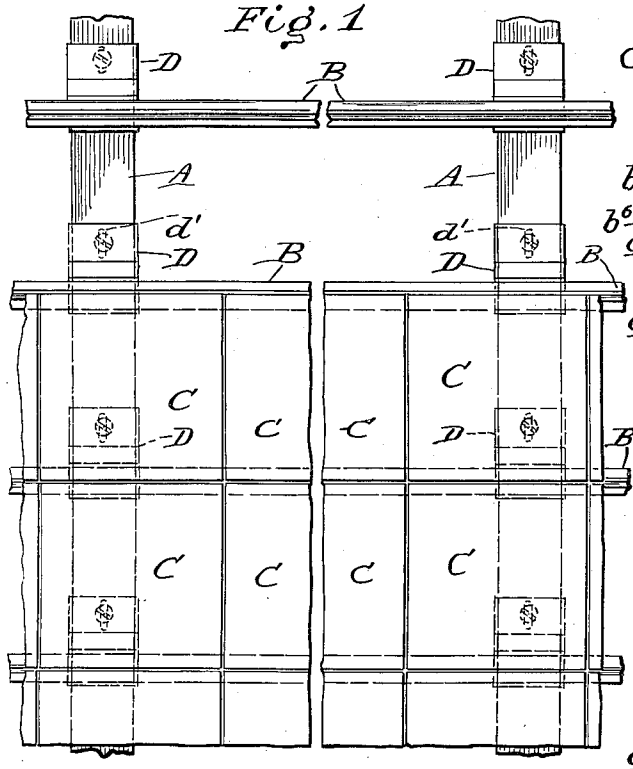
April 9, 1935. C. G. DUFFY 1,997,092

WALL CONSTRUCTION

Filed Feb. 7, 1934 2 Sheets-Sheet 1

Fig. 1



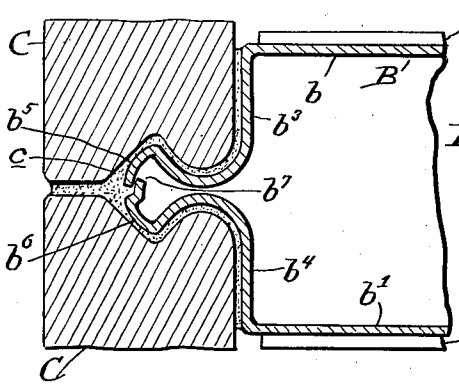


Fig. 3.

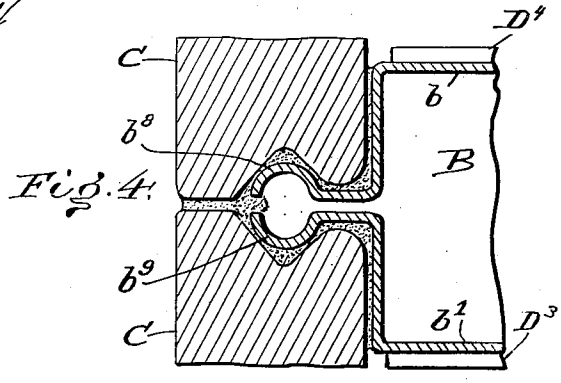


Fig. 4.

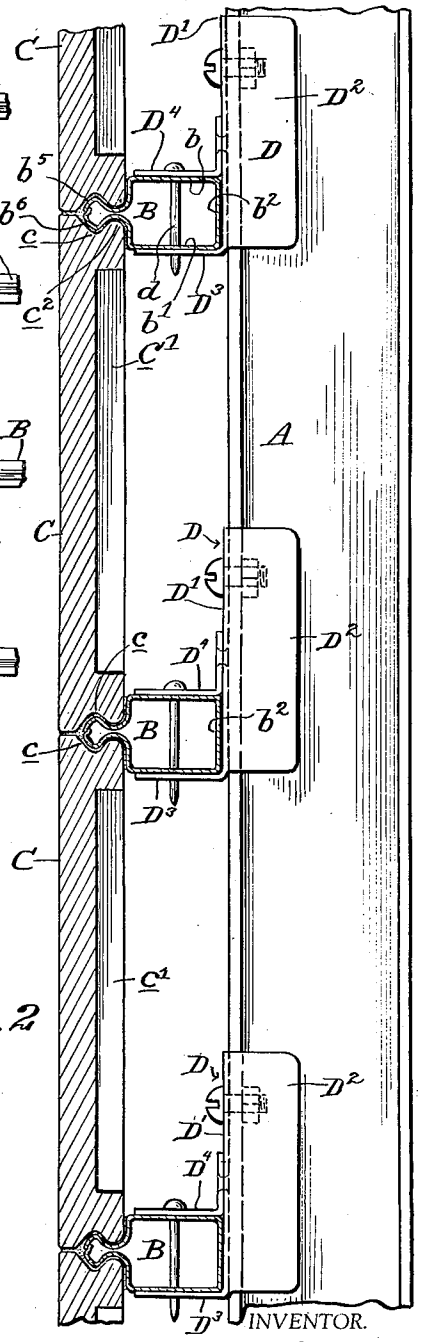


Fig. 2

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Fig. 9.

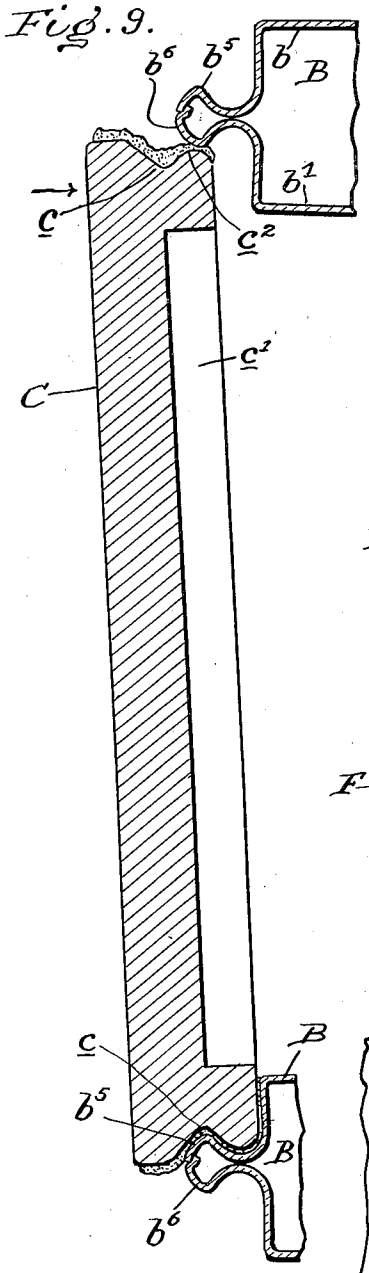


Fig. 5.

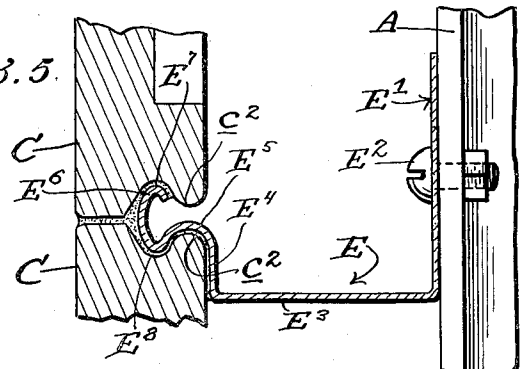


Fig. 6.

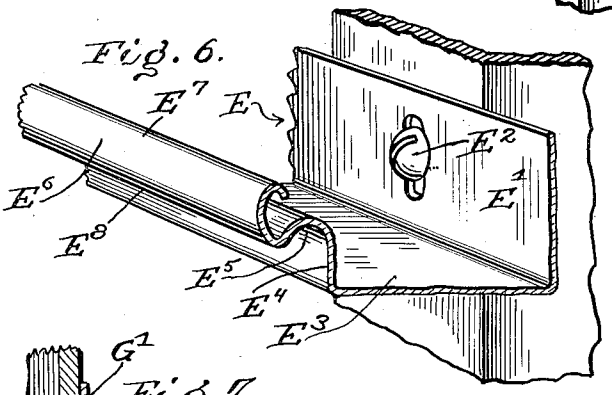


Fig. 7.

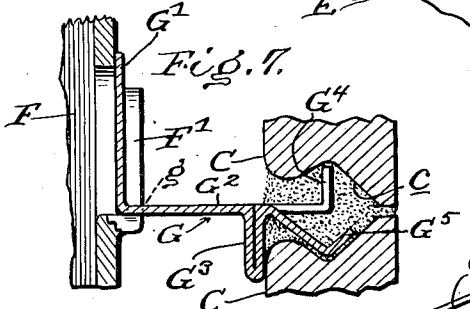
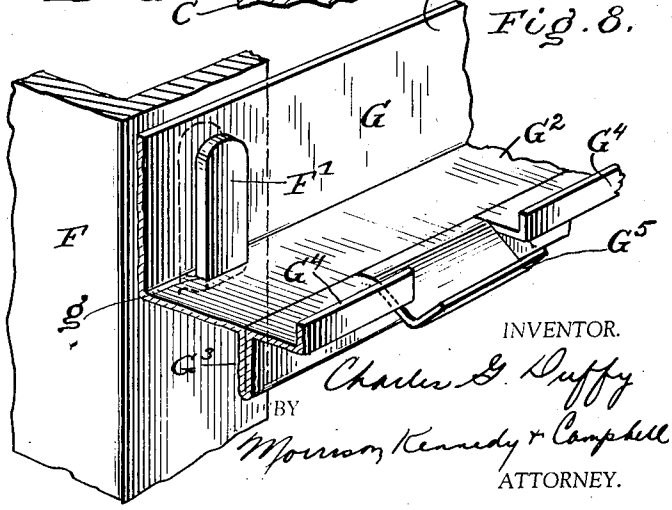


Fig. 8.



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Patented Apr. 9, 1935 1,997,092

UNITED STATES PATENT OFFICE

1,997,092

WALL CONSTRUCTION

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Application February 7, 1934, Serial No. 710,054

23 Claims. (Cl. 72—24)

This invention relates to wall construction and more particularly to a construction wherein tile units are supported by a framework of steel or other suitable material.

In carrying out the invention, the tile units are preferably laid in courses supported by purlins arranged in parallel spaced relation and secured to a suitable support, as for instance vertical studding members. The purlins are formed with beads or projecting portions at the outer edges thereof and which constitute retaining means adapted to engage in grooves formed in the edges of the tile units, thus serving to support and anchor the tile units in position. The retaining means are themselves substantially rigid, but the web sections are so constructed as to permit said retaining means to yield as the tile units are placed in position between adjacent purlins and thereafter to return to their normal positions wherein they engage in the grooves in the tile units alluded to before.

With this construction, the steel frame work may be designed and fabricated in the shop and thereafter erected in the field with relatively unskilled labor, and the tile units sprung into position with little or no difficulty.

In one embodiment of the invention, the purlins are of tubular formation having spaced upper and lower web sections joined together by a web section at the rear, the front section, however, being split and formed with opposed projections or beads which constitute the retaining means for anchoring the tile units. In this form of purlin there is provided sufficient clearance between the opposed bead portions to permit of the necessary yielding movement. Where desired, the outer edges of the bead portions may overlap, thus providing a closed joint without, however, affecting the ability of the bead portions to yield as the tiles are inserted in position.

In another embodiment of the invention, the purlins are provided with a single web portion, having a bead formed at the outer edge thereof to retain the tile units in position, while in still another embodiment of the invention, the outer edge of the web portion is formed with an upstanding flange to support tile units of a course immediately above the purlins, and with a series of depending ears bent to conform to the shape of the grooves in the tile edges to retain the tile units of the course immediately below.

As the tile units are placed in position, the grooves in the edges thereof may be filled with a mastic or adhesive plastic cement which flows around the projections or beads on the purlins, thus making the joints between the tiles watertight and imparting to the wall the effect of usual tile construction.

Referring to the drawings:

Fig. 1 is a front elevation of a section of a wall constructed in accordance with the invention;

Fig. 2 is an enlarged vertical section through a section of a wall of the character illustrated in Fig. 1;

Figs. 3, 4 and 5 are enlarged sectional views, showing different forms of purlins used for supporting and retaining the tile units in position;

Fig. 6 is a perspective view of the purlin illustrated in Fig. 5;

Fig. 7 is a sectional view illustrating still another form of purlin;

Fig. 8 is a perspective view of the purlin illustrated in Fig. 7; and

Fig. 9 is a sectional view illustrating the insertion of a tile unit in position between two adjacent purlins.

The supporting structure to be faced with tile units comprises by way of example, a series of vertical studs A spaced at intervals along the wall or partition, the studs being of any suitable shape as desired. Purlins B are arranged in parallel spaced relation on the supporting studs, the distance between the purlins being sufficient to accommodate a course of tile units C.

The purlins illustrated in Figs. 1 to 4 are of tubular construction and are secured to the studs by clips D. The clip illustrated includes generally a front portion D^1, formed at the side edges with a pair of rearwardly extending flanges D^2 adapted to engage the lateral faces of the studs A, and at the bottom with a forwardly extending flange D^3 serving as a purlin support. The clip further includes a second flange D^4 spot-welded to the front face D^1 of the clip and spaced above the flange D^3. The flanges D^3, D^4 engage respectively the upper and lower faces of the purlins B, the purlins being secured to the flanges by pins *d* extending through holes in the flanges and purlins drilled for the purpose. The clips D are bolted to the studs and for this purpose are provided with elongated slots d^1 in the front portions D^1 thereof which permit a sufficient degree of adjustment longitudinally of the studs to insure the proper spacing of the purlins.

The purlins B, illustrated in Figs. 1, 2 and 3, preferably are of rectangular tubular construction, including top and bottom web sections *b*, b^1, and a rear web section b^2 interconnecting the upper and lower web sections *b*, b^1. The web sections *b*, b^1 are formed at the front with flanges

b^3 and b^4 positioned at right angles to said web sections, and bent outwardly at their free edges to form beads or projections b^5 and b^6, which extend in opposite directions. The rebent portions of the beads overlap to form a closed joint b^7, one bead at its edge being offset to extend for a short distance behind the other bead. As will hereinafter be described, the bead portions b^5 and b^6 serve as a support for tile units.

The tile units C are preferably rectangular in shape and are formed in their peripheral edges with grooves or recesses c which serve to receive the beads formed at the front edges of the purlins. As the invention is particularly applicable for use with glass tiles, the tiles may be provided with recesses c^1 in their rear faces both to decrease the weight of the tile units and also to permit the passage of light with as little absorption as possible.

After the steel framework, including the stud members A and the purlins B is erected, the tile facing is applied simply by springing the individual tile units C into position between a pair of adjacent purlins. The method of applying the tile units is illustrated in Fig. 9. The grooves c in the edges of the tile units are first filled with a suitable mastic and the tile placed upon a lower purlin B for instance, in such a manner that the bead portion b^5 engages in the groove c. Force is then applied at the upper edge of the tile to spring the rear projecting portion c^2 thereof past the lower bead b^6 on the purlin adjacent the tile at the top, and when this is done the projections b^6 and b^5 of the upper and lower purlins will yield to provide the necessary clearance for the insertion of the tile unit. When the tile unit has cleared the beads, both bead projections will return to normal position, the bead b^6 of the upper purlin engaging in the groove c, as shown in Fig. 2. When the tiles are in position, the rear faces thereof rest against the outer faces of the flanges b^3, b^4 of the purlins, which thus constitute shoulders insuring perfect alinement of the front faces of the tiles.

Although the bead portions b^5, b^6 are themselves substantially rigid, the width of the web portions b, b^1 is such that sufficient leverage is provided as the tiles are inserted to cause the purlins to flex at the rear corners, the metal of which the purlins is formed having sufficient resiliency to cause the beads to spring back to normal position to engage in the grooves of the tiles and anchor the same in position.

The construction shown in Fig. 4 is quite similar to that already described, except that the bead portions b^8, b^9 do not overlap at their outer edges. This construction may be used for interior work where a closed joint is not absolutely essential.

Figs. 5 and 6 illustrate a construction wherein the purlin E has but a single web section. As shown, this purlin includes generally a rear flange E^1 which engages the vertical stud members A and which is adjustably secured thereto by a bolt and slot connection E^2, and an intermediate web portion E^3 terminating at the front with an upstanding flange E^4, the outer face of which provides a shoulder against which the tiles seat when in position. The flange E^4 is bent as at E^5 to receive a rear edge c^2 of the tile units and is further bent to form a bead E^6 which has upper and lower opposed projections E^7 and E^8 which serve as the retaining means for the tile units.

As in the embodiments previously described, the bead portions E^7, E^8 are substantially rigid and the tiles are inserted between adjacent purlins in the manner previously described. Here, too, the flange portion E^3 is so constructed that the beads are permitted to yield as the tiles are inserted in position and then caused to return to normal position to anchor the tiles in place.

In Figs. 7 and 8, a somewhat different construction is illustrated. Herein the studs F are provided with struck-up ears F^1 arranged to enter slots g formed at the bottom of the purlins G, the ears F^1 engaging the front face of a flange G^1 with which the purlins are provided. In addition to the flange G^1, the purlins are further provided with an intermediate web portion G^2 bent and rebent as shown, to provide an abutment G^3 against which tile units rest in service. At the front edge of the purlin, there is provided an upstanding flange G^4 adapted to engage in the grooves c formed in the edges of the tile units to support the course of tiles above the purlin. At intervals along the length of the purlin, the flange G^4 is cut and bent downwardly to form projections G^5 which engage in grooves provided in the edges of the tile units to anchor the same in position. Preferably, one projection or ear G^5 is provided for each tile unit so that the projections are spaced apart a distance equivalent to the width of such a tile unit, but if desired, more than one of such ears may be provided for each tile. The tile units are inserted in position in the manner before described, the presence of the web G^2 permitting sufficient resiliency rearwardly of the projections G^5 to permit the tiles to be sprung into position and thereafter to return said projection into normal position, wherein they engage in the grooves formed in the edges of the tile units. Even though movement through the flange portion G^2 may be limited, as will be the case for instance when replacing a broken tile in a completed wall structure, the bead portion G^5 by virtue of its free unrestrained outer edge may yield bodily as a tile unit is sprung into place and thereafter returned to engage in the groove c formed in the edge of such tile unit firmly to hold it in place.

In all of the forms described, a suitable mastic or adhesive plastic cement may be inserted in the grooves formed in the tile edges as they are inserted in position, which mastic or cement will flow around the beads and fill up the spaces between the tiles, thus providing a substantially water-tight joint and giving to the wall the appearance of usual tile construction.

With the present invention it is a very simple matter to replace broken tile units, since it is necessary only to chip away the mastic, remove the broken tile and insert a new one in the manner previously described.

The invention has been described in connection with the tiling of a wall or a vertical frame structure, but it will be understood that the position of the support is not a limitation upon the invention, as the backing member may be horizontal or inclined as desired. Throughout the specification, the words "tile unit" have been used to indicate the wall facing element, but the invention is equally applicable to brick, building blocks and other similar building material, and in the claims the expression "tile unit" is to be interpreted as covering such materials. The invention is susceptible of many modifications within its spirit and is, therefore, to be limited only by the prior art and the scope of the appended claims.

Certain clearly indicated portions of this ap-

plication are found in my Patent No. 1,991,550, issued February 19th, 1935, based upon application, Serial No. 682,960, filed July 31st, 1933 and which was copending with the instant case.

Having thus described my invention, what I claim is as follows:

1. In wall construction, the combination of a support, tile units facing said support and formed with grooves in the edges thereof, purlins arranged in parallel spaced relation on said support, said purlins being formed each with bead retaining means having a free unrestrained edge so as to be yieldable bodily without substantial deformation to permit the tile units to be sprung in position between a pair of purlins and returnable to seat in the grooves formed in the edges of the tile units to anchor the same in position.

2. In wall construction, the combination of a support, tile units facing said support and formed with grooves in the edges thereof, purlins arranged in parallel spaced relation on said support, said purlins being formed each with a web section provided with bead retaining means at the outer edge of the web section, said bead retaining means having a free unrestrained edge so as to be yieldable bodily without substantial deformation to permit the tile units to be sprung into position between a pair of purlins and returnable to seat in the grooves formed in the edges of the tile units to anchor the same in position.

3. In wall construction, the combination of a support, tile units facing said support and formed with grooves in the edges thereof, purlins arranged in parallel spaced relation on said support and provided with bead retaining means at the outer edges thereof, and shoulder portions adjacent said bead retaining means, said bead retaining means having a free unrestrained edge so as to be yieldable bodily without substantial deformation so as to permit the tile units to be sprung into position between a pair of purlins and returnable to engage in the grooves formed in the edges of the tile units to anchor the same in position against the shoulder portions of the purlins.

4. In wall construction, the combination of a support, tile units facing said support and formed with grooves in the edges thereof, purlins arranged in parallel spaced relation on said support, said purlins being formed with substantially rigid longitudinal beads at the outer edges thereof and web sections adjacent said beads, said web sections being designed so as to permit the beads to yield as the tile units are inserted in place between a pair of purlins and thereafter to return to engage in the grooves formed in the edges of the tile units to anchor the same in position.

5. In wall construction, the combination of a support, tile units facing said support, purlins arranged in parallel spaced relation on said support and provided at their outer edges with bead retaining means having a free unrestrained edge, said purlins having sufficient resiliency rearwardly of the bead retaining means so as to permit the latter to yield as the tiles are sprung into position between a pair of purlins and thereafter to return to engage in the grooves formed in the edges of said tile units to anchor the same in position.

6. In wall construction, the combination of a support, tile units facing said support, purlins arranged in parallel spaced relation on said support and presenting at their outer edges a pair of opposed projections adapted to engage in grooves formed in the edges of adjacent tile units, said projections having a free unrestrained edge so as to permit them to yield relatively and independently of each other as the tiles are placed in position and thereafter to return to engage in the grooves in the edges of said tile units to anchor the same in position.

7. In wall construction, the combination of a support, tile units facing said support, purlins arranged in parallel spaced relation on said support and formed each at their outer edges with a split bead providing substantially rigid opposed projections adapted to engage in grooves formed in the edges of the tile units, the split bead construction permitting relative movement between the opposed rigid projections to facilitate the insertion of tile units between adjacent purlins.

8. In wall construction, the combination of a support, tile units facing said support, purlins arranged in parallel spaced relation on said support and formed each at their outer edges with a split bead providing substantially rigid opposed projections adapted to engage in grooves formed in the edges of adjacent tile units, said purlins having sufficient resiliency rearwardly of the bead to permit the projections to yield as the tiles are placed in position and then to return to engage in the grooves provided in the edges of the tile units to anchor the same in position.

9. In wall construction, the combination of a support, tile units facing said support, purlins arranged in parallel spaced relation on said support and formed each at their outer edges with a split bead providing substantially rigid opposed projections adapted to engage in grooves formed in the edges of adjacent tile units, the split bead construction permitting relative movement between the opposed rigid projections to facilitate the insertion of the tile units between adjacent purlins, the opposed projections forming said bead being constructed to overlap at their external extremities to form a closed joint.

10. In wall construction, the combination of a support, tile units facing said support, purlins arranged in parallel spaced relation on said support, said purlins being of tubular construction, the outer portions thereof being split and formed with opposed rigid projections adapted to engage in grooves provided in the edges of the tile units, the split construction of the purlins permitting the rigid projections to yield to facilitate placing the tile units in position between a pair of purlins.

11. In wall construction, the combination of a support, tile units facing said support, purlins arranged in parallel spaced relation on said support, said purlins being of tubular construction, the outer portion thereof being split and formed with opposed rigid projections adapted to engage in grooves provided in the edges of the tile units, said purlins having sufficient resiliency rearwardly of the rigid projections to permit the latter to yield as the tiles are placed in position between a pair of purlins and then to return to engage in the grooves formed in the edges of the tile units to anchor the same in position.

12. In wall construction, the combination of a support, tile units facing said support, purlins arranged in parallel spaced relation on said support, said purlins being of tubular construction, the outer portions thereof being split and formed with opposed rigid projections adapted to engage in grooves provided in the edges of the tile units, the split construction of the purlins permitting the rigid projections to yield to facilitate placing the tile units in position between a pair of purlins, the opposed projections forming said

bead being constructed to overlap at their external extremities to form a closed joint.

13. In wall construction, the combination of a support, tile units facing said support and formed with grooves in the edges thereof, purlins arranged in parallel spaced relation on said support, said purlins being formed each with a single web section bent at its outer edge to form bead retaining means having opposed projections, said bead retaining means having a free unrestrained edge so as to permit it to yield freely as the tile units are inserted in place between a pair of purlins and thereafter to return to engage in the grooves formed in the edges of said tile units to anchor the same in position.

14. In wall construction, the combination of a support, tile units facing said support and formed with grooves in the edges thereof, purlins arranged in parallel spaced relation on said support, said purlins being formed each with a web section provided at its outer edge with upstanding flanges and depending ears, said flanges being adapted to engage in the grooves of tile units in one course to support the tile units thereof and said ears being adapted to engage in the grooves formed in the edges of tile units of an adjacent course to anchor the tile units thereof in position.

15. In tile construction, the combination of tile units, and a support for said tile units including purlins arranged in parallel spaced relation and formed at their outer edges with oppositely extending separated portions providing projections, said projections being received in grooves formed in the edges of adjacent tile elements, whereby the purlins are substantially hidden from view and the tile units held in position on said support.

16. In building construction, the combination of a tile unit provided with a recess in the edge thereof, and supporting means for the tile unit including a bead yieldable to permit the tile to be sprung into position and returnable to engage in the recess formed in the tile edge, said bead having a free unrestrained edge so as to permit it to yield freely without substantial deformation as the tile is sprung into place.

17. In building construction, a tile unit provided with recesses in the opposite edges thereof and supporting means for the tile unit presenting beads adapted to yield to permit the tile to be sprung into position between them and to return to engage in the recesses formed in the tile edges, said beads being unrestrained at one edge so as to be freely yieldable without substantial deformation as the tile is sprung into place.

18. In building construction, tile units arranged edge to edge in courses and formed in such edges with recesses, supporting means for the tile units presenting beads projecting in opposite directions into the recesses in adjacent tile units, said beads each having a free unrestrained edge whereby they are yieldable independently to permit the tile units to be sprung into place.

19. In building construction, a tile unit having a recess formed in an edge thereof and supporting means for the tile unit having a bead bent substantially to the shape of the recess and adapted to fit therein to hold the tile in position, said bead having a free unrestrained edge so as to be yieldable without substantial deformation to permit the tile unit to be sprung into place.

20. In building construction, a tile unit provided with recesses in the edges thereof, and supporting means for the tile unit presenting a pair of beads bent substantially to the shape of the recesses and adapted to fit therein to grip the tile unit at its opposite edges, said beads each having an unrestrained edge so as to permit them to be yieldable bodily without substantial deformation as the tile unit is sprung into place.

21. In building construction, tile units arranged edge to edge in courses and formed in such edges with recesses, supporting means for the tile units presenting beads projecting into the recesses of adjacent tiles and bent substantially to the shape thereof, said beads each having a free unrestrained edge whereby they are yieldable independently to permit the tile units to be sprung into place.

22. In wall construction, the combination of a support, tile units facing said support, and means on the support presenting a split bead providing substantially rigid opposed projections adapted to engage in grooves formed in the edges of the tile units, the split bead construction permitting relative movement between the opposed rigid projections to facilitate the insertion of the tile units in place.

23. In wall construction, the combination of a support, tile units facing said support, means on said support presenting split beads positioned between the edges of adjacent tile units, said split beads providing substantially rigid opposed projections adapted to engage in grooves formed in the edges of said adjacent tile units, said supporting means having sufficient resiliency rearwardly of the bead portions to permit the projections thereof to yield as the tiles are placed in position and then to return to engage in the grooves provided in the edges of the tile units to anchor the same in place.

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