Aug. 2, 1960 D. SCHULTZ 2,947,040

WALL CONSTRUCTION

Filed June 18, 1956

Fig. 1.

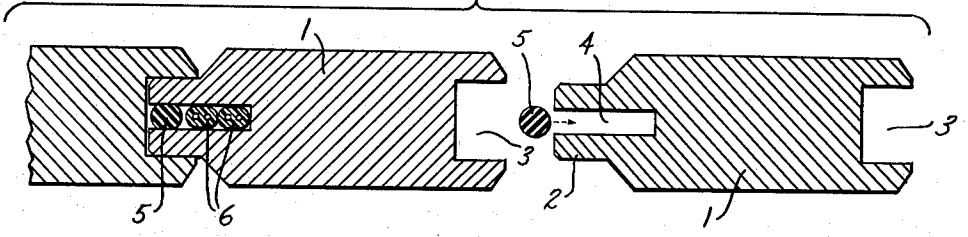


Fig. 2.

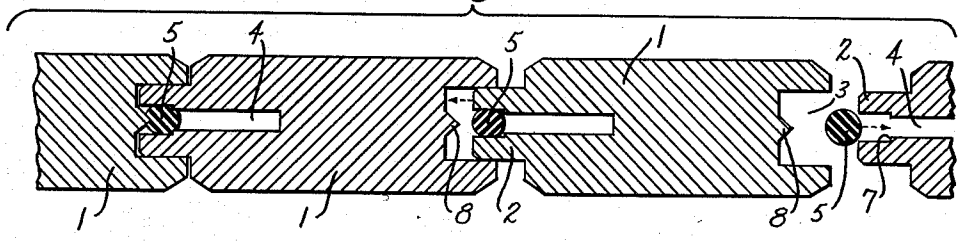
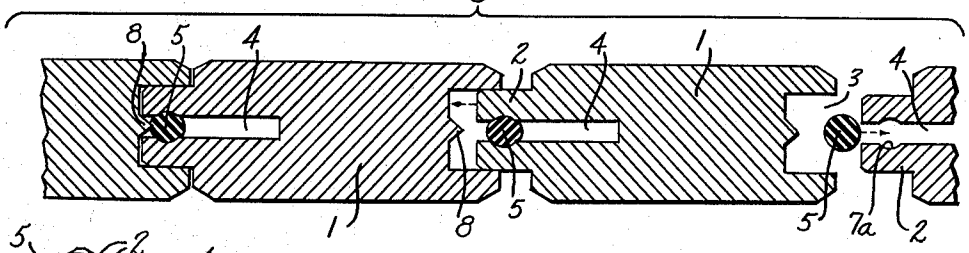


Fig. 3.



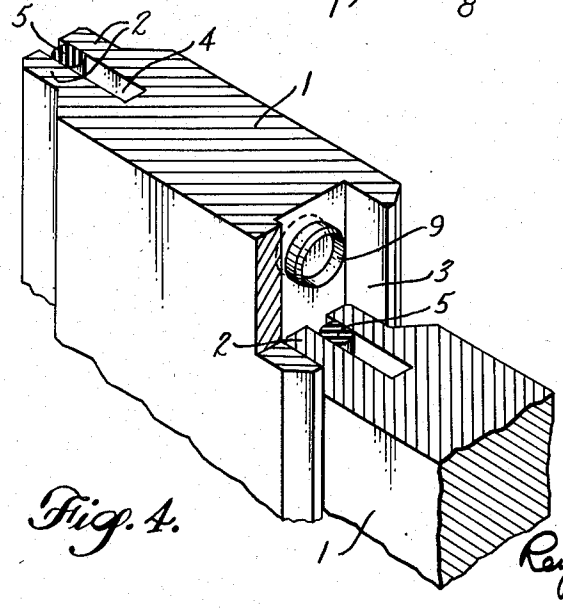


Fig. 4.

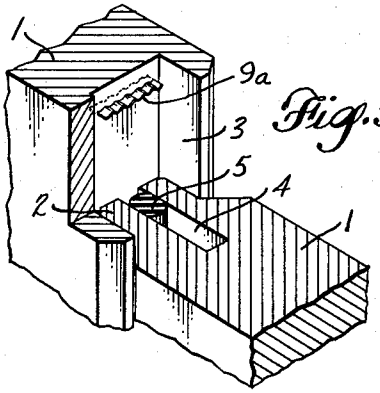


Fig. 5.

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WALL CONSTRUCTION

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8 Claims. (Cl. 20—4)

This invention pertains to a wall construction of the general type disclosed in the patent to Henry W. Salo, No. 2,665,455, dated January 12, 1954.

As in the Salo disclosure, structural units for incorporation in a wall costruction are made of wooden planks, whether these be integrally of one piece of wood or a composite made up by laminating several pieces is immaterial. Each is of a size and shape adequate to sustain structural loads and is intended to be joined to like units by matching tongues and grooves, so that the single-construction wall so built up can be adequate to support all structural loads. In consequence, there need not be any framing nor any interior wall, although an interior wall finish can be applied if preferred. In such single wall construction, however, and indeed if the wall is of double construction, it is still highly desirable to insure that the joints, where the tongue of one unit enters the groove of the adjoining unit, are weather-tight throughout the life of the structure, for moisture entering such joints may cause dry rot, and the entrance of wind will make the house cold. Obviously, changing atmospheric and climatic conditions will cause shrinking and swelling of the wood, the more so if the units are initially of green wood, and from such changes crevices will develop, and cracks may become enlarged, and admit water and wind, and so destroy the weather-tightness of the construction.

In the Salo patent, it was attempted to maintain the weather-tightness of the construction by forming a cavity within the interior of each unit extending the full length of the unit and of a depth inwardly from the outer edge of the tongue to receive a material quantity of fine gravel of sand which, by its fluidity, was intended continuously to urge the furcations of the tongue outwardly against the side walls of the grooves in the adjoining unit wherein the tongues were entered, and by its presence was intended to block entrance of wind. This construction reasonably well accomplished the ends in view, in that, at least initially, the granular filler material urged the tongues outwardly, but it was found that with shrinking the granular filler would not always generate sufficient outward pressure, especially in localized areas, to shut out the weather, and this would admit moisture, in particular, to the interior of the wall construction. The mass of Salo's filler material was concentrated within the body of a unit, and not at the tongue, where outward pressure is most required, and so sometimes failed to maintain the tongue's furcations tightly pressed against the side faces of the groove wherein the tongue was entered. Moreover, as it settled, the granular material left a gap at the top of each cavity, and the seal there became ineffective.

It is an object of the present invention to provide a wall construction of the general type disclosed in the Salo patent, but provided with sealing means which will more positively and in every localized area, throughout the life of the building, urge the furcations of the tongue outwardly against the side walls of the groove within

which they are fitted, and so will indirectly seal the wall against wind, etc., to maintain the construction, throughout the life of the building, more fully and certainly weather-tight than in the Salo construction. In particular, by this invention the tongue-expanding force is positive, is active throughout the lift of the building, has no gap anywhere, and is concentrated within the entrance to the tongue's channel, where it is most effective to urge the tongue of one unit against the side walls of the groove in the joined unit, to maintain a tight but indirect seal throughout the length of the tongue and groove.

The Salo construction had further disadvantages. For one, while it was possible to disassemble the structure, to do so meant the spilling of the granular filler material about the building in the process of disassembling, and this hindered the operation. The present invention presents the advantage that the granular filler material is completely eliminated and the spreader material is in the form of a resiliently compressible or deformable element which can be handled as a unit, and which will remain in place between the furcations of the tongue until removed therefrom.

Another disadvantage of the Salo construction was that the cavities within the individual wall units were completely filled with the granular filler material, and to a depth which somewhat weakened the unit itself, and special provisions had to be made to incorporate wiring, plumbing, and like utility services within the building. By the present invention, only a small portion of the cavity need be occupied by the resilient spreader material, even though the cavity is itself of lesser depth than in the Salo construction, and the remainder of the space within the cavity is thus left free for the reception of utility conduits, and the like.

In the construction of buildings from wall units of this general type, the units are generally held together primarily by the interfitting of the tongues within the grooves, and no nails are used as between adjoining units. This is so in part because it simplifies and speeds up erection, and in part because of the desirability of enabling the construction to be disassembled when its usefulness at a given location is past, so that it may be reassembled elsewhere. However, the individual units were thus left somewhat free to move in slight degree longitudinally relative to one another, by settling or wracking of the building, and it was undesirable to permit such wracking. According to the present invention, means are provided to resist such wracking, yet these means will not prevent nor limit the possibility of disassembling the structure when disassembly is required.

It is, of course, an object to provide a wall construction and unit of the general nature described which shall be relatively simple and inexpensive to manufacture and to assemble, the more so as close fits are not necessary.

With these objects in mind and others as will appear more fully hereinafter, the present invention comprises the novel wall construction and the wall unit, all as illustrated in the accompanying drawings and as will be more fully described in detail hereinafter, and defined in the claims.

Figure 1 is a transverse sectional view through such a wall, showing two units assembled with relation to one another, and a third unit in process of assembly.

Figure 2 is a view similar to Figure 1, but showing a somewhat modified construction.

Figure 3 is a view similar to Figures 1 and 2, but showing a still further modification.

Figure 4 is an isometric view, broken away in section, illustrating the preferred form of Figure 1, but illustrating also anti-wracking or anti-creeping means interposed between two assembled units.

Figure 5 is a view similar to Figure 4 showing a modified form of the anti-creeping element.

The exterior conformation of a unit is immaterial. The preferred interior form of the wall construction and unit is shown in Figure 1. Each of a plurality of planks 1 (meaning by the term "plank" any wooden unit, whether of one piece of material throughout or laminated of several pieces, and of whatever external or cross-section shape) is formed with a tongue 2 along one edge, and a groove 3 along its opposite edge of a size such that the tongue of an adjoining unit, when edge-abutted and pressed into the groove 3, will fit snugly within the groove. Such tongue and groove joints are common in lumber constructions generally. Each unit 1, however, is of rather appreciable thickness so that it may assume structural loads, particularly when placed vertically in the wall, and hence its relatively thick tongue 2 may be channeled, as indicated at 4, to define a cavity extending inwardly from the outer edge of the tongue into the interior of the unit 1 to whatever extent may be necessary. It is preferred that the cavity 4 be of no great depth, so as to leave the major portion of the plank 1 solid and unweakened, and not so subject to warping or other distortion. By this channeling to form the cavity 4, the tongue becomes bifurcated, and being of wood the furcations may flex slightly with respect to one another and to the main portion of the plank 1. The outer edges of the tongue may be beveled to facilitate entry into a groove.

A wall is built up of such units by joining them, tongue and groove, so that the several units are in parallelism, and while it is not essential that they be oriented vertically, that is the preferred arrangement. They can be disposed horizontally however. When interengaged as described, tongue and groove, the outer side faces of the tongue will engage more or less snugly the inner side faces of the grooves 3. Shrinkage and subsequent swelling, and similar climatic or atmospheric conditions, or conditions arising from weather changes, or as a green plank weathers and dries out, will frequently open gaps between two adjoining units, so that the furcations may trend inwardly, if unrestrained, or the sides of the groove 3 may trend outwardly. In order, therefore, to maintain a tight joint between the outer faces of the tongue 2 and the inner or side faces of the groove 3, a resiliently compressible or deformable element 5 is initially inserted within the entrance to the groove in such manner that it is compressed by so doing, and acting as a compression spring will continue thereafter to urge the furcations of the tongue apart and to hold them tightly against the inner faces of the groove 3, regardless of shrinkage or swelling in either of the so-joined units. For instance, if the channel 4 is three-eighths inch in width, the resilient element 5 may be a strip of rubber composition or a substitute for rubber, usually but not necessarily of circular cross-section, perhaps one-half inch in diameter. It will be squeezed down as shown at the left in Figure 1, when it is caused to enter the channel 4, and thereafter will urge outwardly the furcations of the tongue 2.

It will be noted also that the resilient element 5 is not within the bottom of but at the entrance to the channel 4, and within the groove 3, where it exerts the largest moment arm on the furcations, and most directly urges the tongue's furcations outwardly against the sides of the groove. Being located there, the remainder of the groove may be left substantially clear, and may be used as a cavity for the reception of wiring, as indicated at 6, or similar utility conduits.

Figure 2 illustrates a slight modification in which, just inside the entrance to the channel 4, its sides are formed with shoulders 7, facing outwardly, and spaced from the entrance to the channel 4 by a distance approximating or even a little less than the thickness of the sealing

element 5. The entrance width may here be one-half inch, and the strip 5 five-eighths inch in diameter. The sealing element will seat upon these shoulders 7 and will be thereby prevented from entering more deeply into the channel 4. The seal between the element 5 and the two sides of the channel 4 outwardly of the shoulders 7 will be further augmented, and in addition a direct seal will be produced, by the provision of a rib 8 upstanding along the bottom of the groove 3, and of a size to fit within the entrance to the channel 4, which rib, engaging the sealing element 5 as shown at the left in Figure 2, will further compress the latter and urge it more tightly against the shoulders 7. The rib 8 is not essential, but helps to keep a tight seal, and to increase the expansive force of the resilient element 5.

The shoulders 7 may be formed as part of a shallow arcuate groove 7*a*, milled along the sides of the cavity 4. The sealing strip 5 entered within the cavity 4 will seat within the shallow grooves 7*a*, will be somewhat compressed because it is, when unstressed, of somewhat larger dimension than the spacing between the opposite sides of the grooves 7*a*, and may be further compressed, although again this is not essential, by the rib 8.

In order to prevent wracking as between adjoining units 1, it is only necessary to install within the grooves 3 elements which are transversely disposed and which can penetrate each of the units thus abutting, and so by its transverse disposition prevent their movement longitudinally relative to one another. For instance, edge-sharpened rings 9 may be installed in the bottom of each groove 3 at intervals in its length, and these will penetrate the one unit in which they are installed and upon urging the adjoining unit into the groove they will penetrate this second unit. A different type of anti-creeping unit is shown in Figure 5, consisting of the corrugated metal box nailer, often used to hold adjoining planks in a box together, and designated by the numeral 9*a*. The ring form of Figure 4 is preferred since it will hold even though there may be some transverse shrinkage apart of the two elements, for in those circumstances the ring itself is likely to remain within both the units and to cock somewhat, whereas the same may not be true of the corrugated unit 9*a* of Figure 5.

I claim as my invention:

1. A wall structure comprising a plurality of like elongated structural units disposed in parallel, adjoining relationship to define a wall, each of said units having a groove extending along one edge and a tongue extending along its opposite edge and fitted snugly within the groove of the adjoining unit, each tongue having a channel extending inwardly from its edge with the opposite sides of such channel disposed generally parallel to the side faces of the tongue, and a strip of elastomer material substantially uniformly compressible throughout its length and of a thickness in relaxed condition exceeding the spacing between the opposite sides of the tongue channel in relaxed condition, said strip being fitted into the channel of a tongue having its edge portion received within and confined by the groove of an adjacent structural unit which groove limits the extent to which the channel can be spread by the resilience of said elastomer strip squeezed by such channel.

2. The wall structure defined in claim 1 in which the strip is of substantially circular cross section in relaxed condition so that the thickness of such strip is its diameter.

3. The wall structure defined in claim 2 in which the opposite walls of each tongue channel have shallow grooves extending lengthwise of the tongue adjacent to the channel opening, which shallow grooves are located within the groove in which the tongue is fitted, each such shallow groove being of circular arcuate curvature transversely of its length and having a diameter greater than the spacing between ungrooved portions of the opposite

channel walls, and the strip being seated in such channel wall shallow grooves.

4. The wall structure defined in claim 1 in which each tongue channel has shoulders formed on its opposite sides facing the channel opening and located sufficiently close to the edge of the tongue so that such shoulders are located within the groove in which the tongue is fitted, and the strip is engaged with said shoulders and insures that portions of the opposite channel sides between which the strip is squeezed are pressed against the sides of the groove in which the tongue is fitted.

5. The wall structure defined in claim 1 in which each unit includes a rib projecting from the bottom of its groove into the channel of the tongue fitted in such groove and pressed against the strip in such channel.

6. A wall unit for incorporation in edge-to-edge interfitting relationship with a like unit in a wall structure, which unit comprises an elongated structural unit having a groove extending along one edge and a tongue extending along its opposite edge of a size to fit snugly within the groove of a like adjoining unit, said tongue having a channel extending inwardly from its edge with the opposite sides of such channel disposed generally

parallel to the side faces of the tongue, and a strip of elastomer material of a thickness in relaxed condition exceeding the spacing between the opposite sides of the tongue channel in relaxed condition and fitted into said tongue channel and squeezed thereby.

7. The wall unit defined in claim 6 in which the strip is of substantially circular cross section in relaxed condition so that its diameter is its thickness.

8. The wall unit defined in claim 6 in which the opposite sides of the channel have shallow grooves extending lengthwise of the tongue in which grooves the strip is fitted.

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