

Aug. 31, 1965

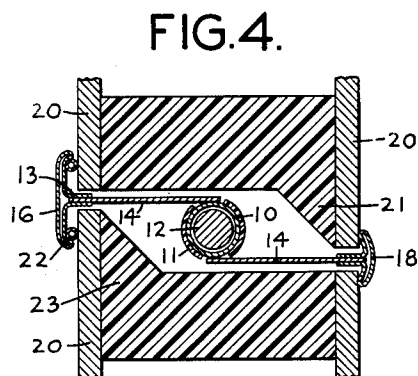
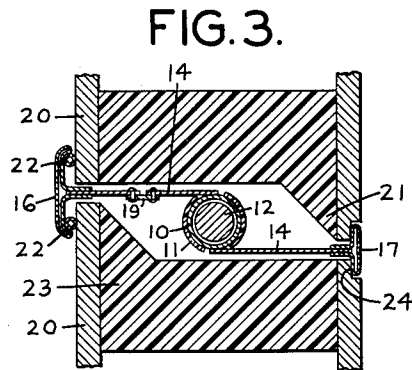
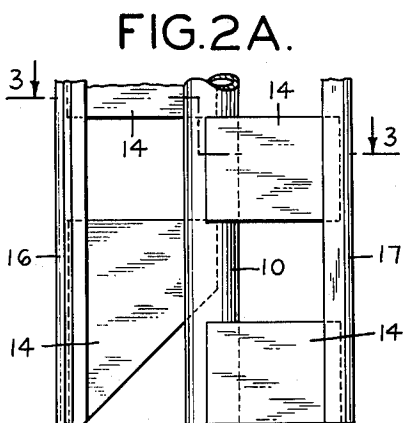
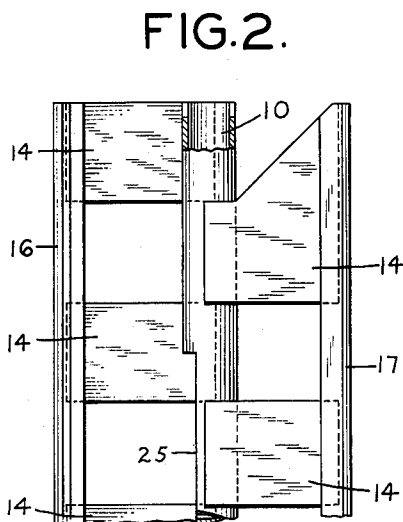
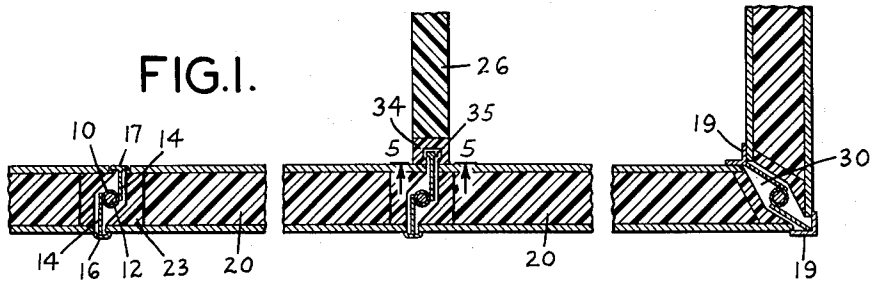
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3,203,147

DEVICES FOR CLOSING THE JOINTS OF PREFABRICATED WALL PANELS

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3 Sheets-Sheet 1



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FIG. 7.

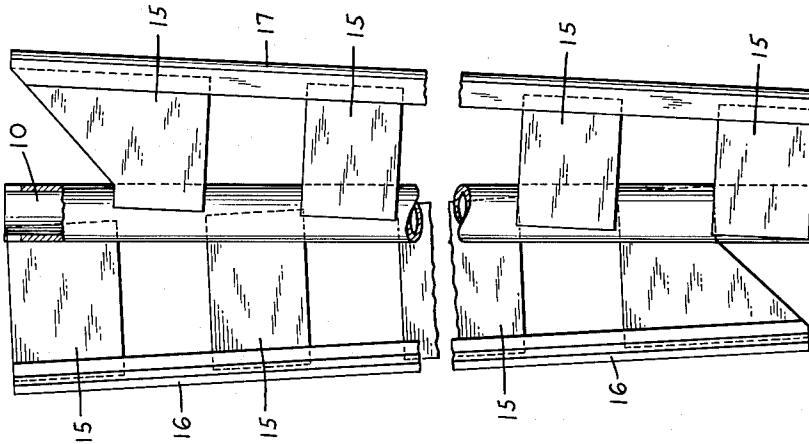


FIG. 5.

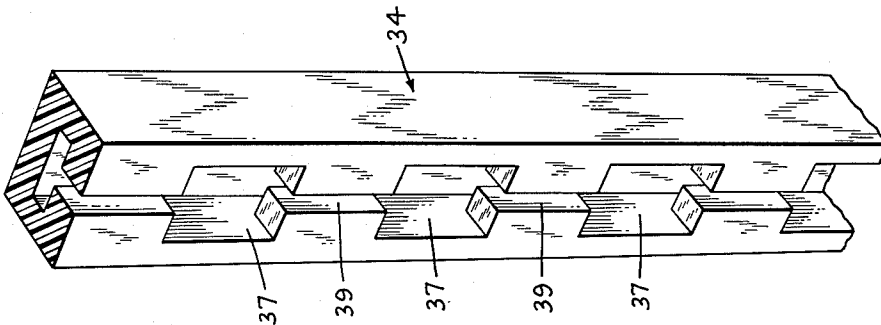
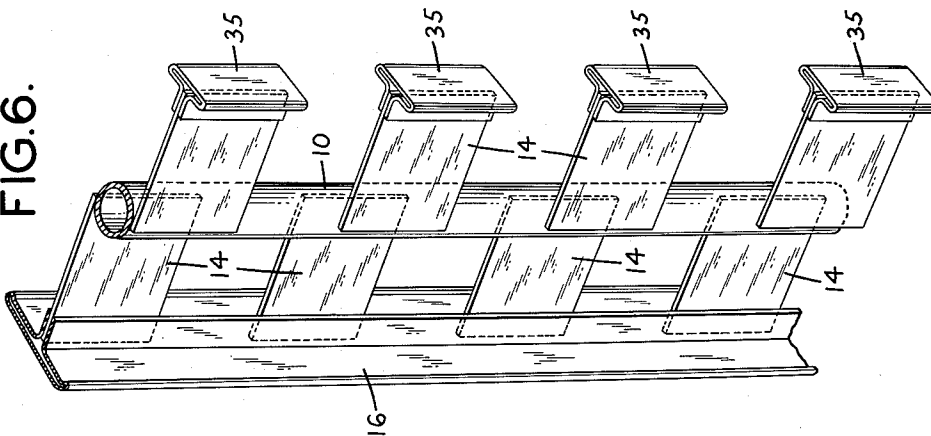


FIG. 6.



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FIG. 8.

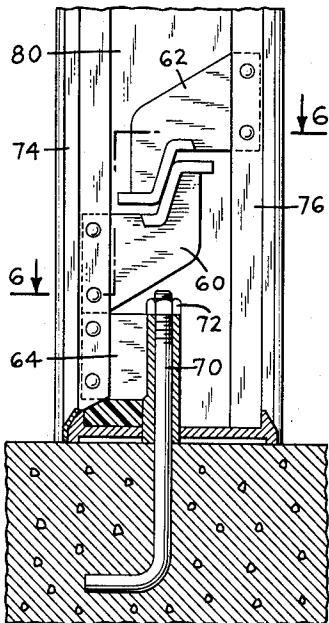


FIG. 9.

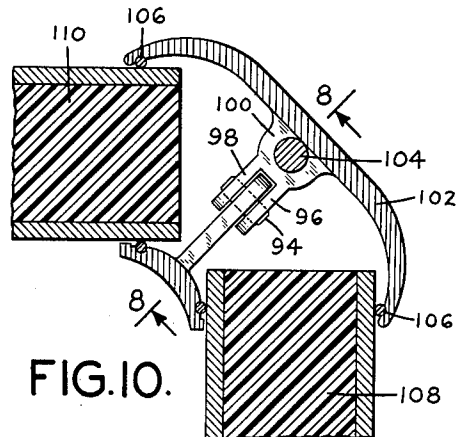
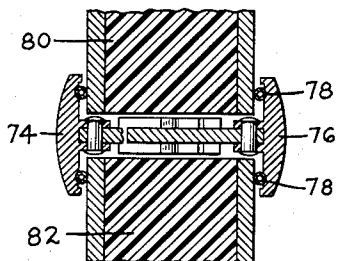
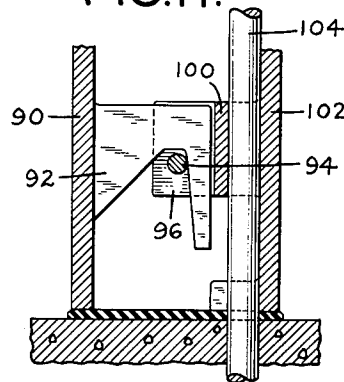


FIG. 10.

FIG. 11.



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DEVICES FOR CLOSING THE JOINTS OF PREFABRICATED WALL PANELS

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6 Claims. (Cl. 52-461)

This invention relates to devices for closing the joints of prefabricated wall panels. More particularly, it relates to devices in the nature of batten clamps adapted for aligning and closing the joints of prefabricated wall panels when used in modular construction.

As the art of making wall panels consisting of an insulating material sandwiched between two wall surfaces is developing, it becomes more and more apparent that some simple, economical way must be found to fasten these panels to one another and to a foundation in a manner which will permit the panels to be used in combination with one another, in the construction of structures which are firmly attached to their foundation and which are mechanically strong, weatherproof, and pleasing in appearance.

It is accordingly an object of this invention to provide a device for aligning and closing the joints between prefabricated wall panels used in modular construction.

It is a further object of this invention to provide a device of the afore-mentioned type which can be used to firmly anchor the prefabricated walls to the foundation.

A still further object of this invention is to provide a device of the afore-mentioned type which can be made weatherproof and which is attractive in appearance.

In accordance with this invention, it has been found that these and other objects and advantages can be obtained with the use of batten clamps provided with means to secure at least one of the batten strips to a framework element adapted to pass through a space between abutting ends of adjacent panels, a member attached to at least one other batten adapted for transmitting a force into the space between the abutting panels to draw the second batten strip toward the first, and means adapted to lie in the space between the abutting panels to cooperate with the member to help exert a clamping force on the two abutting panels.

In the drawings which illustrate preferred modifications of this invention:

FIG. 1 is a plan view partly in section of preferred forms of batten clamps rigidly maintained on the anchor bolt in clamping position with respect to panel units with three variations of panel assemblage being shown.

FIG. 2 is a side elevation of a batten clamp of FIG. 1 showing the details of its construction.

FIG. 2A is a side elevation of a modified version of the clamp shown in FIG. 2.

FIG. 3 is a plan view taken along line 3-3 of FIG. 2 showing in addition, the manner in which the clamp aligns and closes the joints between prefabricated wall panels.

FIG. 4 is a plan view similar to FIG. 3 illustrating a variation in the type of batten used to close the joint between the two panels.

FIG. 5 is a vertical perspective taken on line 5-5 of FIG. 1 showing the intermediate T-shaped slots of the edge portion of a partition member.

FIG. 6 is a vertical perspective of the batten clamp illustrated in FIG. 1 as holding the partition, a portion of whose edge is shown in FIG. 5 in place against the main wall.

FIG. 7 is a side elevation of a modified form of batten clamp shown in FIG. 2.

FIG. 8 is a side elevation of a section of another form of batten clamp showing the manner in which it is fastened to a foundation anchor bolt.

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FIG. 9 is a plan view of batten clamp taken along the line 6-6 of FIG. 8.

FIG. 10 is a plan view of a similar batten clamp expressly designed to form a corner and hold the panel units at right angles to one another.

FIG. 11 is a side elevation taken along the line 8-8 of FIG. 10.

The invention contemplates a wall structure comprising joined structural panels each of said panels comprising a pair of rigid facing sheets and a layer of heat insulating material therebetween as shown in FIGURES 1, 3 and 4 by numeral 20, a space along abutting ends of the adjacent panels, the panels being lined and having the space between the abutting ends closed by a device which includes a vertically disposed fixed rod or anchor bolt 12 in the space and a pair of opposed means overlying said space on opposite sides thereof. These means can be batten strips such as 16, 17, 18 or 19 or an assembly of strip in conjunction with panel such as shown in the middle figure of FIGURE 1 and in FIGURES 5 and 6. In these figures it is seen that the member 35 does not act strictly as a batten but acts in conjunction with slotted vertical edge 34 as a means overlying the space between adjacent panels and is disposed opposite a batten. The device also includes a tubular member 10 which surrounds the fixed rod or anchor bolt 12 in rotatable relation thereto and has connected thereto sheet metal members or membranes 14 fixed to oppose sides of the tubular member and to the respective opposed means. At least one of the opposed means is a strip such as a batten 16, 17, 18 or 19 and the wall structure is joined by virtue of the tubular member being under torsional stress with the means clamped to the exterior surface of the panels and the tubular member 10 is held under torsional stress by a locking means such as a pin which if released will release the torsional stress and permit the tubular member to rotate to a relaxed state thus releasing the opposed means from clamping engagement with the panels.

The batten clamp illustrated in FIGS. 1 to 4 comprises a tube 10 which has a length substantially equal to the height of the wall panel with which it is to be used. It may be a normal cylindrical tube as shown in FIG. 2A or it may have a cut-out portion 25 as shown in FIG. 2. This tube is adapted to be used in conjunction with an anchor bolt 12 on which it rotates freely. Metal sheets or membranes 14 are attached tangentially to tube 10 and are adapted to pass outwardly through the space between the edges of the prefabricated panels 20 where they terminate at battens 16, 17, 18, 19 or 35. Clock-wise rotation of the tube 10 about the anchor bolt 12 will draw the battens 16, 17, 18, 19 and 35 closer toward the anchor bolt and, in those cases where prefabricated panels are positioned with their edges in alignment and the membranes 14 extending outwardly through the space between the edges of the panels, the battens will be drawn against the wall panels which will thereby be aligned with one another and with the foundation bolt 12.

The battens may, of course, be designed in many different ways. Batten 16 is a modification which is particularly adapted for use on an outside wall where weather-proofing is important. Preferred forms of battens are arched outward from the wall surface so as to conceal the joint between the panels and also gaskets 22 used for weatherstripping. The battens have a member 14 which is perpendicularly attached to the inside surface. With the aid of this member, they can be drawn together with enough force to flatten the edges against the wall surface and to compress the weatherstripping gaskets 22 which may be made of neoprene or similar materials. A preferred form of batten 16 may be made by folding a stainless steel sheet in such manner that the batten is formed from the mid-section and the member perpendicular thereto. The two

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side sections 13 are brought in and aligned side by side as shown in FIG. 4 of the drawing. A batten made in this manner can be fastened to the member 14 by spot welding. The batten may, of course, be made of other materials including other metals, fiberglass, plastics, wood, etc. This batten is provided with a gasket 22 which may be made of neoprene or similar material. In order to make doubly sure of a weatherproof joint, the space between the joints of the prefabricated panels may be filled with a caulking material before the batten is pulled into position.

The batten illustrated at 17 is designed to fit into a recess 24 in the interior face of a panel wall, which may be made of gypsum wall board, in order to allow taping and finishing in a manner to give a continuous smooth-surfaced wall.

Batten 18 is a decorative type batten which may be used on inside wall structures in which the batten itself is to furnish part of the decorative scheme. For particular purposes such as use in corners, the battens may naturally be given the desired configuration such as shown at 19 in FIG. 1 of the drawings.

If the tube 10 is made of sufficiently strong material to withstand twisting when torsion is applied to tighten the battens and hold the panels in alignment with one another, the membranes 14 may be fastened in direct alignment with one another as shown in FIG. 2 of the drawing. However, if the material which is used takes on an appreciable twist, the twist may be compensated for by fastening the membranes 15 along a spiral line such as shown in FIG. 7 rather than a straight line as shown in FIG. 2.

In use, the tube 10 can be put in position on the anchor bolt before the panels are brought into position, whereby the locating of the batten is quick and easy. To avoid the necessity of lifting this batten and tube to its full height of 10' for placing it on the anchor bolt, the tube used can be cut open at the front to within 1 or 2' of the top so as to admit the anchor bolt when the tube is raised 1 or 2'. When the cut-away pipe as shown at 25 in FIG. 2 is used and insulating material is poured into the space around the tube, it will enter the open face of the tube and fill the space between it and the anchor bolt, thereby firmly anchoring the tube.

In order to eliminate the possibility of heat transmission from the inner to the outer batten whereby condensate might form on a metal inner batten in cold weather, the tube 10 can be covered with an insulating material 11 such as transite, asbestos, etc. The battens can be attached to such insulated pipe with the aid of rivets. Alternatively, the member 14 between the batten 16 and tube 10 can be made in two sections which are riveted or bolted together with a strip of insulating material 19 between the two sections at the overlap. Slotted bolt holes furthermore make such member adjustable.

Clamps of this type are adapted for modular construction in which repeating panel units are interchangeable. Part of a structure of this type is shown in FIG. 1. In the drawing as shown, the anchor bolts 12 are firmly held in a base. These may be in the form of threaded bolts that are firmly cast into the foundation. In those cases in which the panel walls are the regulation 4' in width, the bolts are to be modularly spaced at about 4' center to center. The typical panel 20 would have a modular thickness of about 4" and could be made of any satisfactory weatherproofing material comprising sufficient strength and stiffness. The panels can have recesses along abutting ends, offset to cut away the outer edge of the panel along one joint and its inner edge along the next joint, forming projecting, diagonally opposite tongues as shown at 21, 23 in FIGS. 1, 3, and 4. The space formed by these recesses will accommodate the various devices by which the battens are clamped and the panels are held in alignment with the anchor bolts. Other variations in the offset recesses can be used for corners such as shown at 30 in FIG. 1. The dimensions of the panels would naturally correspond to the height of the wall section or to modular units to

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complete the wall where doors or windows are to be installed.

The offset recess, which is provided in each end of the preferred panels used along with the clamps of this invention, has a particular advantage in that it permits the panels to be swung into position around the anchor bolts and twist-on battens. This eliminates the need for raising and lowering the panels into position. When once the panels have been swung into position, the battens can be tightened with about $\frac{1}{2}$ of a turn whereby the panels are drawn into alignment and locked to the anchor bolt.

FIGS. 1 and 5 show the thin indoor partition 26 provided with a slotted vertical edge 34 having narrow slots 39, to engage the T-shaped members of batten 35 (FIGS. 1 and 6) alternating with slots 37 wide enough to admit these T-shaped members. Thereby panel 26 can be engaged with batten by raising the panel just a little above normal position; then the battens can be tightened to maintain close contact between the partition and the wall and hold the panel in position.

In the preferred form of structure in which the above-described clamping devices are used, the space between the panels can be filled after the battens are tightened in position with any suitable free-flowing caulking material such as stucco, foam resin, or concrete, which will set or cure in position. When this procedure is used, it will furnish permanent positioning and weatherproofing of the paneled wall joints.

FIGS. 8 through 11 illustrate another modification of the batten clamps of this invention. The clamp there shown is a quick-closing bayonet type of batten clamp. In a device of this type, the clamps may take any number of specific forms, one type being illustrated in FIGS. 8 and 9 and another in FIGS. 10 and 11. Fundamentally, in the construction of the bayonet type batten clamp, one batten is provided with a projection adapted to fit around the anchor bolt and hold the batten in alignment therewith. This projection is further provided with a slot or hook or similar device adapted to cooperate with a hook-shaped member attached to a companion batten. The two battens combined are adapted to snugly hold and clamp the panels between them in alignment with the anchor bolt when said hook member is engaged.

In the batten device shown in FIGS. 8 and 9 of the drawings, each of the battens 74, 76 is provided with a rigid hook-shaped member accommodated in the space between abutting edges of panels 80 and 82. One hook 60 faces upward, and the other 62 faces downward. Batten 74 is further provided with a member 64 which is adapted to be fitted around the anchor bolt 70 and to be secured thereto with the aid of nut 72. The battens 74 and 76 there shown are provided with gaskets 78, by means of which the joints between the two panel sections 80 and 82 are sealed.

The bayonet type device shown in FIGS. 10 and 11 is one which can be used in conjunction with an anchor bolt which extends throughout the full length of panel. In this device, the batten 90 is provided with a downwardly facing hook member 92 which, upon being positioned in place, engages pin 94 extending across the slot between the ears 96 and 98 of the member 100, fastened to batten 102. This member is further adapted to fit over and snugly engage the anchor bolt 104. The particular design of the device shown in FIG. 10 is one which is useful in holding panels as 108, 110 at right angles to one another. The battens there shown are also provided with gaskets 106 which help to make the seal between the panels 108 and 110 weatherproof.

The batten clamps of the type disclosed and described herein are self-centering devices which exert pressure simultaneously on the inner and outer sides of the panel walls. They are superior to prior art structures which involve the use of bolts which penetrate the battens and mar the appearance of the panel walls. They are also superior in that they furnish complete sealing of the panels,

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which was not possible with bolt construction. Furthermore, in contrast to bolt construction, they permit the use of offset ends in the panel walls which are desirable, if the panel walls are to be securely fastened to anchor bolts held in position during assembly.

Although certain preferred embodiments of the invention have been disclosed for purpose of illustration, it will be evident that various changes and modifications may be made therein without departing from the scope and spirit of the invention.

I claim:

1. A wall structure comprising joined structural panels, each of said panels comprising a pair of rigid facing sheets and a layer of heat-insulating material therebetween, a space along the abutting ends of adjacent panels, said panels being aligned, and having the space between said abutting ends closed by a device, said device including a vertically disposed fixed rod in said space, a pair of opposed means overlying said space on opposite sides thereof, a tubular member surrounding said fixed rod in rotatable relation thereto, sheet metal members fixed to opposed sides of said tubular member and to the respective opposed means, at least one of said means comprising a strip, said tubular member being under torsional stress with said means clamped to the exterior surfaces of said panels and means locking said tubular member under said torsional stress, whereby release of said locking means will release said torsional stress and permit said tubular member to rotate to its relaxed state thus releasing said means for clamping engagement with said panels.

2. A wall structure according to claim 1 wherein the

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ends of the sheet metal members are connected to one another through a heat insulating member.

3. A wall structure according to claim 1 wherein said sheet metal members are attached to said tubular member along a spiral line.

4. A wall structure according to claim 1 wherein said means for locking said tubular member under said torsional stress is a pin.

5. A wall structure according to claim 1 wherein at least one of said strips is a batten strip arched outward from the wall surface so as to conceal the joint between the joined structural panels, as well as gaskets used in waterproofing.

6. A wall structure according to claim 1 having heat insulating means provided on said tubular member between it and the metallic sheet metal members connected to said strips.

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