

Dec. 30, 1930.

M. L. CARR

1,786,822

METALLIC STRUCTURE

Filed April 30, 1928

Fig:1

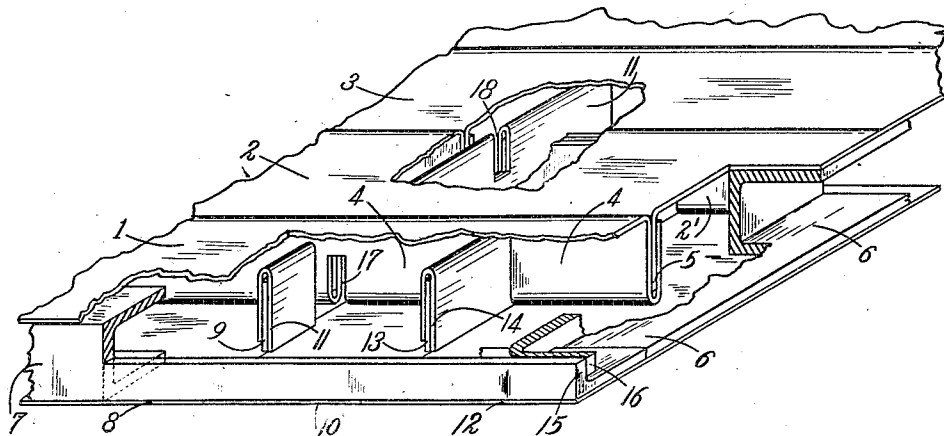


Fig:3

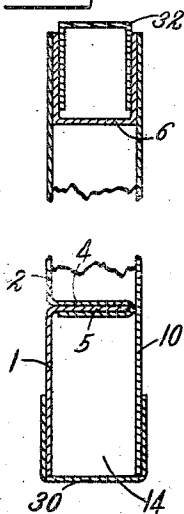
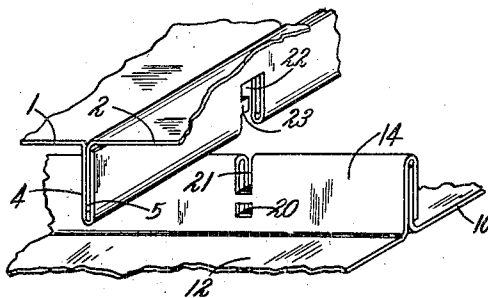


Fig:2



—Inventor—
Maurice L. Carr

George H. Simmons Atty:

UNITED STATES PATENT OFFICE

MAURICE L. CARR, OF NEW YORK, N. Y.

METALLIC STRUCTURE

Application filed April 30, 1928. Serial No. 273,904.

My invention relates in general to metal doors, partitions, walls, floors, and the like, more particularly to such structures in which the space between the faces is divided into a plurality of small spaces or cells; and the principal object of my invention, briefly stated, is the method of constructing a new and improved structure of this kind.

As a further object of my invention, I provide a new and improved method of fastening the two faces of the structure together, a method which produces an economically constructed smooth faced structure.

As a further object of my invention, I produce a structure which is considerably lighter in weight, the lightness being obtained without sacrificing the rigidity of the structure. Moreover, the structure can, if desired, be shipped to the place of its installation in a knock down form, with considerable savings in freight and cartage charges, and assembled without the aid of special tools.

Further, objects of my invention, not specifically mentioned here, will be apparent from a reading of the detailed description and claims, as follows:

To illustrate my invention I have shown, by way of example, a door constructed in accordance with the objects of the invention, it being understood that this showing is by way of example only, as there are many other usages which can be made of the invention.

Fig. 1 shows a broken perspective of the door; Fig. 2 illustrates one method of fastening the faces of the door together, and Fig. 3 shows the details of the closing in channels.

The face of the door shown in Fig. 1 comprises sheet metal members 1, 2, 3, etc. The edge of member 1, adjacent to member 2, is bent downward, forming a U shaped projection 4, which stands at right angles to the face of the member. The edge of member 2, adjacent to member 1 is bent downward to form a projection 5 which stands at right angles to the face of the member and fits into the U-shaped projection 4. These two projections are fastened together by

bolts, screws, riveting, or welding. Similarly, the edge of member 2, adjacent to member 3 is bent downward in a U-shaped projection, and the adjacent edge of member 3 is bent and fitted into the U. The remaining members of the face, with the exception of the last, are duplicates of the member 2. The last member, not shown, is similar to the member 1, except that the projection is straight instead of U-shaped, and fits into the member adjacent to it.

The other face of the door comprises sheet metal members 8, 10, 12, etc. The edge of member 8 adjacent to member 10, is bent upward to form a projection 9, which fits into the U-shaped projection of the adjacent member 10. Similarly the adjacent edges of the other members of the faces are bent, the one to form a U-shaped projection and the other to form a straight projection which fits into the U. These projections, which are in reality standing seams, are so disposed that the seams of one face lay at right angles to the seams of the other face, in the assembled door.

The seam 4—5, and other similar seams of that face of the door are pierced at regular intervals by the slots 17. The seams 9—11, etc., of the other face of the door, are pierced at regular intervals by the slots 18. In the assembled door the slots 17 and 18 register to form a lap joint between the transversely disposed seams. These slots and seams are so proportioned that the seams of the one face of the door rest against the innermost side of the opposite face of the door. This forms a plurality of cells, which are bounded on two sides by seams of the one face, on two other sides by seams on the other face and on the two remaining sides by the face of the door.

In smaller structures these notches would be of equal depth in the two faces of the structure to form a half lap joint. In larger structures, or in structures where additional stiffness is desired, the notches can be cut to complementary depths. That is, for example, the notches in the 9—11 seam might be cut only $\frac{1}{4}$ the depth of the seam, and the registering notches in the seams of the

other face, such as 4, would be cut to $\frac{3}{4}$ of the depth of the seam. In adjacent seams, 13—14, for example, the cutting could be reversed; that is, $\frac{3}{4}$ in 13—14 and $\frac{1}{4}$ on 4—5 and other registering seams. If particular stiffness was desired in one direction, at the expense of stiffness in the opposite, all the seams in that one face would be cut to $\frac{1}{4}$ depth, and all the seams in the weaker face to $\frac{3}{4}$ depth. In certain other instances, it might be desirable to cut the seams of one face at varying depths with the shallow notches in the center of the structure and the deeper notches near the edge. The notches in the seams of the other face would be cut to register. Thus it will be seen that a wide variation in the details of the construction can be made to fit the structure to particular requirements.

The edges of the door are closed in by channels. The exact manner of placing these channels depends largely upon the use to which the door is to be put. In one embodiment of the invention, a hinged door, the top and bottom channels are turned out, and the latch and hinged edges closed by a channel turned in. In Fig. 1 I show such a door, with the channel 7 turned in and the channel 8 turned out. The outwardly turned channel permits grinding of that edge of the door to fit it into the casement or frame while the inwardly turned channel presents a smooth, slightly edge to which hinges and latches can be readily attached. The flange of the outward turned channel 6 is cut away to butt against the flange of the channel 7, and the web is bent to form the L-shaped projection 16 which butts against the web 15 of the channel 7, to form a braced corner. This projection is fastened to the channel by screws, bolts, riveting, or welding.

In another embodiment of my invention, the channels of the door may be over and on the outside of the faces of the door. Such an embodiment is shown at the bottom of Fig. 3.

It will be seen that the channel 30 overlaps the faces 1 and 10 of the door. The corners of the door may be made by butting the channels together or by mitering them. At the top of Fig. 3 I show another method of closing the edges of the door. The main channel is turned out, and a filler channel 32 is tightly fit within the main channel. This latter channel 32 is adjustable so that the door can be accurately fitted into its frame. The filler channel is fastened to the main channel by screws, bolts, welding or soldering.

In still other embodiments, a combination of the foregoing methods of closing the edges might be desirable. The channels need not all be placed in the same manner, the combinations making the structure fit readily into any requirements which may arise.

In ordinary doors, the two faces of the door are held together by flat headed bolts or screws. However, if the door is to be used

as an office door, or a door in a hotel room or the like, it is often desirable to have the faces of the finished door perfectly smooth, and not marred by the bolt heads. Doors of this kind are usually painted to represent a single piece of wood, and must therefore be smooth and free from projections.

In Fig. 2 I show the details of a smooth faced door, particularly an improved method of holding the faces of such a door together. In the seam 4—5 between the sections 1 and 2 I place the slot 22 into which the tenon 23 projects. In the seam 14 of the other face of the door, I place the slot 21 and the mortise 20. In assembling the two sections slots 21 and 22 are made to register, then the face containing the seam 4—5 is slid at right angles to the seam 14 to insert the tenon 23 into the mortise 20, thereby securely locking the faces of the door together. When the edge channels of the door are fastened in place, the two faces are securely held with respect to each other, and the tenon is thereby held in the mortise. The cracks in the faces of the door, which appear at the joints between sections, can be filled in with solder, putty, or the like, and the door face polished smooth so that the surface can be painted and grained as mentioned above.

Fire resisting doors are frequently filled with a fire resisting material, to give the door added fire resisting properties. Among the materials that may be used for such purposes are diatomaceous earth, asbestos, mineral wool, and the like. These materials, like most flaky substances, will settle some in time, and unless special means are used to prevent it, voids will be formed by this settling. The cells contained within a door of my invention afford a convenient means for supporting such material. Since the interior of the door is divided into little cells, the material is securely supported in small volumes, each of which settles very little because of the lessened weight the lower stratas must support.

If a moulded filler is to be used in a door of my construction, the one face of the door is assembled and laid flat. The filler is poured in this face and then the other face is forced in place. If the channels are placed as shown in Fig. 1 they form an edge for the casting operation but if the channels are to overlap the faces, as shown in Fig. 3, a temporary form must be used until the filler has had a chance to set.

It frequently happens that the sound deadening properties of a door are equally as important as the fire resistance. The multicellular construction used in my doors has good sound deadening properties, but if more complete deadening is wanted, the door can be filled with a sound deadening material. Mineral wool, wool felt, or any suitable material can be used as a filler. The material will be supported by the seams, and therefore the

sound deadening properties of the door will be retained for a longer period of time than was possible in doors of the type constructed heretofore.

Extremely large doors, such as would be used in garages, factories and warehouses and the like, can be shipped to the place of installation in a knock down form, and assembled on the job, without the use of special tools. The sections for a door of this type are similar to those shown in Fig. 1, differing therefrom in that the seams are carried to the edge of the door. The channels would best be of the type shown in Fig. 3, and would be held in place by bolts.

While I have chosen to describe my invention with a door, I have done so by way of example only, as there are many other uses to which the structure can be put, by one skilled in the art, without departing from the scope of the invention.

Having thus described my invention, what I consider new, and desire to have protected by Letters Patent, is pointed out in the appended claims.

What I claim is:

1. In a double metal structure, sides or faces composed of a plurality of sheet metal sections united and held together by standing seams projecting inwardly at right angles to the face, the seams of one face being disposed transversely to and half lapped into the seams of the other face to cross brace the door and to form a plurality of completely closed cells, channel members fitted at the edges of the structure to close the space between said faces, and means for holding said faces together.

2. In a double metal structure, a face composed of a plurality of metal sections, standing seams joining adjacent ones of said sections, notches in said seams, a second face similarly constructed, notches in the seams of said second face, said notches registering in the assembled structure to form a lap joint that permits the seam of one face to rest against the inward side of the other face to thereby cross brace the structure, means for closing the space between the edges of said faces, and means for holding said faces together.

3. In a metal structure, two faces each composed of a plurality of metal sections, standing seams joining adjacent ones of said sections, notches in said seams, a tenon projecting into the notches of one of said faces, a mortise adjacent to the notches of the other of said faces, said seams being disposed at right angles to each other in an assembled structure, with said tenons inserted into said mortises by moving the face containing the tenons longitudinally of its seams to lock said faces together.

4. In a metal structure, two faces each composed of a plurality of metal sections, stand-

ing seams joining adjacent ones of said sections, notches in said seams, a tenon projecting into the notches of one of said faces, a mortise adjacent to the notches of the other of said faces, said faces being assembled with the seams of one disposed at right angles to the seams of the other with the notches registering and the face containing the tenons being then moved longitudinally of its seams to register, with said tenons with said mortises to thereby lock said faces together, and means including channels for closing in the edges of said structure.

5. A double faced structure having the faces spaced apart by standing seams on the faces, the seams of the one face being disposed at right angles to and lapped into the seams of the other face to brace the structure and to form a plurality of completely closed cells.

6. In a double faced metal structure, a planar face composed of a plurality of sections having a U-shaped flange disposed at one of its edges and an L-shaped flange disposed at its opposite edge, said L-flanges being inserted in the U-flanges of adjoining strips to form standing seams composed of three thicknesses of metal and disposed at right angles to the face, said seams having slots in their free edges, a second and similarly constructed face disposed with its seams at right angles to the seams of the first and with its slots registering with the slots of the first seams to bring the free edges of the seams of the first against the second face and the free edges of the seams of the second face against the first face, said seams and faces thereby forming completely closed cells between the faces and said seams preventing translation of one face on the other in all directions, means for locking the faces together to prevent separation by movement in the planes of the seams, and means for closing the edges of the structure.

In witness whereof, I hereunto subscribe my name this 28th day of April, A. D. 1928.

MAURICE L. CARR.