

Nov. 27, 1934.

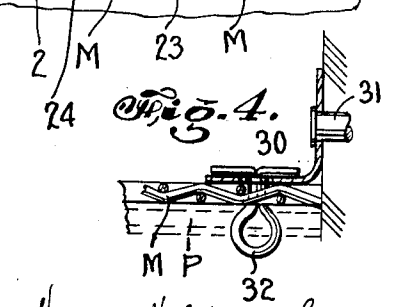
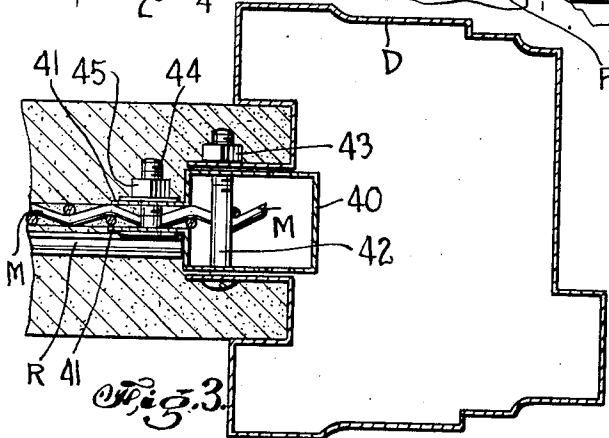
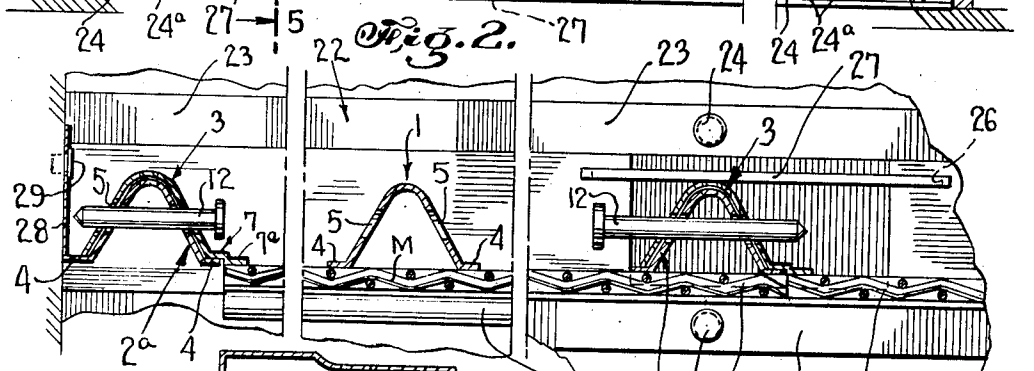
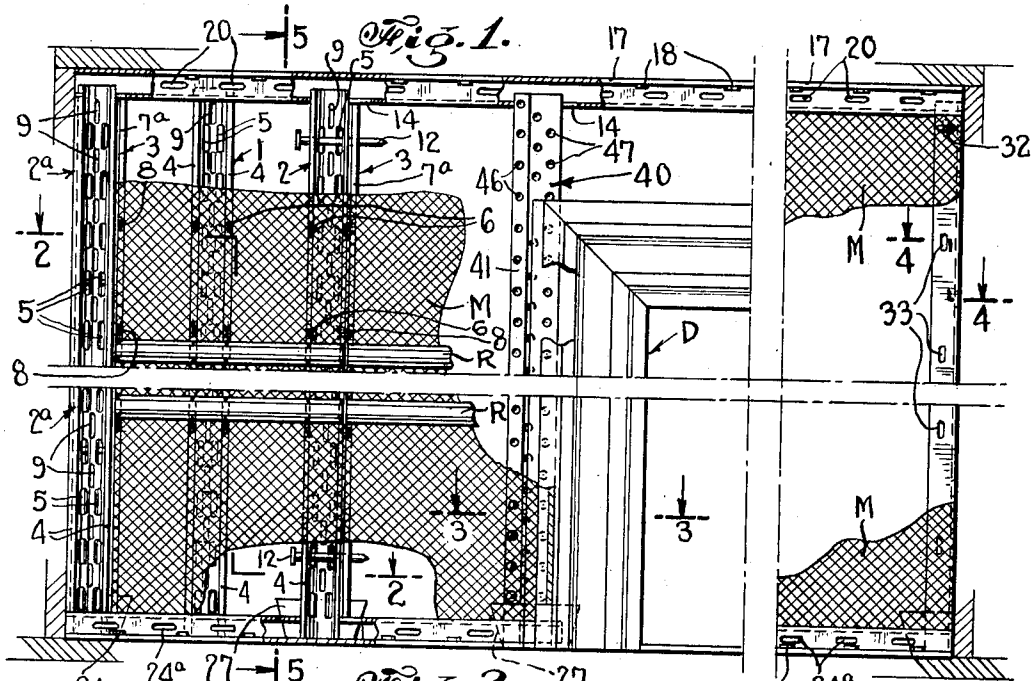
H. HOLDSWORTH

1,982,104

WALL CONSTRUCTION

Filed Sept. 2, 1933

3 Sheets-Sheet 1



Harry Holdsworth
INVENTOR
BY *Mock & Blum*
ATTORNEYS

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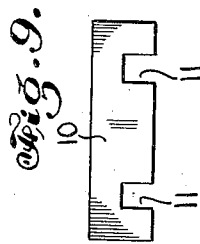
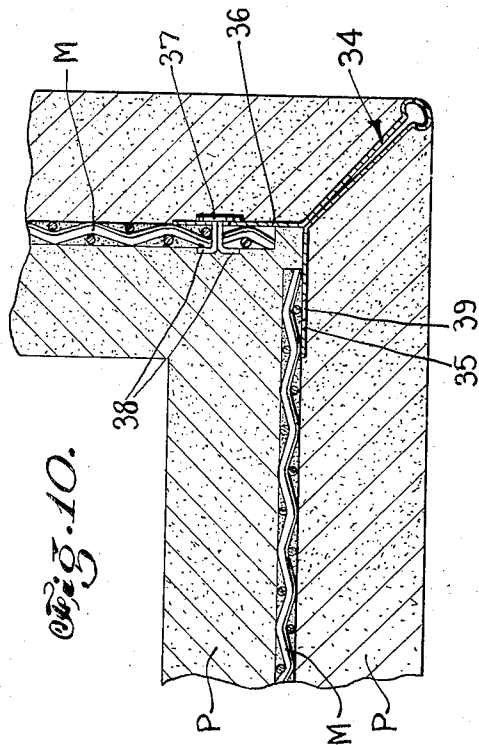
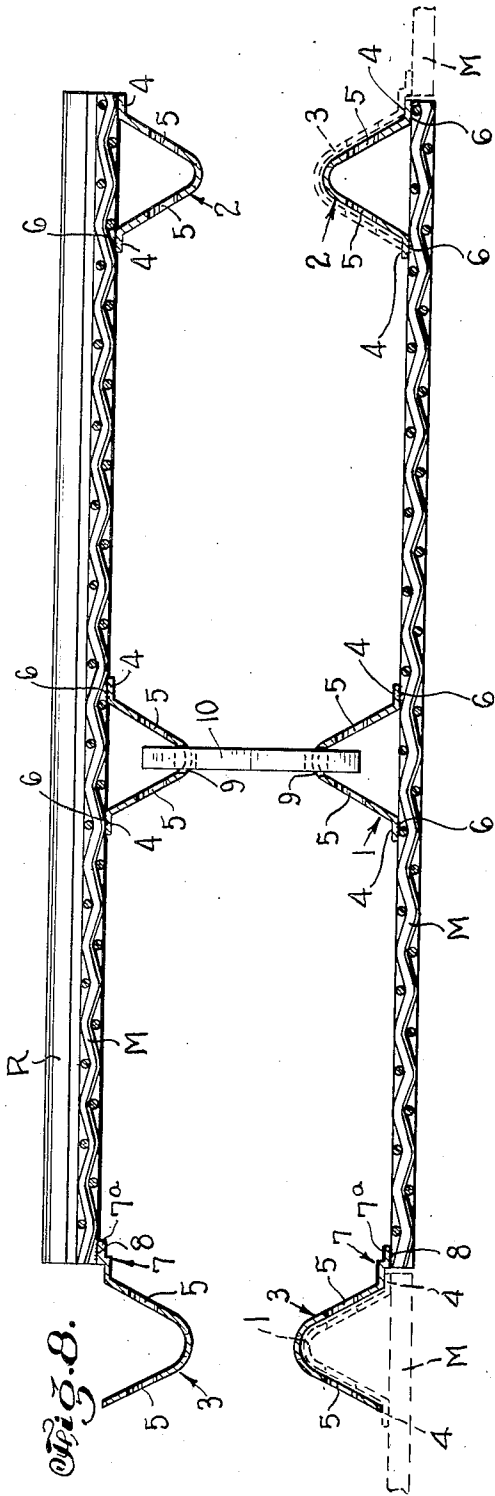
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Harry Holdsworth
INVENTOR
BY *Mock & Blum*
ATTORNEYS.

UNITED STATES PATENT OFFICE

1,982,104

WALL CONSTRUCTION

Harry Holdsworth, New Rochelle, N. Y., assignor
to Fairfax Partition & Construction Company,
Inc., New York, N. Y., a corporation of New
York

Application September 2, 1933, Serial No. 687,952

14 Claims. (Cl. 72-46)

This invention relates to a new and improved wall construction.

One of the objects of the invention is to provide a construction for partitions, walls, and the like, so that said building units can be conveniently and economically manufactured and assembled. Likewise, the improved walls and partitions are light, rigid and durable, and they are properly bound to the plaster or other covering material, if such covering material is used.

Another object of my invention is to provide building elements for constructing walls, partitions, and the like, said elements being generally similar to each other, save for certain changes which are necessary in starting and finishing walls, and the like, so that walls or partitions of any desired length can be constructed by assembling a suitable number of these elements.

Other objects of my invention will be set forth in the following description and drawings which illustrate a preferred embodiment thereof, it being understood that the above general statement of the objects of my invention is intended merely to generally explain the same and not to limit it in any manner.

Fig. 1 is an elevation illustrating the construction of the improved device.

Figs. 2, 3, 4 and 5 are respectively sectional views on the lines 2-2, 3-3, 4-4 and 5-5 of Fig. 1.

Fig. 6 is a perspective view of the ceiling member, in the inverted position.

Fig. 7 is a perspective view of a floor member.

Fig. 8 is a horizontal sectional view illustrating the assembly of the improved elements, in order to make a double wall.

Fig. 9 is an elevation of the spacer which is illustrated in Fig. 8.

Fig. 10 is a horizontal section illustrating the construction at a corner.

Referring to Fig. 8, each element which is used for constructing the improved wall or partition, (save the elements which are used for starting or finishing the partition, or for other special purposes) consists essentially of a central rib 1, and end ribs 2 and 3. The ribs 1 and 2 are of identical construction.

Referring to Fig. 8, each of the ribs 1 and 2 has a general triangular cross-section, and each of said ribs is provided with flanges 4. Said ribs may be stamped or otherwise made from any suitable metal, such as sheet metal or the like. Said ribs 1 and 2 are likewise provided with lateral openings 5 which are used for connecting adjacent elements to each other. Likewise, said

lateral openings 5 permit the entrance of the plaster P or other finishing material so that the plaster penetrates and fills said ribs.

Wire mesh M or other suitable material (either perforate or imperforate) is connected to the flanges 4 of the ribs 1 and 2, by means of spot welding at the points 6, or by any suitable fastening means of any kind. The wire mesh or the like, therefore reinforces the ribs 1 and 2, since it forms a third leg of the triangular cross-sections of said ribs. The rib 3 which is provided at one end of each said element, also has a general triangular cross-section, which is larger than the cross-section of the ribs 1 and 2. Hence, the rib 3 of one section can overlap the end rib 2 of the adjacent section, this being illustrated in dotted lines in Fig. 8. One edge of the rib 3 is free from a flange, although a flange could be provided if desired, similar to the flange 4. The other or inner edge of said rib 3 is provided with a flange 7, having an inner end 7a, which is offset from the body thereof. The wire mesh M or other material, is also welded or otherwise suitably connected at the points 8, to the member 7a. Hence, when the elements are assembled, the mesh members of the respective sections are aligned with each other, and their lateral surfaces are in substantially the same planes.

The ribs 1, 2 and 3 are likewise provided with openings 9, through which the plaster or other plastic material can enter. Said openings 9 have the general rectangular shape shown in Fig. 1, their corners being rounded, and said openings 9 also make it possible to connect the elements which are used for constructing a double wall, by means of a spacer 10 having notches 11. When the spacer 10 is put into position, the notches 11 thereof fit over the adjacent portions of the walls of the ribs, so that the parallel elements are held against relative movement, out of the desired parallel position. In order to connect overlapping ribs 2 and 3, ordinary nails 12 can be used, as shown in Fig. 2. Said nails preferably have a loose fit in the openings 5, as the final union between the parts is made by the plaster or other material, although there is a fairly snug fit between overlapping ribs 2 and 3. However, there may be a small space between overlapping ribs 2 and 3, if this is desired.

The ribs 1, 2 and 3 may be of any desired height, corresponding to the height of the wall or partition. The upper ends of said ribs (including the pairs of overlapping ribs) enter the openings 14, in the bottom flanges 15 of the ceiling members 16. Said ceiling member 16 have

flanges 17 which abut the ceiling beams or the like, and said flanges 17 are connected to the ceiling beams or to any other support by means of nails 18, which pass through openings 19, provided in the flanges 17.

If desired, the overlapping ribs 3 can be made shorter than the ribs 1 and 2, so that the overlapping ribs 3 do not enter the ceiling members 16. The ceiling members 16 are also provided with openings 20, through which the plaster or the like, can pass. Said openings 20 are provided at both sides of each ceiling member 16, only one of said sides being shown in Fig. 6. The bottoms of the ribs 1, 2 and 3 enter recesses 21 which are provided in floor members 22. Said ceiling members 16 and said floor members 22 can be stamped or otherwise made out of sheet metal, or any other suitable material. The floor members 22 have flanges 23 which are connected to the floor beams or the like by means of nails 24, which pass through openings 25. The vertical walls of the floor members are provided with "plaster" holes 24a, through which the plaster or the like can pass. Said floor members 22 are provided with recesses 26, and the bottoms of the ribs are held in position by means of wedge-shaped keys 27, which are driven into said slots or recesses 26. It will be noted that the recess 21 is open at the front thereof, so that the upper ends of the ribs 1 and 2, and of rib 3 (if desired) can be pushed upwardly so as to enter the openings 14, and the lower ends of said ribs can then be readily swung into the openings or recesses 21.

This construction is very light, strong and rigid, because the wire mesh or other material can be welded or otherwise suitably secured to the ribs, before the elements are assembled. This also greatly decreases the cost of production, and it makes it possible to apply the wire mesh in perfectly planar form to said ribs. The wire mesh or other material may be even under a certain tension, as it is welded to the ribs, in order to secure a rigid construction. The floor and ceiling elements, 16 and 22, may be of any desired length.

In order to start a wall, a rib 2a is utilized, of the type shown in Fig. 2. This rib 2a generally corresponds to the rib 2, save that it has an additional flange 28, which is perpendicular to the flanges 4. In constructing the rib 2a, one of the flanges 4 may be made wider than the other flange 4, this detail being shown in Fig. 2. The third flange 28 of the rib 2a is connected to the corresponding wall, by means of a fastening member 29. In order to finish a wall, the construction shown in Fig. 4 is utilized. This consists of an angular member 30, which is connected to one of the walls by means of a fastening member 31. Said angular member 30 is connected to the wire mesh of one of the elements, by means of a cotter-pin 32, which passes through said wire mesh and through an opening 33 which is provided in said angular finishing member 30. Any suitable number of said cotter-pins 32 can be passed through the superposed openings 33.

Fig. 5 shows in dotted lines how the upper end of a rib is inserted into the ceiling member, and how the lower end of the rib is then swung into final position.

The elements are reinforced by any suitable number of horizontal ribs R, which are welded or otherwise suitably secured to the wire mesh M. At the points where said horizontal ribs R are welded to the wire mesh, the spot welding may also be extended to the flanges of the ver-

tical ribs, and if fastening members or fastening devices of any kind are used, the same effect can be secured in order to give maximum strength and rigidity.

The construction illustrated in Fig. 4 is used when it is desired to connect a partition to a finished wall.

When two walls, perpendicular to each other, are originally constructed, the construction shown in Fig. 10 is utilized. This comprises a corner member 34 having flanges 35 and 36 which are perpendicular to each other. The wire mesh in each part of the corner construction, is connected to said corner member 34 by means of fastening members 37 having legs 38. These fastening members 37 pass through openings 39 and through the wire mesh.

As shown in Fig. 10, each of these fastening members 37 is provided with a head and with two bendable legs. These legs can be inserted through the openings 39 and through the wire mesh, and the ends of said legs can be bent as shown in Fig. 10. Each corner member 34 has the full height of the walls. Whenever it is necessary to include a door in the wall or partition, the construction shown in Fig. 3 is utilized. This shows the door jamb D which may be of any suitable construction. Said member D has parallel flanges, between which there is located a member 40 having parallel flanges 41. The members D and 40 are made of any suitable metal or other material. The vertical member 40 is connected to the adjacent flanges of the member D, by means of a bolt 42, having a nut 43. Said bolt 42 also passes through an opening in the wire mesh M, as said mesh extends into the interior of said hollow member 40. The mesh M is likewise connected to the flanges 41 by means of a bolt 44 having a nut 45. Said bolt 44 has a head of the usual type, and the shank of said bolt 44 is passed through suitable openings 46, of the flanges 41, and through the wire mesh 45. Any suitable number of said bolts 42 and 44 can be utilized.

As shown in Fig. 1, the member 40 is provided with plaster holes 47, in order to admit the plaster which is applied above the top of the door.

As shown in Fig. 1, the vertical members 40 enter the ceiling members, and they also enter the floor members.

It will be noted that a basic wall element has been provided which can be utilized in a simple and flexible manner in constructing new buildings, and in constructing partitions for buildings which have been previously erected.

It will be noted that whenever a wall element is referred to in the claims, this includes the construction of partitions.

It will also be noted that the completed wall or partition consists essentially of reinforced plaster or concrete or the like, because there is an intimate contact and union throughout between the metal parts and the plaster or concrete. However, the invention also applies to walls or partitions which are not finished with plaster or concrete. Likewise, while the main utility of the invention is for constructing walls or partitions, the building element specified herein may be used for constructing floors, ceilings, or the like.

While ribs having triangular cross-sections have been illustrated, the invention generally applies to any hollow rib having an open side (which may be provided with flanges), a member (such as the mesh M) being connected to

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both edges of said open side, and extending beyond said rib.

For convenience, the ribs 2 and 3 may be designated as edge-ribs of each element, and it will be noted that the metal member M is connected to both edges of the open side of the rib 2, and to only a single edge of the open side of the rib 3.

For convenience, the faces of the ribs in which the openings 9 are located, may be designated as the outer faces of said ribs. While ribs of triangular cross-section have been illustrated, the invention generally applies to hollow ribs having any desired cross-section. This cross-section may be polygonal (having four or more sides), in which case the inner rib 2 could be slid into the corresponding outer rib 3.

It will be noted that the upper ends of the ribs may extend sufficiently above the wire mesh, in order to enable said upper ends to enter the openings 14. The lower ends of said ribs may likewise extend a sufficient distance below the wire mesh or other connecting means.

In many cases it is desired to provide sound-proofing between one floor and another. According to this invention, this can be very simply and efficiently done by providing a strip of felt or other suitable sound-proofing material, between the ceiling beams and the ceiling members 16, and also between the floor beams and the floor members 22. In such case the nails or other fastening members which pass through the holes 19 and 25, would pass through said strips of sound-proofing material.

This will provide a cushion of sound-insulating material upon each floor, and the floors above and below the same, which is especially useful in the design of a tall building. The plaster or other finishing material will cover and conceal the cushions of sound-proofing material.

Referring to Fig. 5, the bottoms of the vertical ribs would rest on such cushions. The tops of the ribs are spaced from the ceiling beams. Since the felt cushions or the like are somewhat yieldable, the partition has a certain amount of give, which is particularly valuable in providing walls or partitions for tall buildings, which have considerable sway. In such tall buildings, ordinary walls or partitions crack and the improved partition is substantially proof against cracking. The use of the openings 5 and 9 is of particular advantage because it prevents the plaster from cracking. If a rib is made imperforate the plaster tends to shrink away from the rib when there is a change in temperature because the plaster and the metal rib have different coefficients of expansion. However by providing openings of sufficient size and number in the ribs, the plaster enters and substantially fills these ribs so that the plaster is firmly bound to the ribs and cracking is eliminated.

I have shown a preferred embodiment of my invention, but it is clear that numerous changes and omissions can be made without departing from its spirit.

I claim:

1. A building element comprising a hollow rib having an open side, and a metal member connected to both edges of said open side, and extending beyond said rib, said ribs having openings in the body thereof through which plaster can enter said rib to be bonded thereto.

2. A building element comprising a perforate metal member, and hollow ribs connected to said perforate metal member adjacent the edges thereof, each of said hollow ribs having open sides ad-

acent said perforate metal member, one of said hollow ribs having both edges of its open side connected to said perforate metal member, the other metal rib only having one of its edges connected to said perforate metal member, the cross-section of the last mentioned rib generally corresponding to and being larger than the cross-section of the first mentioned rib.

3. In combination, a pair of building elements, each said element comprising a metal member having a first edge-rib and a second edge-rib connected thereto adjacent the edges thereof, said ribs being hollow, the first edge-rib having an open side whose edges are connected to said metal member, the second edge-rib having an open side of which only a single edge is connected to said metal member, the second edge-rib of one element overlapping the first edge-rib of the other element.

4. In combination, a pair of building elements, each said element comprising a metal member having a first edge-rib and a second edge-rib connected thereto adjacent the edges thereof, said ribs being hollow, the first edge-rib having an open side whose edges are connected to said metal member, the second edge-ribs having an open side of which only a single edge is connected to said metal member, the second edge-rib of one element overlapping the first edge-rib of the other element, said ribs having openings in the faces thereof, through which fastening means can be passed.

5. In combination, a pair of building elements, each said element comprising a metal member having a first edge-rib and a second edge-rib connected thereto adjacent the edges thereof, said ribs being hollow, the first edge-rib having an open side whose edges are connected to said metal member, the second edge-ribs having an open side of which only a single edge is connected to said metal member, the second edge-rib of one element overlapping the first edge-rib of the other element, the edge of the second edge-rib to which the metal member is connected having a flange which is provided with an offset portion to which said metal member is directly connected so that the metal members of the respective sections are aligned with each other.

6. In combination, a pair of building elements, each said element comprising a metal member having a first edge-rib and a second edge-rib connected thereto adjacent the edges thereof, said ribs being hollow, the first edge-rib having an open side whose edges are connected to said metal member, the second edge-rib having an open side of which only a single edge is connected to said metal member, the second edge-rib of one element overlapping the first edge-rib of the other element, the second edge-rib being shorter than the first edge-rib.

7. In combination, a pair of building elements, each said element comprising a metal member having a first edge-rib and a second edge-rib connected thereto adjacent the edges thereof, said ribs being hollow, the first edge-rib having an open side whose edges are connected to said metal member, the second edge-ribs having an open side of which only a single edge is connected to said metal member, the second edge-rib of one element overlapping the first edge-rib of the other element, the edge of the second edge-rib to which the metal member is connected having a flange which is provided with an offset portion to which said metal member is directly connected so that the metal members of the respective sections are

aligned with each other, the top of the second edge-rib being below the top of the adjacent first edge-rib.

8. In combination, a hollow ceiling member having openings in its bottom face, a hollow floor member having openings, each of the openings in said floor member extending into the top face and into the front face thereof, and wall sections having vertical ribs whose upper and lower ends extend respectively into said openings, means for retaining the lower ends of said ribs in the openings in the floor member, and wire mesh sections connected to said ribs.

9. In combination, a hollow ceiling member having openings in its bottom face, a hollow floor member having openings, each of the openings in said floor member extending into the top face and into the front face thereof, and wall sections having vertical ribs whose upper and lower ends extend respectively into said openings, means for retaining the lower ends of said ribs in the openings in the floor member, and wire mesh sections connected to said ribs, said ribs being hollow and having spaced vertical edges, each said wire mesh section being connected at one edge thereof to both edges of a rib, each said wire section being connected at its other edge to a single edge of a rib which overlaps the adjacent rib of the adjacent section.

10. A building construction comprising metal ceiling elements and metal floor elements, yieldable cushions between the floor elements and the floor beams, upstanding ribs located within said ceiling elements and said floor elements, the bottoms of said upstanding ribs resting upon said cushions, and metal members connecting said upstanding ribs.

11. A building construction comprising metal ceiling elements and metal floor elements, yieldable cushions between the floor elements and the floor beams, upstanding ribs located within said ceiling elements and said floor elements, the bottoms of said upstanding ribs resting upon said cushions, and metal members connecting said upstanding ribs, the tops of said ribs being vertically spaced from the ceiling beams.

12. A building construction comprising metal ceiling elements and metal floor elements, yieldable cushions located between the ceiling elements and the ceiling beams, yieldable cushions located between the floor elements and the floor beams, upstanding ribs having their ends within said elements, the bottoms of said ribs resting upon the adjacent cushions, and metal members connecting said ribs.

13. In combination, a hollow rib having an open side, perforate metal material connected to both edges of said open side and extending beyond said rib, plastic finishing material covering said rib and said perforate metal material, said rib having openings therein, said plastic finishing material extending through said openings and into said rib, so as to bond said plastic material and said rib to each other.

14. A building element comprising a hollow rib having an open side, and a perforate metal member connected to both edges of said open side and extending beyond said rib, said rib having a tapered cross section, the longitudinal apex of said rib having openings therein.

HARRY HOLDSWORTH. 110

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