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[54] **BUILDING CONSTRUCTION FOR ROOFS OR WALLS**
4 Claims, 7 Drawing Figs.

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F04c 1/34
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461, 484, 222, 461, 223, 489, 639, 283

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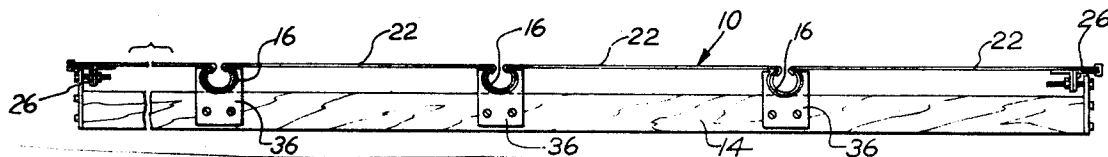
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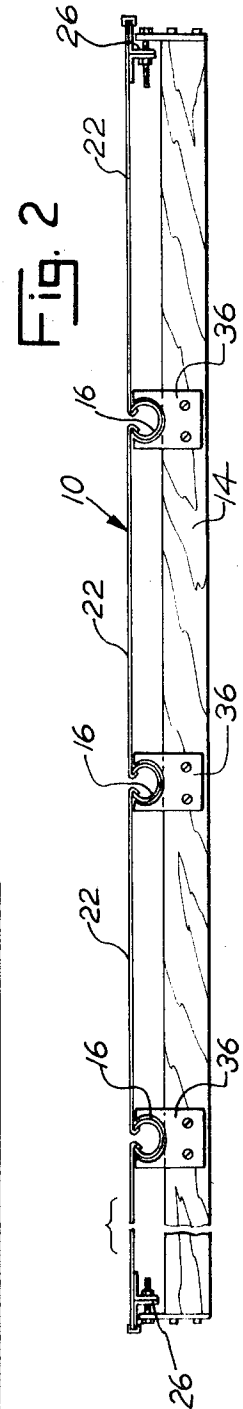
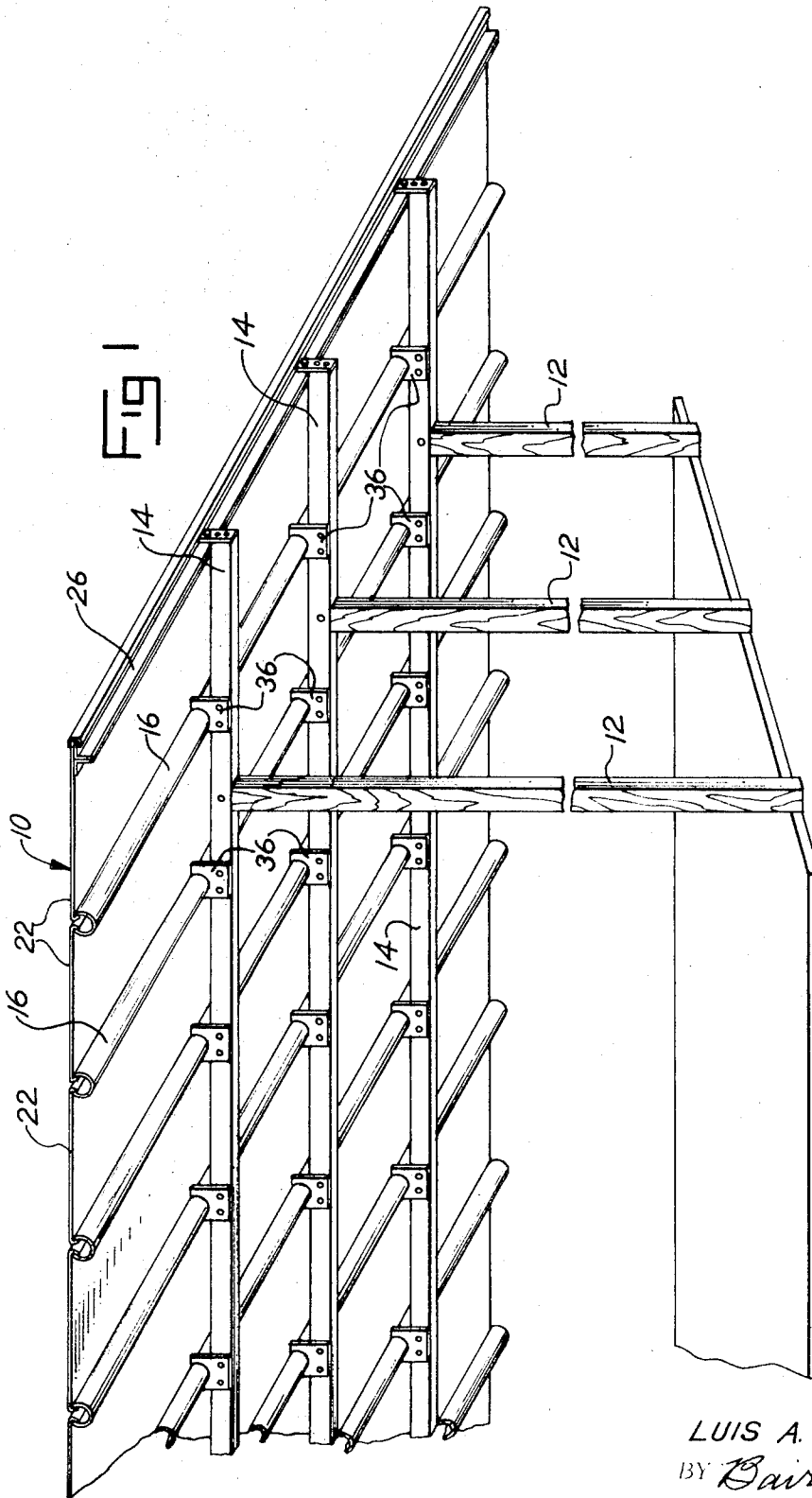
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ABSTRACT: A building construction in which parallel sheets of impervious material are carried in laterally stressed relationship by bridging members of a resilient and imperforate construction. The joint between adjacent sheet material members and the bridging members is water tight in use when the entire structure is placed in tension.





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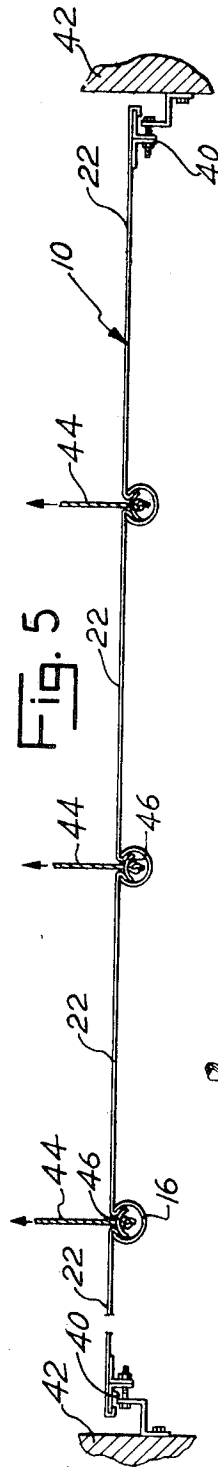
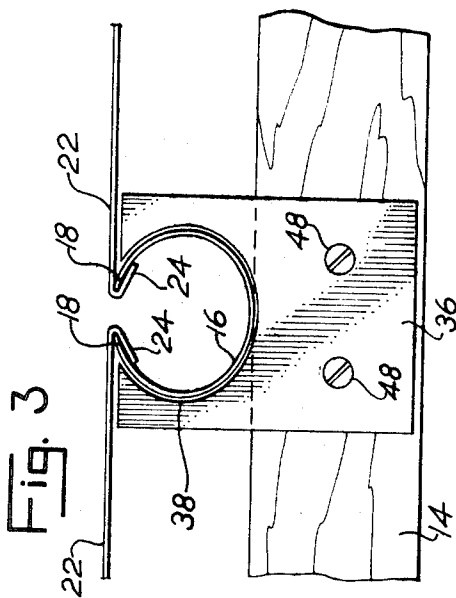
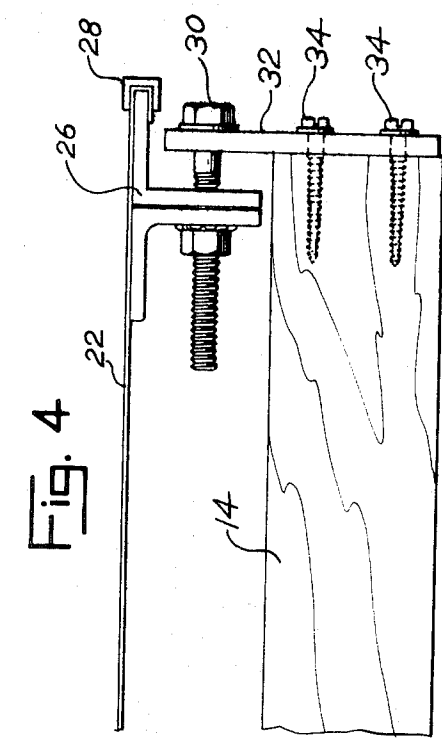


Fig. 7

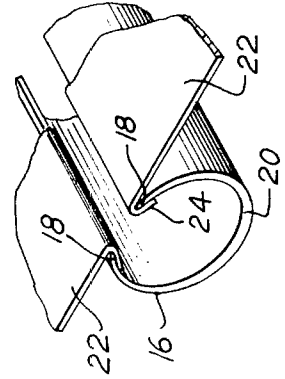
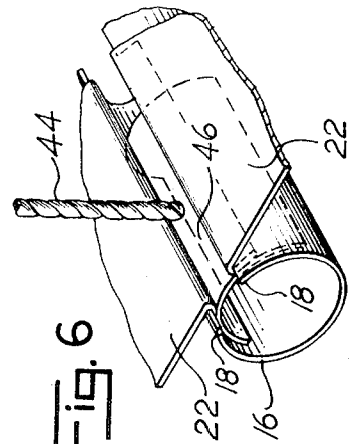


Fig. 6



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BUILDING CONSTRUCTION FOR ROOFS OR WALLS

BACKGROUND OF THE INVENTION

Known methods of roof construction usually follow a standard pattern. A framework is constructed. On the framework there is laid a covering of roof boards or panels. These boards or panels are attached to the frame with nails, screws or rivets and are covered with overlapping impervious shingles or sheets. These shingles or sheets are frequently attached to the roof boards or panels by means of nails. The nails must be overlapped by other impervious shingles or sheets to cover the nail holes and to prevent water from entering through the roof. In the case of sheet roofing, especially on flat roofs, the overlap is frequently sealed with hot tar, again to make the ultimate surface as impervious to water as possible.

These general remarks apply, especially with respect to overlap, to roofs having exposed surfaces of tile, wooden shingles, asbestos shingles, asphalt shingles, sheet material impregnated with asphalt and corrugated metal. In dealing with the inherent weaknesses and disadvantages of such roof constructions, an exceedingly heavy and inflexible structure is developed, oftentimes much heavier than actually required to deal with expected stresses and rainfall. This is particularly true in areas having relatively infrequent snow, thereby having a relatively light anticipated roof load. It is also particularly true in the construction of very large and relatively flat roofs.

SUMMARY OF THE INVENTION

The principal aspect of this invention has been executed with a metal sheet material and slit pipes. The sheet is formed with a turned back flange on each of its longitudinal edges. The pipe is sawed longitudinally on one side to provide a slit into which is inserted the flanged edges of two adjacent sheets. The pipes are loosely supported on a suitable rectangular frame.

After the assembly of sufficient roof structure to cover the desired area, tension is applied to the external edges of the entire structure whereby the sheet material is laterally stressed against the resiliency of the slit pipe. With the entire structure so stressed, it will shed water and will support considerable weight. After tensioning, suitable positioning plates are installed below the slit pipes whereby the pipes are positioned with respect to the supporting structure below.

It is therefore an object of this invention to provide a roof or wall construction employing sheets of flat impervious material, the adjacent sheets being supported in stressed condition by watertight bridging members.

It is a further object of this invention to provide a roof or wall structure which, while being flexible to accommodate varying winds and temperature changes, is inherently stiff and self-supporting between spans by reason of its stressed construction.

A further object of this invention is to provide a roof construction in which the waterproofing sheet material contributes to the structural strength of a roof, thereby permitting very light weight overall construction and supporting means therefor, a distinct and special advantage in so-called flat roof construction.

Another object is to provide a roof or wall construction which is easy and fast in assembly and which can be readily and rapidly disassembled for reuse.

Another object is to provide a roof construction which may be suspended from a network of cables over an otherwise uncluttered area.

These and other objects will be apparent from the following drawings and the description of the preferred embodiment of the invention.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a view in perspective of a portion of a roof constructed according to this invention,

FIG. 2 is an end view of such a roof construction,

FIG. 3 is a detail view in perspective showing a bridging member in place,

FIG. 4 is a detail view in elevation of a suitable tensioning device used on the ends of the roof structure,

FIG. 5 is an end view of a roof constructed according to the invention and suspended from cables,

FIG. 6 is a detail view showing the fittings used to suspend the roof from the cables of FIG. 5, and

FIG. 7 is a view in perspective of a second bridging member, having increased strength.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In the drawings, and in this description, this building construction is illustrated and described as a roof construction. However, it will be immediately apparent that this construction is equally usable as a lightweight outer wall or an inner partition.

As shown, the roof 10 is supported generally by upright studs 12 which carry stringers 14 of sufficient strength to resist the tensioning required, as will appear later.

A plurality of bridging members 16 are supported in parallel relationship and perpendicular to the longitudinal axis of the stringers 14. The bridging members 16 may be of various cross-sectional shapes and function to bridge the gap between the edges of adjacent sheets of sheet material. As shown in FIGS. 1, 2, 3, and 5, the bridging members 16 are circular in cross section. FIG. 7 shows a bridging member 16 which is relatively thin at the jaw edges 18 and relatively thick at the diametrically opposite portion 20.

There are three essential characteristics required in the bridging member 16 if the structure is to be used as a roof: It must present two parallel jaw edges 18 adapted to receive and coact with the edges of the sheet members 22; it must be impervious to water (when used as a roof) except as to the area between the adjacent jaw edges 18; it must be inherently resilient so that tensioning of the sheet members 22 will tend to open the jaw edges 18 with respect to each other, while retaining the capacity to close the jaw edges 18 toward each other when the tension is relieved, as by heat on the sheet members 22. Any tubular members, whether of approximately circular, triangular, rectangular or other cross section, having the above three characteristics may be used as the bridging members 16. Only two of these characteristics are required if the structure is not used as a shield from rain.

The sheet members 22 are preferably aluminum sheet of a constant width. A hooklike flange 24 is rolled on the opposite edges of the sheet members 22, adapted to mate with and coact with the jaw edges 18.

Clamping and tensioning means of any suitable construction is mounted on the ends of the stringers 14 for tensioning the sheet members 22 and the bridging members 16. As shown in FIGS. 1 and 4, a T-bar 26 extends the entire length of the outermost sheet member 22. The outer edge of the sheet member 22 is rolled around the outer edge of the T-bar 26 and held against movement by a friction clamp 28. The T-bar is supported above the outer end of the stringer 14 on an adjusting bolt 30, in turn mounted in a hanger 32 attached, as by screws 34, to the ends of the stringer 14. By means of this tensioning structure, or any similarly acting tensioning device adapted to apply a relatively uniform force to the entire edge of the outermost sheet member 22, the entire roof deck may be stretched into a relatively flat condition.

The plates 36, as shown in FIG. 3, are of any suitable shape and present an upper open portion 38 shaped to conform to the outside configuration of the bridging members 16. The plates 36 do not support the weight of the roof 10, but serve to restrain the bridging members 16 from lateral and upward movement.

As shown in FIGS. 5 and 6, the roof 10 is adaptable to cable suspension rather than support from stringers 14. This construction is especially adaptable to false ceilings or large roof areas wherein an uncluttered floor area is desired. In this form of the invention the roof 10 comprises the sheet members 22

and the bridging members 16. The tensioning means 40 is basically identical to the tensioning means shown in FIG. 4 excepting that it is carried by an external wall 42 or similar structure.

The weight of the roof 10, in the form of FIG. 5, is carried by cables 44 suspended from any suitable support (not shown). The lower ends of the cables 44 are attached to shoes 46 which conform to the inner configuration of the bridging members 16, and are received therein. It will be appreciated that the shoes 46 may be inserted into the ends of the bridging members 16 serially and positioned to support the roof 10 as desired.

The assembly of the roof 10 is simple and fast. With the studs 12 and the stringers 14 in position to form the substructure and the other materials prepared, the bridging members 16 are placed approximately in position with the plates 36 hanging from the bridging members 16 adjacent the stringers 14. The hooklike flanges 18 of adjacent sheet members 22 are then inserted between the jaw edges 18, followed by the securing of the lateral edges on the tensioning means. Tension is then applied to the entire structure until the roof 10 is relatively flat. The positioning members 36 may then be secured to the stringers 14 by any suitable means such as the screws 48.

What I claim is:

1. In a building structure, the provision of a covering member comprising, in combination, a plurality of sheet members having coupling means formed on two opposing edges of each sheet, a bridging member receiving the coupling means of two adjacent sheet members, and tensioning means connected to the outside edges of the outermost sheet members and tensioning the sheet members and the bridging member as a unitary structure.

2. The building structure of claim 1 wherein the bridging member is a tube which has been slit longitudinally to present continuous jaw portions for coaction with the coupling means on the edges of the sheet members, whereby the jaw portions of the tube react resiliently to variations in tension within the covering member.

3. The building structure of claim 1 wherein the bridging member is supported on a frame, plate members mounted on the frame, said plate members being shaped to embrace said bridging member and retain the same in a selected position without perforating said bridging member.

4. The building structure of claim 1 wherein the bridging member is supported by hangers projecting upwardly from the bridging member.