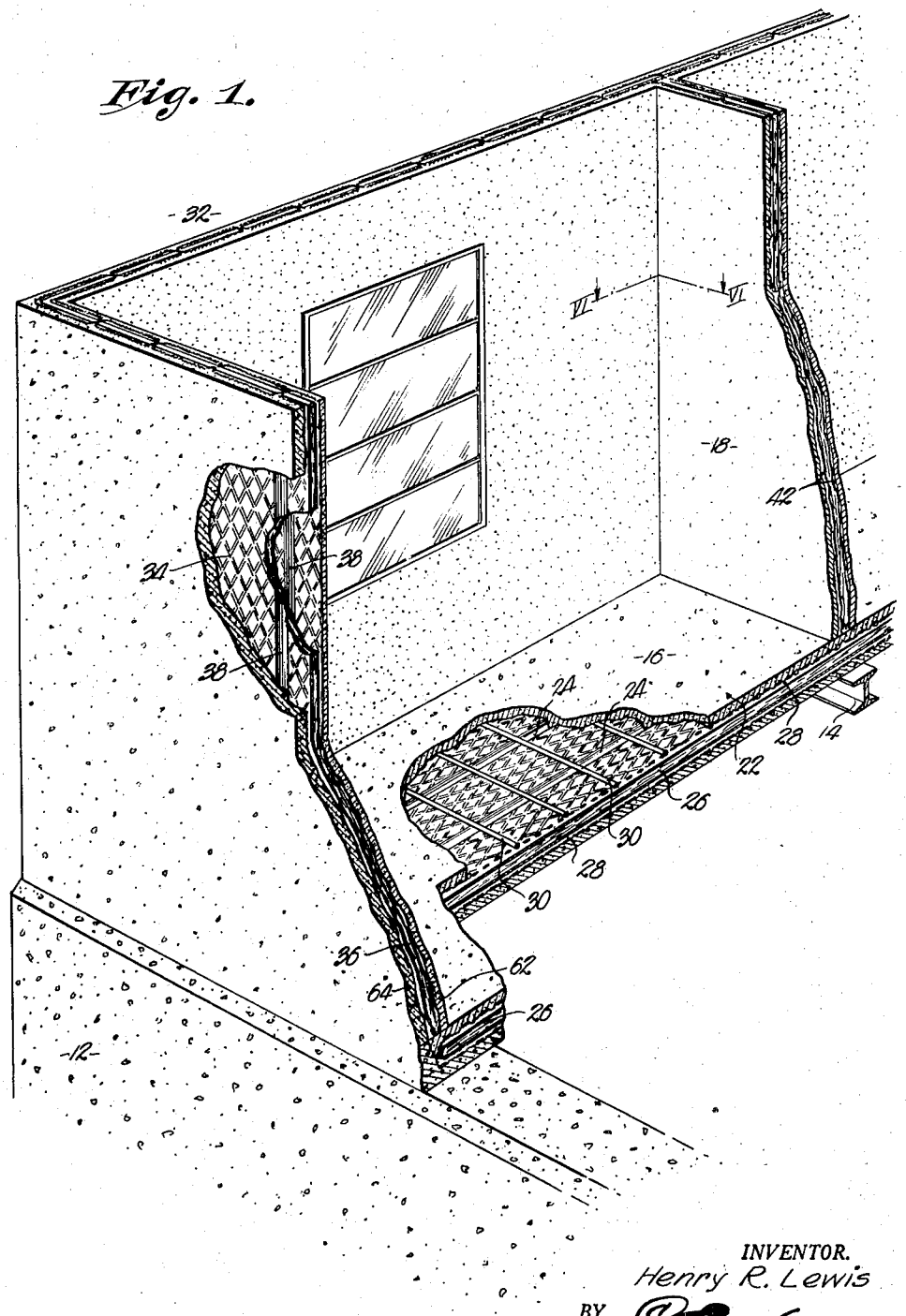
July 26, 1949. H. R. LEWIS 2,477,381

REINFORCED CEMENTITIOUS HOLLOW BUILDING WALL

Filed Dec. 27, 1943 4 Sheets-Sheet 1

Fig. 1.



INVENTOR.
Henry R. Lewis
BY
ATTORNEY.

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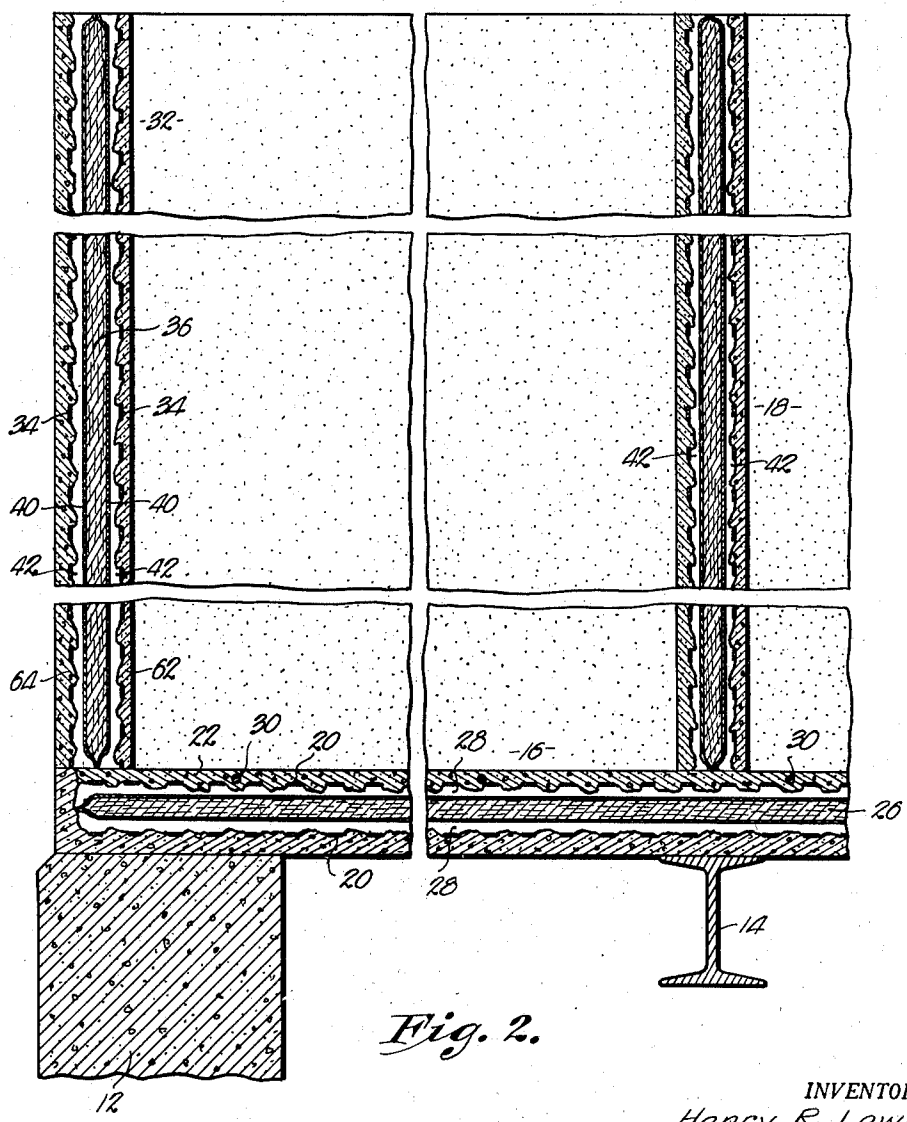


Fig. 2.

INVENTOR.
Henry R. Lewis
BY

July 26, 1949. H. R. LEWIS 2,477,381

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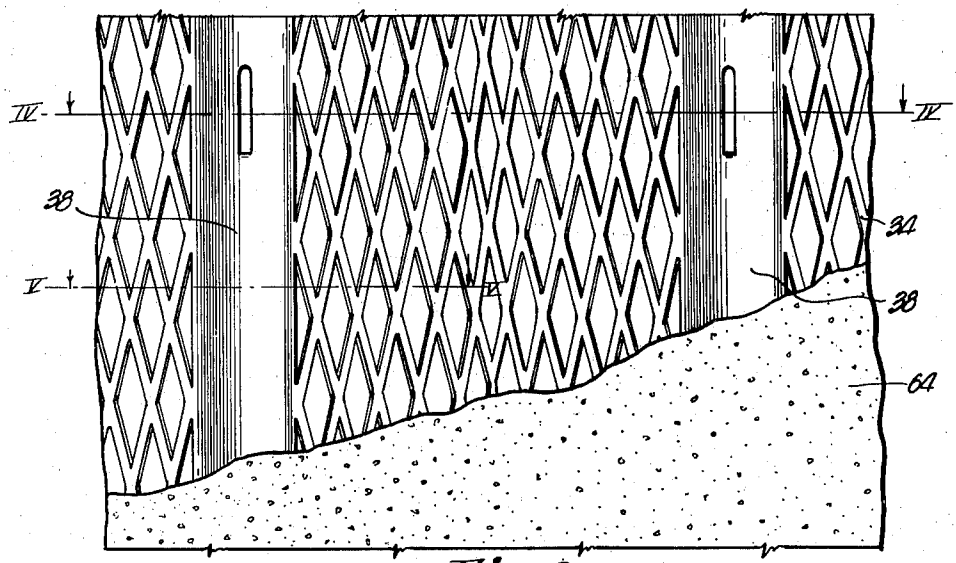


Fig. 3.

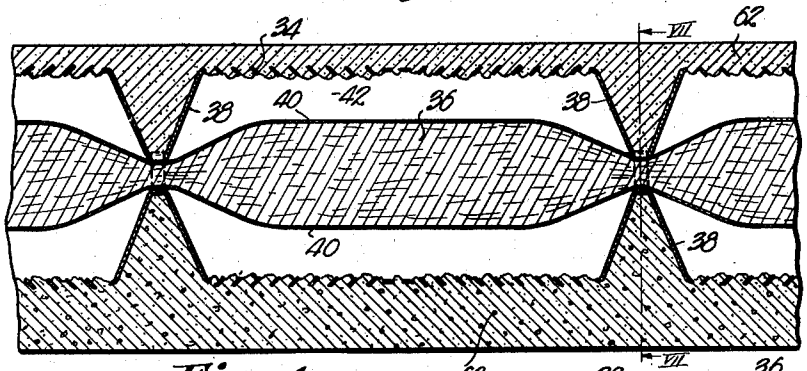


Fig. 4.

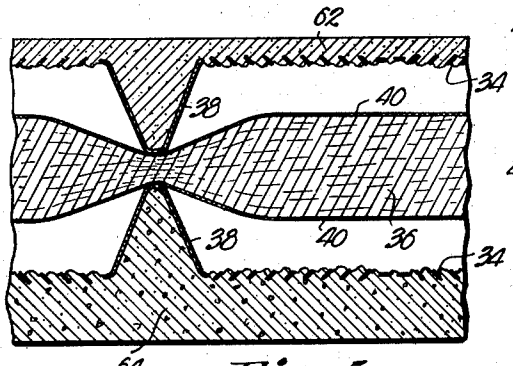


Fig. 5.

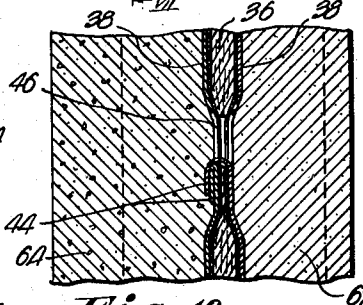


Fig. 10.

INVENTOR.
Henry R. Lewis
BY
ATTORNEY.

July 26, 1949. H. R. LEWIS 2,477,381

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Filed Dec. 27, 1943 4 Sheets-Sheet 4

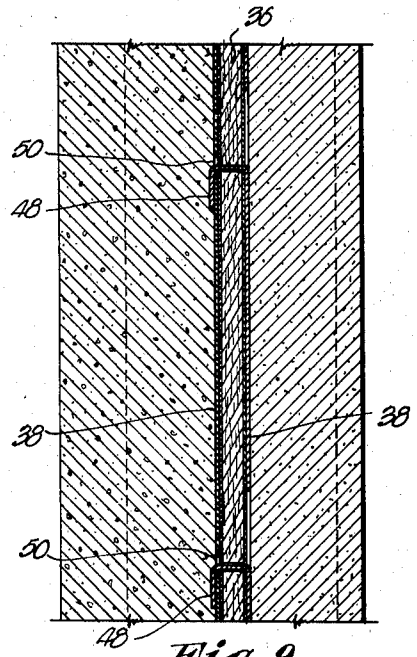


Fig. 9.

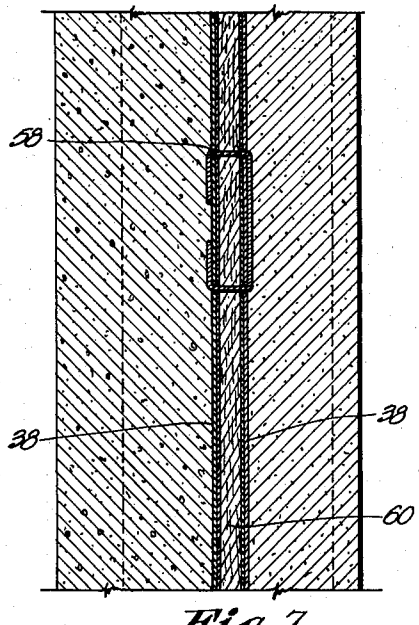


Fig. 7.

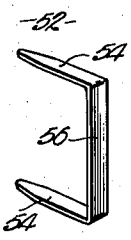


Fig. 8.

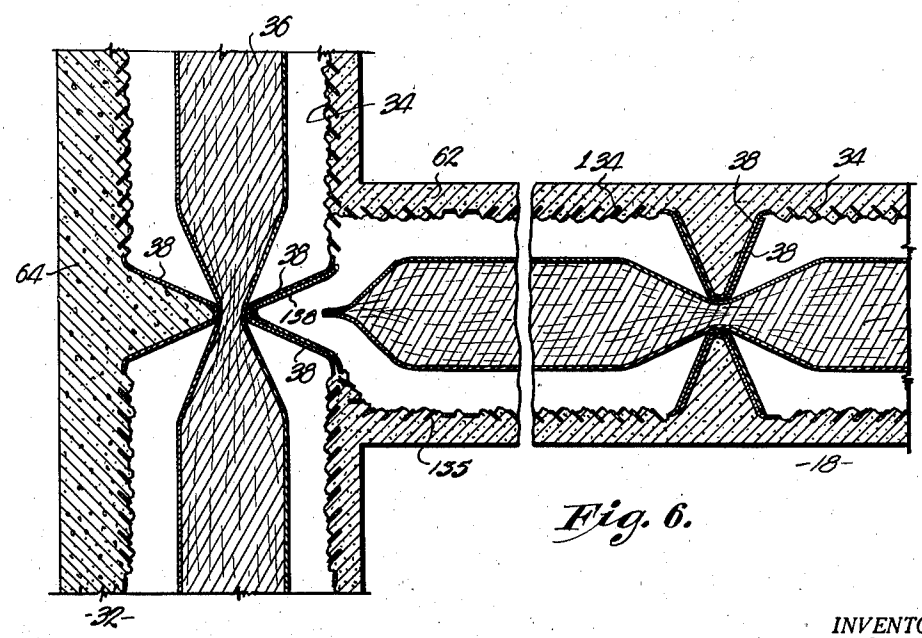


Fig. 6.

INVENTOR.
Henry R. Lewis
BY
Hall Howell
ATTORNEY.

Patented July 26, 1949

2,477,381

UNITED STATES PATENT OFFICE

2,477,381

REINFORCED CEMENTITIOUS HOLLOW BUILDING WALL

Henry R. Lewis, Kansas City, Mo., assignor to R. C. Lewis, Kansas City, Mo.

Application December 27, 1943, Serial No. 515,644

1 Claim. (Cl. 72—48)

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This invention relates to structures generally and particularly to buildings having the walls, floors, ceilings and other component parts thereof, formed of specially designed panels, and the primary aim of the invention is the provision of an unique combination of elements constituting such panels.

Another primary object of this invention is to provide building structure wherein the component parts thereof are formed of specially designed parts to form panels that include load-bearing members, means for receiving cementitious substance to present desirable coatings, and specially supported insulating material, all secured together by means permitting assembly on the job.

A still further important aim of the instant invention is to provide building structure parts in the nature of floors, walls, ceilings and partitions, each of which is thermally insulated through the inclusion therein of a blanket of material having low heat conductivity and that cooperates with specially formed panels of foraminous material to establish through the interior of the structure elements mentioned, a number of air cells that further contribute to the ability of the walls, etcetera, to prevent the passage of heat units therethrough.

This invention has for a still further object to provide building units in the nature of walls or the like comprising an integrated mass coated with cementitious substance, having reinforcing structural elements therein and incorporating a number of dead air spaces disposed on each side of an insulating blanket that is held in operative position by ribs pressed laterally from the aforesaid panels.

The invention has for another salient feature the provision of building structure wherein the walls, floors and other similar parts thereof, are composed of a number of sheets of expanded metal lath, each having laterally projecting ribs, said sheets of expanded metal lath being arranged in back-to-back relation with the opposed ribs secured together through the employment of easily manipulable elements, the character of which permits attachment or formation on the job and as the building parts mentioned are being assembled.

A large number of minor objects will appear during the course of the following specification, referring to the accompanying drawings, wherein:

Fig. 1 is a fragmentary perspective view illustrating a building structure and a number of

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the component units thereof, all made in accordance with the present invention.

Fig. 2 is a fragmentary vertical sectional view through a portion of the building structure shown in Fig. 1, illustrating the manner of supporting floor, wall and partition units.

Fig. 3 is a fragmentary elevational view of a portion of one of the panels of foraminous material with much of the cementitious substance thereon removed therefrom.

Fig. 4 is a fragmentary sectional view taken on line IV—IV of Fig. 3, looking in the direction of the arrows and illustrating the manner of disposing a blanket of insulating material within the building panel to establish dead air spaces.

Fig. 5 is an enlarged fragmentary sectional view taken on line V—V of Fig. 3.

Fig. 6 is an enlarged fragmentary sectional view through a portion of the building illustrating the manner of interconnecting a partition with one of the walls, taken on line VI—VI of Fig. 1.

Fig. 7 is a fragmentary sectional view taken on line VII—VII of Fig. 4.

Fig. 8 is a perspective view illustrating the preferred form of clip which is employed in securing together the opposed ribs of adjacent panels.

Fig. 9 is a fragmentary longitudinal sectional view through the bights of proximal ribs, illustrating another manner of interconnecting the back-to-back foraminous panels; and

Fig. 10 is a similar sectional view showing another way of interconnecting the laterally extended ribs of opposed foraminous panels by employing struck-out portions of the U-shaped ribs.

Buildings having the general characteristics of those illustrated in the accompanying drawings and especially Figs. 1 and 2 thereof, are particularly desirable when the component parts thereof are formed in accordance with this invention. Such building structures as are created to embody the combination of parts forming walls, partitions, floors, etc., are preferably placed upon suitable foundation walls 12 to insure solid footing. Any peripheral foundation walls 12 that are employed may be supplemented by supporting girders 14 disposed in spaced apart relation beneath floor 16 and desirably at points below this floor 16 where partitions are erected.

The partition, illustrated in Figs. 1 and 2, is broadly designated by the numeral 18 and is built upon floor 16 after the latter has been laid either as a conventional reinforced slab or by placing upon foundation 12 and girders 14, a number of panels assembled as hereinafter described.

In practice, it has been found practicable to

embed the two opposed panels 20 of foraminous material within a concrete or other cementitious slab 22. The panels 20 are held in spaced apart relation by the integral ribs 24 thereon. These ribs or the panels per se, are secured together by elements hereinafter described in detail by reference to Figs. 7 to 10 inclusive.

A blanket 26 of insulating material is held between the foraminous panels 20 in spaced relation thereto for the purpose of establishing dead air space or air cells 28. The floor 16 when so made is strong enough to support the weight to which it is subjected, will not sag, and presents air spaces and material of low thermal conductivity.

Where extra rigid floor structure is desired, reinforcing rods 30 are laid at desirable intervals across the upper foraminous panel 20. In the illustrated embodiment of floor 16 (Figs. 1 and 2), reinforcing bars 30 are laid upon upper panel 20 to intersect ribs 24 which bridge the distance between foundation 12 and girder 14. These bars 30 are long enough to likewise bridge the distance between an under-pinning such as a portion of the foundation 12 or a girder similar to that designated by the numeral 14.

The peripheral walls 32 of the building rest upon floor 16 and may be tied thereto by interconnecting the foraminous panels 34 of walls 32 to foraminous panels 20 of floor 16. In fact, the panels 34 with insulating blanket 36 therebetween, may be erected upon panels 20 of floor 16 prior to pouring or otherwise placing the upper layer of cementitious substance 22.

Panels 34 are provided with laterally projecting ribs 38 that project toward each other from the backs of panels 34 when they are in the operative position in parallelism and in spaced condition. As panels 34 are brought together, the blanket of insulating material 36 is engaged by the bights of the U-shaped ribs 38 and held taut to bridge the space between proximal ribs 38. The type of insulating material 36 which is preferred is that having sheets of building paper or the like 40 forming a confining case for the insulating material 36.

The blanket of insulating material 36 is compressed between opposed ribs 38 and regardless of the type of interconnecting means that is employed, the ribs are drawn tightly against the blanket of insulating material 36 and held in slightly spaced apart relation to insure that no metal-to-metal contact of an appreciable amount is present. Thus, the possibility of heat conductivity is reduced to a minimum and the component parts of the building structure are not only insulated by material 36 but are filled with air cells 42 bounded by the blanket of insulating material 36, a portion of the foraminous panels 34 or 20 as the case may be, and ribs 38. Ribs 38 are devoid of perforations and constitute adequate load-bearing structural parts which in walls 32, serve as studding or vertical frame members capable of receiving and holding a roof or upper floor weight.

Foraminous panels 34 and 20 employed in walls 32 and floor 16 respectively, are in the nature of expanded metal lath sheets, the longitudinal marginal edges whereof are in the form of a rib such as 24 or 38.

Referring now particularly to wall 32 and having reference to Fig. 6 of the drawings, foraminous panels 34 are held together by nesting the ribs formed along the proximal longitudinal vertical edges of said panels. Assuming the panels are twenty-four inches in width, it will be obvious that a structure weight supporting part in the nature of a studding, will be presented in wall 32 every twenty-four inches. This weight supporting structural element will be a pair of nested ribs 38 on each side of the blanket of insulating material 36. The ribs 38 are substantially U-shaped in cross section and the bights of opposing ribs are in alignment and held together by clips or integral ears in a manner hereinafter specified.

When partition 18 is to be joined to an outside wall 32, the marginal rib 138 of one or both of foraminous panels 134 and 135 thereof, is bent to enter a similar rib 38 of a panel 34 in the wall 32 to which the partition is joined. Reference to Fig. 6 indicates the manner in which panel 135 of partition 18 is secured to outside wall 32. In other words, as shown in Fig. 6, the panel 135 of partition 18 extends beyond that end thereof adjacent wall 32 and has a rib 138 disposed in nesting relation within a rib 38 of the inner panels 34 of wall 32.

It is contemplated that a hand tool be employed in forming means for securing together the opposed panels of metallic foraminous material. In Fig. 10 the bights of opposed ribs 38, having the blanket of insulating material 36 therebetween, are fastened together by striking therefrom, ears 44 that are bent as illustrated. The ear 44 struck from rib 38 to the right (Fig. 10), is forced through the blanket of insulating material 36, through opening 46 formed by producing ear 44 on the lefthand rib 38, and thence downwardly into gripping condition. A number of such interlocking parts may be formed along each of the opposed pairs of ribs 38.

In the form of interconnecting means illustrated in Fig. 9, fingers 48 are struck from the bight portion of one rib 38 and threaded through perforations 50 provided in the bight of opposing rib 38. These fingers pass through the blanket of insulating material 36 prior to their being bent into the condition illustrated to rigidly hold the opposing ribs in a place where lateral movement is precluded.

In Figs. 7 and 8 is illustrated a clip, broadly designated 52. This clip is U-shaped and has legs 54 and a bight 56. In use this clip 52 has its legs 54 extended through opposed perforations 58 in the bights of opposite ribs 38 and through the intervening blanket of insulating material 60. The ends of legs 54 are bent to tightly hold the ribs together.

After the panels of foraminous material 134 and 135 in partition 18 and panels 34 of walls 32 are assembled, the faces are coated with cementitious substance. Partition 18 and the inner face of walls 32 will have a plaster or other suitable inside finish 62 applied while the outer surfaces of walls 32 will have concrete, stucco, or other selected cementitious material 64 applied to render the same weatherproof. Obviously, such plaster or the like 62 as is applied to the inner face of the building walls 32 and the faces of partitions 18, may be colored and finished to suit the taste of the owner.

When the cementitious coatings 62 and 64 are applied, any interlocking structure that has been employed is held against accidental displacement because the cementitious substance enters and fills the hollow ribs 38 to preclude straightening of ears 44, fingers 48 or legs 54, as the case may be.

A very small amount of metal-to-metal con-

tact is created when employing any of the interlocking devices above described.

When ribs 38 constitute load-bearing structural elements, the rigidity and function is enhanced by the concrete or other substance, which is introduced thereinto when the panels are faced. These load-bearing elements produced by ribs 38, therefore, extend substantially the full width of the partition, wall or floor when the building is erected.

It is possible to manipulate the expanded metal lath having ribs 38 or 24 as the case may be, to produce walls or building structure parts of a wide variety of dimensions without losing the advantages arising from the combination of ribs, panels, interlocking means, cementitious substance, insulating material, and air cells. The invention, therefore, is flexible and capable of use when erecting most any type of enclosure.

The fragmentary illustrations of building structures, shown in the official drawings, accompanying this specification and forming a part hereof, are for illustrative purposes only, and therefore, it is desired to be limited in the embodiment of this invention only by the scope of the appended claim.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

In building structure, a pair of relatively perpendicular walls, said walls each comprising a pair of spaced, metal lath, sectional panels, each of the sections having a number of spaced, inwardly extending, V-shaped, hollow ribs integral therewith, the outermost ribs of each section being in nested relationship with proximal ribs of sections next adjacent thereto, the ribs of one panel being aligned with the ribs of the opposite panel and having their apices spaced apart; a continuous partition comprising a pair of spaced, paper sheets having resilient insulating material therebetween disposed in compressed relationship between the ribs of said panels; a number of interconnecting elements passing through said apices of the aligned ribs and through said partition, said ribs being otherwise imperforate; and a coating of cementitious material on the outermost face of each panel respectively, said coatings filling the ribs in locking relationship to said elements, one of the ribs of one wall extending into nesting relationship with one of the ribs of the other wall, the cementitious coatings of said one wall merging with the proximal coating of said other wall whereby to join the walls as a unit.

HENRY R. LEWIS.

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