June 1, 1937. E. W. INGRAM ET AL 2,082,578

METAL BUILDING CONSTRUCTION

Filed March 25, 1935

Fig. 1.

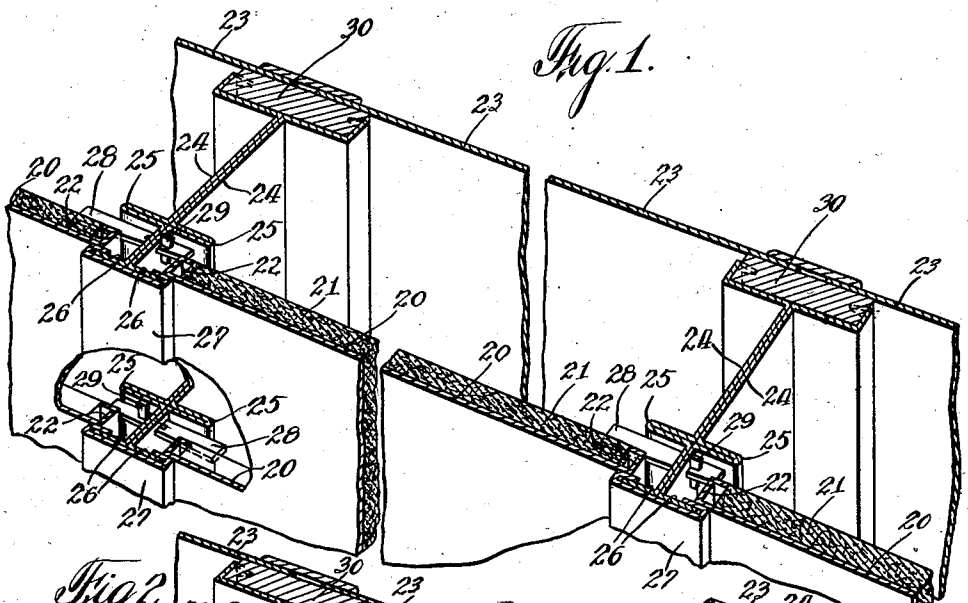


Fig. 2.

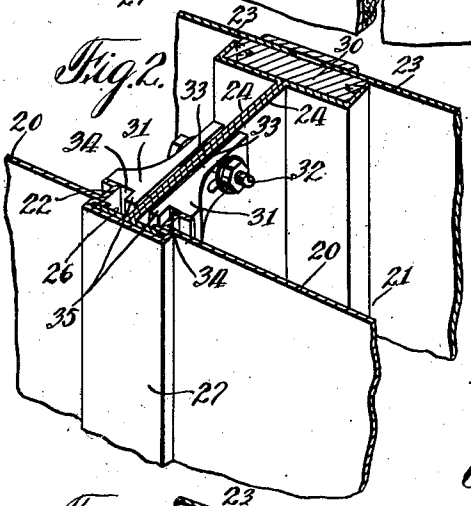


Fig. 4.

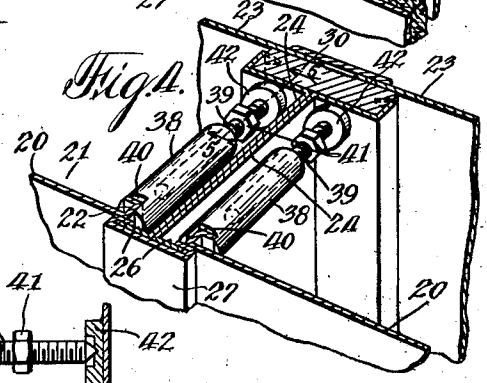


Fig. 5.

Fig. 3.

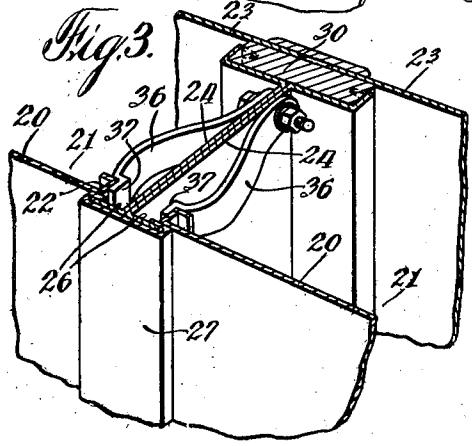
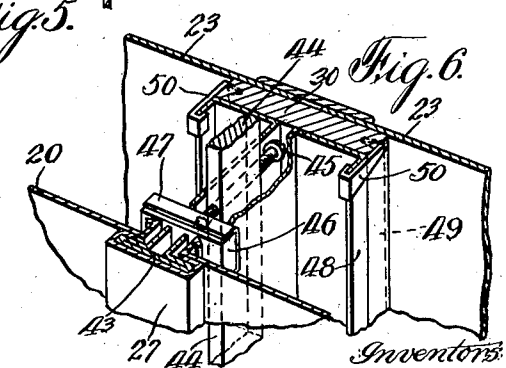


Fig. 6.



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METAL BUILDING CONSTRUCTION

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Application March 25, 1935, Serial No. 12,858

5 Claims. (Cl. 189—34)

This invention relates to metal building construction of the type wherein its elemental parts may be standardized, pre-fabricated and stocked, and then as desired taken to the site of the proposed building and there quickly assembled and erected into the desired building without special cutting and fitting and with only ordinary tools and workmen. It further contemplates the so-called knock-down type of building, which, if occasion requires, may be readily taken down and transported to a new location and there again erected for use, or the parts may be re-stocked or stored for future use.

More particularly the present invention relates to the wall construction of such buildings involving such members as the studding and the parts associated therewith, although such structural members are or may be frequently used in other relations in and about the building, such, for instance, as cross member or beams above and below windows, doors, or the like.

An object of the invention is to provide a structure of the class described that shall be highly efficient, of comparatively low cost and attractive in appearance.

Another object is the provision of such a structure wherein there is no tendency to displace, distort or strain the outside paneling by the stresses imposed when incorporated in a building.

Further objects and advantages will appear from the detailed description to follow and the appended claims, in connection with the accompanying drawing, which shows several embodiments of the invention. In this drawing,—

Fig. 1 is a perspective horizontal section of a portion of a wall of a building of the type referred to, two vertical studs and associated parts being shown;

Fig. 2 is a similar view, but with one stud only, of another form of studding;

Fig. 3 is a view similar to Fig. 2 showing still another form of studding;

Fig. 4 is a similar view showing another form of studding;

Fig. 5 is a detail view of the bearing of the adjusting screws of Fig. 4; and

Fig. 6 is a perspective sectional view of a different studding and associated parts.

Referring to Fig. 1 of the drawing, sections of two studs and the outside and inside wall panels associated therewith are shown assembled and attached together to form a complete wall structure. Such walls may be of the desired dimensions but ordinarily have an over-all thickness of about six inches; the studding are spaced as necessity may require, but ordinarily several feet apart, and the wall panels are of corresponding width and of the desired height, usually several feet where no openings or other obstructions interfere.

The outside panels **20**, which may be of suitable sheet metal and, if desired, lined with a sound-deadening material **21**, which may also be of heat-insulating quality, and having rearwardly and inwardly bent side edges **22**, are firmly secured by said edges to the studding and form the outer or outside facing of the wall. The inside facing of the wall is formed by the panels **23**, which may be of thin sheet metal or other material, and are likewise secured, as hereinafter explained, at their vertical edges to the studding. Both the outside and inside panels may be coated on their outer faces with porcelain enamel, which may be plain and of any desired finish or color. The sheets or finish or both may be formed to resemble brick, tile or other configuration.

The studding comprise, preferably sheet metal members rolled or drawn in half-stud sections with their web portions **24** placed back to back and preferably suitably spot-welded together, with the welds on four-inch centers staggered, although they may be bolted or otherwise secured together.

A longitudinal shoulder **25** is formed in the web, as indicated, and the outer edge is bent outwardly at right angles, as at **26**, to form a flange. These two oppositely extending edge portions **26** form the end flange or head of the completed stud. A sheet metal finishing or trim strip **27** may be slipped over the stud flanges **26, 26**.

As shown, the studing extends through between the separated or spaced edges of the wall panels **20** to the outside of the panels and to secure them firmly in position the panels are pressed or pushed outwardly against the studding flange or head, instead of being pulled inwardly against the stud by an outside key or clamping device, as in some structures.

In order thus to push the panels outwardly in this form of Fig. 1, suitable metal wedges **28** are driven into position between the shoulders **25** and the adjacent edges **22** of the pans **20**. These wedges may pass through suitable slots in the webs **24** of the stud and a retaining pin **29** in wedge form may be driven down through a hole or slot in the main wedge **28** on the opposite side of the web to hold the wedge **28** in its wedging position tightly between the shoulder and pan edge. These wedges are placed at frequent intervals throughout the length of the stud as may be

necessary or desired to hold the pans firmly, and those for the pan on the opposite side of the stud are reversed in direction, as shown in the lower fragmentary section at the left of Fig. 1.

Preferably alternate wedges hold the panels on the corresponding side from which the wedges are inserted. Thus, as illustrated in Fig. 1, the upper wedge may hold only the left hand panel, while the lower wedge holds only the right hand panel. This enables the workman to mount a succeeding panel after a preceding one has been secured in place.

By thus pushing the pans or panels out against the flanges or heads of the studding the outer face of the panels and of the wall is maintained in its flat, natural, definite and fixed plane and there is no danger of surface disfigurement by the displacement of the various panels constituting the face of the wall or distorting, bending or springing the panels, with possibility of cracking the finish, if any, by any unevenness of pressure in the clamping.

At the opposite edge of the stud the metal is bent outwardly from the web and thence forwardly to form a channel for the nailing or furring strip **30**, which is preferably of wood or other suitable material, a little thicker than the depth of the channel to prevent the edges of the latter from physically contacting with the metal inside panels **23**, to insulate the latter from direct contact with the former, to prevent transmission of frost, sound vibrations, or the like.

This furring strip **30** may be secured in its channel in any desired way, as by nails, screws, prongs, or other desired means.

The inside panels **23** are secured at their vertical side edges to the nailing strips **30**, as by nails, screws or in any desired way, and their adjacent edges and securing means may be covered by a suitable trim strip of sheet metal or other material.

As thus constructed, the parts may be made and assembled in a factory. When the framework of the building has been erected, the outside panels are slipped in place and the wedges tightened. Any desired insulating material, such as rock wool, may be packed into the open spaces and the inside panels secured in place. If for any reason it is desired to dismantle the building, the reverse operations are quickly performed. In case of accident or other cause, individual panels, either inside or outside, may be removed or replaced.

In the form shown in Fig. 2 the construction is the same except that the web of the stud has no shoulder but a pair of clamping lugs **31** at frequent intervals are placed on opposite sides of the web and are secured in position by the clamping bolt **32** passing through the web. These lugs are slotted for the passage of the bolt, whereby they may be adjusted back and forth without removing the bolt entirely, and they may be serrated or roughened, as at **33**, near the bolt where they bear against the web, the better to hold them in their tightened positions. Their opposite ends are notched to provide a seat **34** to bear against the in-turned edge flange of the cutside panel **20**, and a lip portion **35** extending into the space between the web and panel.

In order firmly to press the panel against the head of the studding the lugs **31** are pressed tightly against the panel and the bolt **32** tightened to clamp said lugs in their panel clamping position. When desired to loosen the panel for any reason, the reverse operations take place.

In the form shown in Fig. 3, instead of rigid lugs, a pair of spring metal lugs **36**, as shown, are securely bolted to the web of the stud and when the panel is in place may be sprung into the position shown, with their bent ends **37** seated against the inside edge of the panel **20** and thus to tightly press the same against the outer flange or head of the stud.

These spring clamps may likewise be adjustably bolted to the web if desired.

In the form shown in Fig. 4 the pan, panel or other surface material is held in place by a rocking screw lug, the base for which is welded to the opposite bottom portion of the nailing strip channel. Thus, a rod or tubular member **38**, counterbored and internally threaded, to receive a screw bolt **39**, fits against the edge of the pan, the same being notched across the end, as at **40**, to fit over the said edge flange of the pan **20** and thereby being prevented from turning. The bolt **39** has a nut **41** secured rigidly thereto and the end of said bolt is bluntly pointed and seats in a recess in the disc-like base **42**, which is welded or otherwise secured to the bottom of the nailing strip channel of the stud. This construction permits a rocking bearing of this end of the clamping member even though said member is not adjusted exactly at right angles across the web.

With this construction, the outside panel may be pressed as firmly as desired in position and there is no danger of the clamp loosening or slipping. There is no cutting or special forming of the web. These screw clamping devices, like the lugs of the other forms, are placed at the desired intervals through the length of the stud.

In Fig. 6 the studding proper is made of one piece of sheet metal by reversely bending the material in the flange or head and carrying the same across the head or flange. Thus the material is carried across as at **43** and the two half-studs are not separated. In this instance too a trim strip may be put around these flanges to form a part of the head. In this form, too, the webs are spaced apart sufficiently to receive an elongated reinforcing member **44** to which the webs are preferably welded. Adjusting and push-clamping screw bolts **45** at intervals are threaded through this bar and bear upon wooden or similar blocks **46** having a metal housing **47** which pass transversely through suitably enlarged holes in the webs of the studding and bear adjacent their ends on the edges of the panels **20**. Tightening of the bolts **45** thus clamps the pans **20** against the outer head or flange of the studding. The rocking motion and tolerance of the wooden blocks take up any variation in the flange or the turned up or in portion of the panel. In this form too the outside panels may be removed or replaced from the inside without disturbing the inside panels, holes being formed in the nailing strip for access to the bolts **45**.

Instead of turning out the stud sheet to form the furring strip channel edge, the same may be turned in the opposite direction, as at **48**, instead of forwardly, the more usual way, as indicated by the dotted lines **49**; and in that case the triangular prongs **50** may be used, the same being bent at their sharp ends and driven into the edge of the furring strip, while their other ends are bent to fit over the rear flanges **48**.

Various changes and alterations may be made without departing from the spirit and scope of the invention as set forth or intended to be set forth in the appended claims.

We claim:

1. A building wall construction comprising in combination, aligned wall panels, built-up sheet metal studding having webs extending between the edges of the panels with heads outside the panels, oppositely disposed laterally extending shoulders formed on the said webs inside the panels, wedges adapted to be driven between the shoulders and the inside edges of the panels to clamp a selected one of the panels firmly against the inside of the heads, and means for locking said wedge in clamping position.

2. A building construction comprising, in combination, wall panels, sheet metal studding having webs extending between the edges of the panels with heads outside the panels, and means cooperating with the studding and movable transversely of the plane of the web to clamp the panels against said heads, said webs having laterally extending shoulders, said clamping means cooperating with one of said shoulders to clamp only a corresponding panel against said heads.

3. A building construction comprising, in combination, wall panels, sheet metal studding having webs extending between the edges of the panels with heads outside the panels, said webs having laterally extending shoulders and openings through said webs between said shoulders and said heads, and reversible means movable through said openings and cooperating with the shoulder on one side to clamp corresponding panels against said heads.

4. A building construction comprising, in combination, wall panels, sheet metal studding having webs extending between the edges of the panels with heads outside the panels, said webs having laterally extending shoulders and openings through said webs between said shoulders and said heads, reversible means movable through said openings and cooperating with said shoulders to clamp corresponding panels against corresponding sides of said heads, and means to lock said movable means in clamping position.

5. A building wall construction comprising, in combination, algined wall panels, a built up sheet metal studding, said studding comprising substantially flat sheet metal strips secured together to form webs extending between the edges of the panels, and forming a head outside said panels, laterally extending shoulders formed on said strips inside said panels, and wedges adapted to be driven between said shoulders and the inside edge of a single panel whereby each web clamps only its corresponding panel snugly against the inside of said head.

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