for supporting said sheet, and resilient means carried by said sheet and adapted to enter the said slots and engage the inner walls of the said sides of said ribs thereby to secure the sheet to said ribs.

5. A sheet metal foundation for building constructions, the same comprising a metal sheet, a plurality of hollow sheet metal supporting ribs each having a slot and a flange projecting from each side of said slot for engaging and supporting said sheet, and resilient means carried by said sheet and adapt-

ed to enter the said slots and engage the inner walls of the said ribs thereby to secure the sheet to said ribs.

6. A sheet metal foundation for building constructions, the same comprising a metal sheet, and a plurality of hollow triangular sheet-metal supporting ribs each having a slot provided between two of the sides thereof and each of said sides having a flange projecting therefrom for supporting said sheet, resilient members projecting from said sheet and each of a greater normal maximum width than the width of said slots and adapted to be pressed through said slots into the said ribs and to engage the convergent sides of said ribs thereby to secure the said sheet to the said ribs.

7. A sheet metal foundation for building constructions, the same comprising a metal sheet having diamond-shaped ribs projecting from a side thereof with a slot between the junction of each of said ribs and said sheet, and a plurality of hollow triangular-sheet metal supporting ribs each having a slot provided between two of the sides thereof and each of said sides having a flange projecting therefrom for supporting said sheet, the first-mentioned ribs being each of a greater normal maximum width than the width of the last-mentioned slots and adapted to be pressed through such slots into the supporting ribs and to engage the convergent sides of such ribs thereby to secure the said sheet to such ribs.

8. A sheet metal foundation for building constructions, the same comprising a metal sheet, a plurality of supporting ribs, and resilient means carried by said sheet and adapted to be pressed into interlocking engagement with said ribs.

9. A foundation for building constructions of the character set forth comprising a metal sheet adapted to be secured to a structural beam, a supporting rim therefor having a base adapted to rest upon said beam and convergent sides extending from said base, and means for securing the said rib to the said beam, said means comprising a clamp secured to the top of said beam and having hooks adapted to engage the convergent sides of the said rib.

10. A foundation for building constructions of the character set forth comprising a metal sheet adapted to be secured to a structural beam, a supporting rib therefor having a base adapted to rest upon said beam and provided with projections on opposite sides thereof, and means for securing the said rib to the said beam, said means comprising a sheet metal clamp secured to the top of said beam and having integral resilient hooks adapted to engage the said projections.

11. A foundation for building constructions of the character set forth comprising a metal sheet adapted to be secured to a structural beam, a triangular supporting rib therefor, and means for securing the said rib to the said beam with the base of said rib resting on said beam, the said means comprising a metal clamp having a flange formed therewith for engaging the said beam and provided with a slot for the reception of the base of said rib, the said clamp having resilient hooks formed therewith, the ends of said hooks being arranged to engage opposite sides of the said rib.

12. A foundation for building constructions of the character set forth comprising a metal sheet adapted to be secured to a structural beam, a triangular supporting rib therefor, and means for securing the said rib to the said beam with the base of said rib resting on said beam, the said means comprising a metal clamp having a flange formed therewith for engaging the said beam, the said clamp having resilient hooks formed therewith, the ends of said hooks being arranged to engage opposite convergent faces of the said rib.

13. A foundation for building constructions of the character set forth comprising a metal sheet adapted to be secured to a structural beam, a triangular supporting rib therefor, and means for securing the said rib to the said beam with the base of said rib resting on said beam, the said means comprising a clamp having a slotted base adapted to receive the base of said rib and having flanges adapted to be bent into engagement with opposite sides of the beam, each side of the said clamp being provided with an upwardly extending hooked flange, and the convergent sides of the rib being provided each with an outwardly projecting rib adapted to be engaged by the end of a hooked flange.

14. A foundation for building constructions of the character set forth comprising a metal sheet adapted to be secured to a structural beam, a supporting rib therefor, and means for securing the said rib to the said beam, the said means comprising a clamp having a slotted base adapted to receive the base of said rib and having a flange adapted to be bent into engagement with a side of the beam, each side of the said clamp being provided with an upwardly extending hooked flange, the sides of the rib being provided each with a projection adapted to be engaged by the end of a hooked flange.

15. A sheet metal foundation for building constructions comprising one or more metal sheets and hollow triangular supporting ribs to which said sheet or sheets are secured, and means for securing together the abutting ends of said ribs, the said means comprising clamping members each having a base of approximately the same width as the bases of the said ribs and provided with a flange at each side of such base, the base of the flange being

arched upwardly whereby, on depressing the arch, the base of the clamping member will engage the abutting bases of a pair of aligned ribs with their flanges in engagement with the convergent sides of said ribs, and means for securing both of said ribs to said clamping member.

16. A sheet metal foundation for building constructions comprising one or more metal sheets and hollow triangular supporting ribs to which said sheet or sheets are secured, and means for securing together the abutting ends of said ribs, the said means comprising clamping members each having a base of approximately the same width as the bases of the said ribs and provided with a flange at each side of such base, the base of the flange being arched upwardly whereby, on depressing the arch, the base of the clamping member will engage the abutting bases of a pair of aligned ribs with their flanges in engagement with the convergent sides of said ribs, and means for securing both of said ribs to said clamping member, said means comprising longitudinally spaced slots in the base of the clamping member and a tongue struck from the base of each of said ribs and projected through the corresponding slot in said member.

17. A sheet metal foundation for building constructions comprising one or more metal sheets and hollow triangular supporting ribs to which said sheet or sheets are secured, and means of securing together the abutting ends of said ribs, the said means comprising a clamping member inserted within the abutting portions of a pair of aligned ribs and extending across the joint between said ribs, the said clamping member having an arched base and a flange at each side of said base whereby when the arched base is pressed into engagement with the base portions of the said ribs it will engage such base portions with the flanges in engagement with the convergent sides of said ribs, and means for securing the said clamping member to such abutting end portions of the said ribs.

18. A sheet metal foundation for building constructions comprising one or more metal sheets and hollow triangular supporting ribs to which said sheet or sheets are secured, and means for securing together the abutting ends of said ribs, the said means comprising a clamping member inserted within the abutting portions of a pair of aligned ribs and extending across the joint between said ribs, the said clamping member having a base adapted to engage the abutting base portions of such pair of ribs and side flanges adapted to engage the inner walls of the sides of such abutting portions of said ribs, and means for securing the said clamping member to such abutting end portions of the said pair of ribs.

19. A metal foundation for building constructions, the same comprising a metal sheet having spaced resilient angular ribs projecting from one side thereof, and a plurality of hollow ribs each having a slot formed between converging sides thereof into which one of the first mentioned ribs may be pressed, the said angular shaped ribs being of greater normal width than the said slots.

20. A metal foundation for building constructions the same comprising a metal sheet having one or more resilient angular ribs projecting from one side thereof, there being a slot provided between the junction of each of said ribs and said sheet, and a hollow supporting rib for each of the first mentioned ribs, each supporting rib having a slot of less width than the width of such first mentioned rib and into which each such first mentioned rib may be pressed.

21. A sheet metal foundation for building constructions, the same comprising a metal sheet and one or more supporting ribs therefor, and means for securing each such rib to said beam, said means comprising a clamp secured to said beam and having resilient portions adapted to be pressed into interlocking engagement with said rib.

22. A foundation for building constructions of the character described adapted to be secured to a structural beam, the same comprising a metal sheet and one or more supporting ribs therefor, and means for securing each such rib to said beam, said means comprising a metallic clamp having a flange thereon adapted to engage said beam and being also provided with resilient projections adapted to receive said rib therebetween and to hold the same in interlocking engagement therewith.

In testimony whereof, I hereunto affix my signature.

JAMES F. LOUCKS.