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ANCHORING SYSTEM FOR THE INSTALLATION OF SLABS ON VERTICAL AND OVERHEAD SURFACES

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FIG. 1

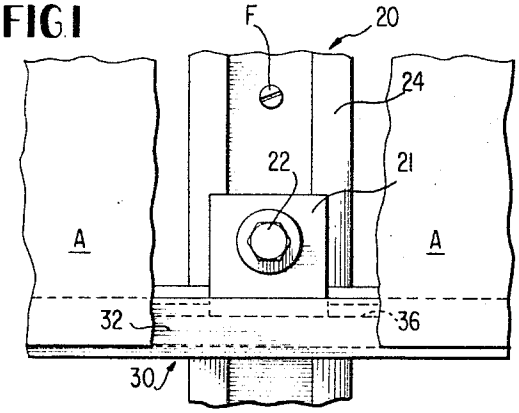


FIG. 2

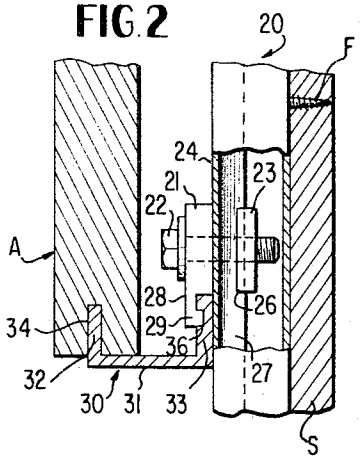


FIG. 4

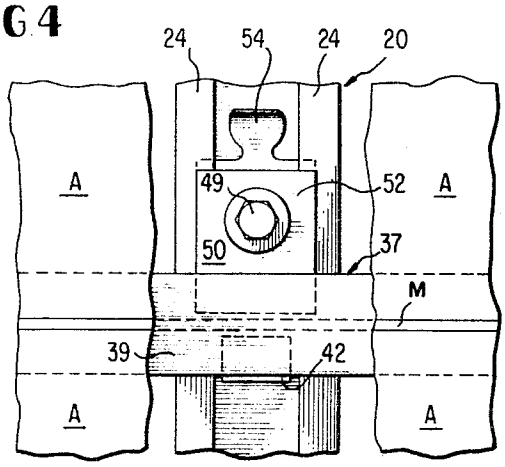
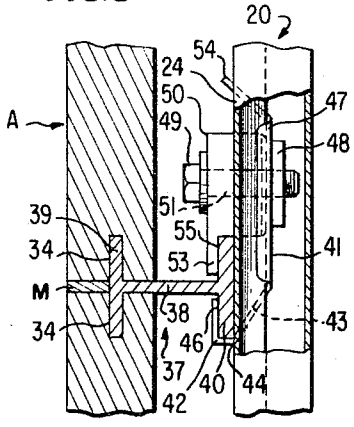


FIG. 5



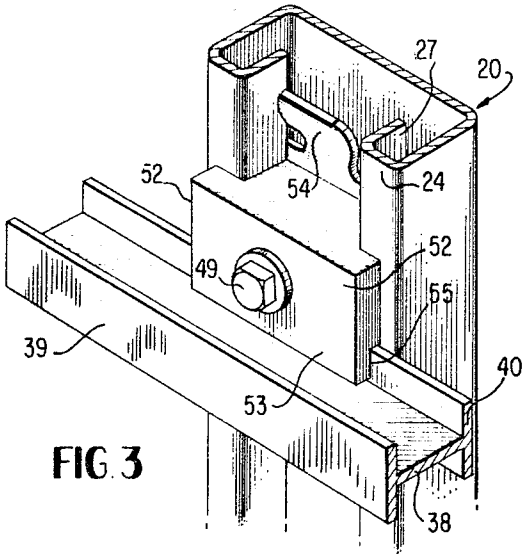


FIG. 3

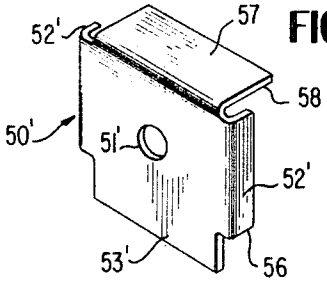


FIG. 3a

INVENTOR.
JULES SCOTT ZIBELL

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FIG. 7

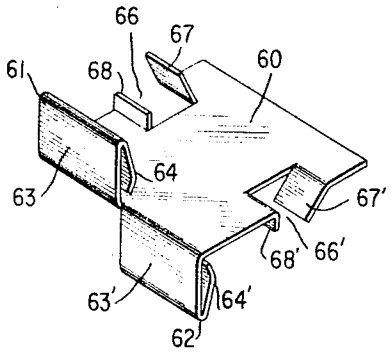
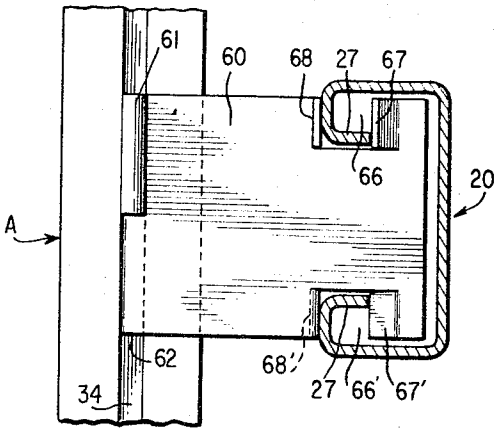


FIG. 6



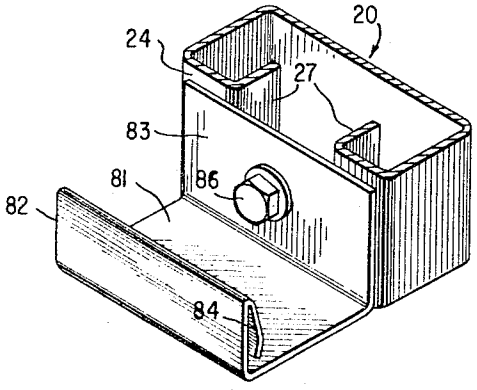


FIG. 12

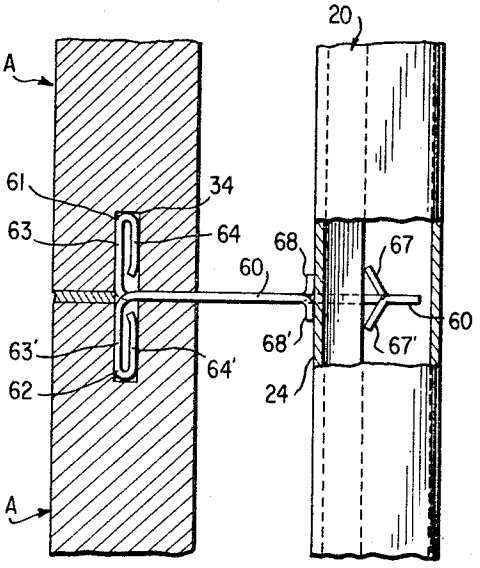


FIG. 8

INVENTOR.
JULES SCOTT ZIBELL

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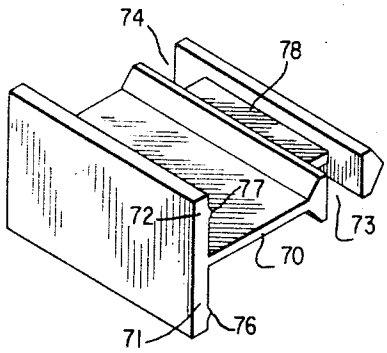

FIG. 9

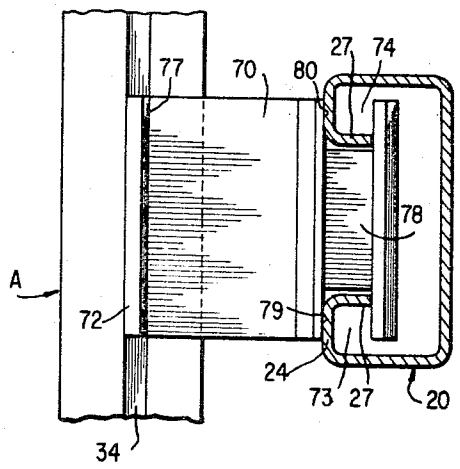

FIG. 10

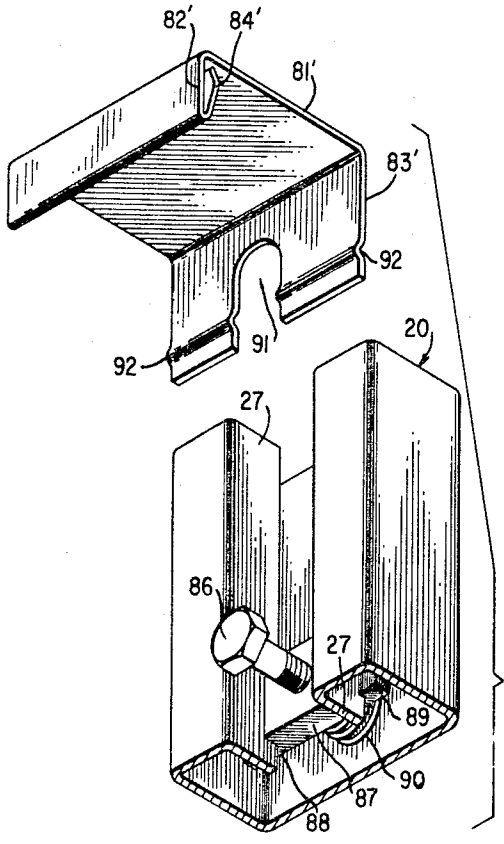

FIG. 13

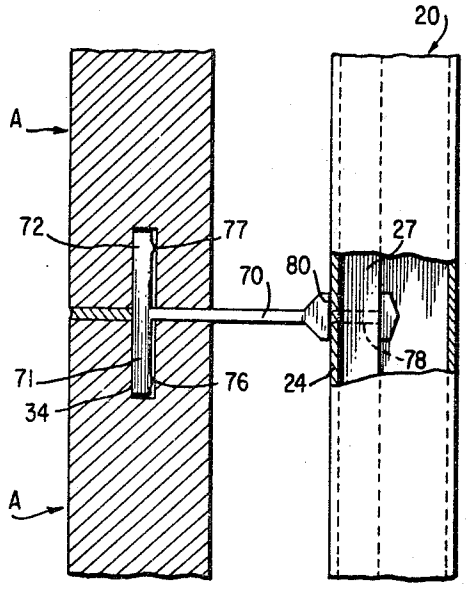

FIG. 11

INVENTOR.
JULES SCOTT ZIBELL

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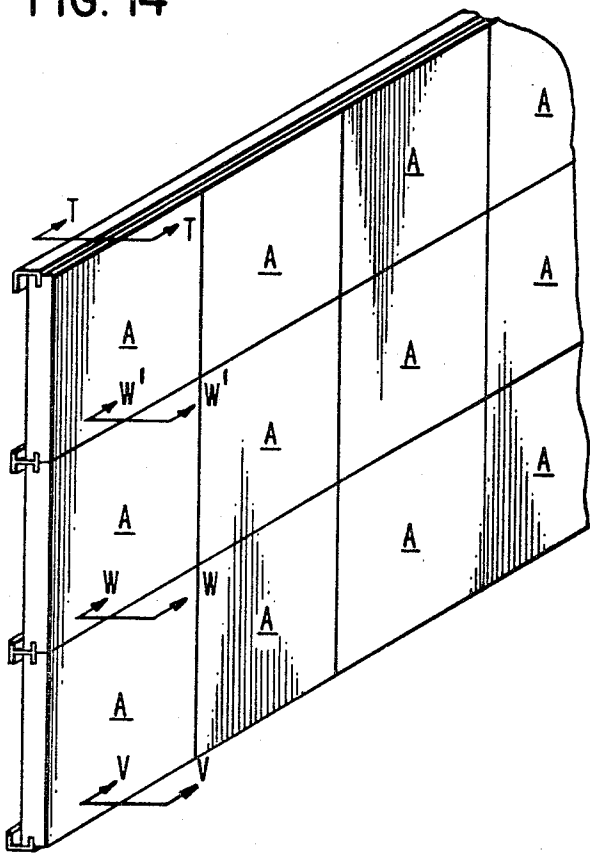
FIG. 14



INVENTOR
JULES SCOTT ZIBELL

United States Patent Office 3,319,983 Patented May 16, 1967

3,319,983

ANCHORING SYSTEM FOR THE INSTALLATION OF SLABS ON VERTICAL AND OVERHEAD SURFACES

Jules Scott Zibell, Tate, Ga., assignor to The Georgia Marble Company, Atlanta, Ga., a corporation of Georgia

Original application Dec. 27, 1960, Ser. No. 78,477, now Patent No. 3,234,702, dated Feb. 15, 1966. Divided and this application Aug. 25, 1965, Ser. No. 495,741

3 Claims. (Cl. 287—189.35)

This invention relates in general to the anchoring of wall forming materials to structural members and more particularly to anchoring systems for facing slabs for both interior and exterior construction, and is a division of my copending application Ser. No. 78,477, filed Dec. 27, 1960, now Patent No. 3,234,702, granted Feb. 15, 1966.

An object of this invention is to provide an improved anchoring system for facing materials wherein the anchoring points are easily aligned and plumbed so as to accurately establish the face of the finished wall.

Another object of this invention is to provide an anchoring system for facing materials which provides continuous support therefor.

Another object of this invention is to provide an anchoring system for facing materials which assures a positive weather seal at the joints of the facing material.

The invention is most advantageously used with slabs, for example, marble, having a kerf or groove formed in at least two peripheral edges thereof. The invention features shaped metal struts having a generally U-shaped configuration with the legs thereof being formed with inwardly facing flanges or re-entrant sections, said shaped metal struts being secured to structural members of the structure which is to be covered with the facing material. These struts are located at desired intervals to provide repeating anchoring points. According to the invention, the facing material is supported from these metal shaped struts by means of anchor members, each of which includes a web portion which spaces the facing material from the struts, a kerf inserted or engaging portion formed on the end of the web and a strut engaging portion secured to the strut. According to one embodiment, a bedding or base channel anchor and cap channel anchor are formed from an extruded U-shaped channel member. Preferably, one leg of the U-shaped member is made longer than the other leg of the U-shaped member and this long leg is formed with a longitudinally extending groove which receives a recessed projection formed on a clip element. The arrangement according to this embodiment is such that the outside surface of the U-shaped strut member and the surface of the clip carrying the recessed projection are coplanar. When a bolting means for securing the clip to the strut member is applied, the U-shaped channel member is rigidly held in place.

According to a second embodiment, an H-shaped extruded channel member is secured to the strut member by means of a two part anchoring clip, one of the clip parts having a hook formed on one end thereof for hooking over a portion of one of the flanges of the H-shaped channel member while the other clip part has an extension which cooperates with the hook on said first clip part to substantially surround the flange of the H-shaped channel member abutting said strut member and secured together and to the strut by a cap screw. A tab formed on one of the clip parts facilitates positioning of the two part clip assembly in the strut member. The other flange of the H-shaped channel member has one-half thereof received in the kerf of an adjacent slab. The arrangement is such that the thickness of the web joining

the two flanges of the H-shaped member spaces the two contiguous slabs a sufficient distance apart so that a mortar joint may be formed between the two slabs. In addition, a positive weather seal at the joint is effected.

According to another embodiment, the anchoring element comprises a rectangularly shaped clip member having oppositely disposed spring finger flanges receivable in the kerf formed in two contiguous slabs of facing material. On the opposite end and in opposed relationship to each other are formed a pair of notches, each having spring fingers for gripping the re-entrant or inwardly turned edges of the U-shaped strut member.

According to another embodiment the anchoring member or clip comprises an extruded T-shaped member with the stem of the T-shaped member having an enlarged end portion, which enlarged end portion is notched on each side thereof for frictional engagement with the re-entrant flange portions of the U-shaped channel strut. The arms of the T-shaped member may be provided with ridges which, when the kerfs of two abutting slabs are fitted thereover, assures a tight fitting of the arms of the T-shaped member in the kerfs of the slabs.

In still another modification, a U-shaped clip anchor is formed from sheet metal. One leg of the clip anchor is bent over on itself to form a spring finger for insertion in the kerf of the slab of facing material. The other leg of the U-shaped clip is slotted so that a securing bolt may be placed prior to the positioning of the clip on the strut member. A flexible rib formed on each side of the slotted leg of the U-shaped clip anchor prevents dislodgment of the anchor from the securing bolt.

Other objects, advantages and features of the invention will appear from the following description taken in connection with the drawing, in which:

FIGURE 1 is a front elevational view of one embodiment of this invention;

FIGURE 2 is a cut-away of FIGURE 1;

FIGURE 3 is an isometric view of another embodiment of the invention;

FIGURE 3*a* is a modified clip part of the two part clip assembly shown in FIGURE 3;

FIGURE 4 is a front elevational view of the assembly shown in FIGURE 3;

FIGURE 5 is a cross-sectional view of the arrangement shown in FIGURE 4;

FIGURE 6 is an isometric view of a sheet metal anchoring clip according to the invention;

FIGURE 7 is a top view of an anchoring assembly including the anchoring clip shown in FIGURE 6;

FIGURE 8 is a cross-sectional side view of the arrangement shown in FIGURE 7;

FIGURE 9 is an isometric view of an extruded anchoring clip according to the invention;

FIGURE 10 is a top view of the anchoring device shown in FIGURE 9 as it is used according to the invention;

FIGURE 11 is a cross-sectional view of the arrangement shown in FIGURE 10;

FIGURE 12 is an isometric view of another embodiment of the invention showing a clip anchor for a bedding or base joint;

FIGURE 13 is an exploded view of another embodiment of the invention showing a cap clip anchor, and

FIGURE 14 is a view of a marble slab wall constructed in accordance with the invention.

Referring now to FIGURES 1 and 2 of the drawings a U-shaped metal strut 20 is secured to a structural member S of the structure to which the facing material A is to be applied by any suitable fastening means, as for example, screws F. There will of course be a plurality of such strut members 20 secured to the structural members at desired intervals to provide repeating anchoring

points. Each U-shaped metal strut may be formed, rolled or extruded to produce a channel-like section with inwardly facing flanges or re-entrant portions 27. A clip member 21 is secured by cap screw 22 and locking nut 23 in abutting relation to the planar edges 24 of the strut member 20. Locking nut 23 has raised edges 26 which fit over the inside edges of the re-entrant portions 27 of the legs of the strut member 20 and prevents turning of the locking nut 23.

One end 28 of clip member 21 is provided with a recessed projection or ridge 29. A continuous U-shaped channel member 30 having a web portion 31 and a kerf engaging short leg 32 and a strut abutting long leg 33 is secured by the clip member 21 in abutting relation to the channel strut 20 and supports the slab A when the kerf 34 of the slab is fitted with the kerf engaging leg 32 of the channel member 30. There will, of course, be a clip member at each intersection or anchoring point of channel member 30 with the struts 20. The long leg 33 of the channel member 30 has a groove 36 which receives the recessed projection 29 of the clip member 21. It will be noted that the long leg 33 of the channel member 30 is thicker than the short leg 32 so that the groove 36 may be formed in the long leg 33 without unduly weakening the support.

While the foregoing description of FIGURES 1 and 2 relate to a bedding or base channel anchoring arrangement, it will be obvious that this same arrangement may be used as a cap channel anchor for use when changing to another type of material or at window sills, copings, etc. This may be done by securing the clip member 21 in an upright position prior to insertion of the channel member 30. The channel 30 is placed in the kerf 34 of the slab and driven longitudinally until the recessed projection 29 on the clip member 21 is seated within channel groove 36 to interlock these parts. Of course, the width of recessed projection 29 will be slightly less than the width of channel groove 36 to avoid interference when the channel 30 is driven into place.

The anchor shown in FIGURES 3, 4 and 5 is an intermediate joint anchor and includes an H-shaped channel member 37 having a web 38 joining kerf engaging flange 39 and strut abutting flange 40. Strut abutting flange 40 is secured in an abutting relationship to edges 24 of channel strut 20 by means of a two part clip assembly. A first clip part 41 has formed on one end thereof a hook 42, the hook being formed with an angle section 43, which angles downwardly and outwardly from the body portion of the clip part 41, a base 44 which extends in a direction normal to the body of the clip part 41 and a third portion which is normal to the direction of the base part 44 of the hook 42. As shown in FIGURE 5, clip part 41 is positioned inside of the channel and has laterally extending flanges or wings 47 which are turned outwardly so as to engage the inside edges of re-entrant portions 27 of the strut 20. A threaded nut 48, which may be integral with the clip part 47, receives a cap screw 49 passing through a second clip part 50. Second clip part 50 is provided with a bore 51 through which passes cap screw 49 so that when cap screw 49 is threadedly engaged with locking nut 48, the clip assembly is secured to the channel strut 20. It will be noted that second clip part 50 has laterally extending flanges or wings 52 which abut edges 24 of the strut member 20. A cut out portion 55 on the lower edge of second clip part 50 fits over the upper portion of flange 40 so that when the cap screw 49 is tightened, the flange 40 of the H-shaped member 37 is clamped to strut 20.

Extension 53, which is formed by the cut-out 55 of the clip part 50 extends substantially to the web portion 38 of the H-shaped channel member 37, as does hook part 46 on clip part 41. By this arrangement, a large area of frictional engagement is formed on the H-shaped channel member. It will be noted that the flange 40 of the H-shaped channel member 37 is substantially completely enclosed by the two clip parts 41 and 50 and a portion 24 of the U-shaped channel strut 20. On the upper end of clip part 41 is formed a tab 54, which tab facilitates the positioning of the clip part in strut 20.

It will also be noted that the web portion 38 of the H-shaped channel member 37 gauges the joint thickness which joint may be filled with mortar M or other joint filling material.

As shown in FIGURES 3, 4 and 5 clip part 50 is a solid block of metal. Preferably, however, clip part 50 may be fabricated from relatively heavy gauge sheet metal such as shown in FIGURE 3*a*. The part 50' shown in FIGURE 3*a* may be stamped from sheet metal so that wings 52' are struck or bent inwardly to form a shoulder 56 which shoulder abuts the upper edge of flange 40 on the H-shaped channel member 37. Likewise, inwardly bent tab extension 57 is shaped so that its edges 58 engage the inner side of re-entrant portions 27 on the legs of the U-shaped strut member 20.

In a similar fashion, the clip part 21 shown in FIGURE 2 may be fabricated from sheet metal as shown in FIGURE 3*a* with the downward extension 53' turned inwardly to form an inset or recessed projection similar to the recessed projection 29 shown in FIGURE 2.

The anchors shown in FIGURES 1 through 5 are particularly adapted for load bearing installations. The remaining embodiments of the invention are more particularly adapted for non-load bearing installations. As shown in FIGURES 6, 7 and 8, one such anchoring device comprises a sheet of metal, generally rectangular in shape, in which the body portion 60 carries at one end thereof a pair of oppositely disposed kerf engaging spring fingers 61 and 62 respectively. Each kerf engaging spring finger comprises a straight portion 63 which extends at right angles to the body portion 60 and spring portion 64 which is bent inwardly with respect to straight portion 63. The distance between the straight portion 63 and the furtherest portion of the spring element 64 is somewhat larger than the width of the kerf 34 formed in the facing material. By this arrangement, when the spring fingers are pressed into the kerf of the facing material, spring element 64 is moved toward the straight portion 63 to provide a snug, relatively tight, frictional fit of the spring fingers in the kerf of the slab. On each side of the body member 60 there is formed a pair of notches 66 and 66', the portions of the body member 60 which are removed to form the notches 66 remaining attached to the body portion and struck either downwardly or upwardly to form long spring elements 67, 67' and short arms 68 and 68' which cooperate to grip the re-entrant portions 27 of the strut member 20.

It will be noted that each spring element 67 is disposed on the side of the body member 60 as its corresponding kerf engaging spring finger 63. Consequently, the long finger 67 engages the inside edge of the re-entrant portion of the U-shaped strut member at a point above the plane of the body member 60 and provides a stronger support or brace for the body member. This clip element may be applied to the strut member 20 by inserting the body member 60 at an oblique angle through the space between the re-entrant portions 27 of the channel member and given a twisting movement into a horizontal plane.

It will also be noted that projections 68 forming part of the material which is removed to form notches 66, is disposed at right angles with respect to the body member 60. Thus, when the clip has been inserted or affixed to the channel member 20, the projections 68 form a relatively large area of engagement with the flat portions 24 on the legs of the channel strut 20.

The intermediate joint anchor clip shown in FIGS. 9, 10 and 11 is formed from an extruded member, which is best seen in FIGURE 9. This clip anchor includes a web portion 70, kerf engaging flanges 71 and 72 on one end of the web 70 to form a T-shaped element, and an enlarged end of the web, said enlarged end having notches 73 and 74 for receiving and frictionally engaging the re-

entrant portions 27 of channel strut 20. Flanges 71 and 72 are provided with raised ribs 76 and 77 respectively which bear against one side of the walls forming the kerf 34 so as to assure a tight frictional engagement of said flange members with the kerf 34 of the slab of facing material A. It will be noted that the enlarged end of the web 70 is provided with a reduced transverse section 78 and that the side of the notches are parallel to each other. By this arrangement, the clip may be inserted at an oblique angle with respect to the horizontal and given a slight twist to lock it in place. The surfaces 79 and 80 forming walls of the notches 73 and 74 respectively fit flush with edge 24 of the legs of the channel strut 20, and, due to a slight resiliency in the re-entrant portions 27 of the channel strut 20, the web 70 is frictionally held extended from the channel 20.

As explained in connection with the description of FIGURE 5, the web portion 70 gauges the thickness of the joint between the two contiguous portions of facing material which joint may be filled with joint filling material.

Referring now to FIGURE 12, there is shown a nonload bearing bedding clip comprising a U-shaped channel member which may be formed from sheet metal. This clip comprises a web 81 and two right angle flanges 82 and 83. Flange 82 is bent down upon itself to form a spring finger having spring element 84 which operates in the same manner as spring element 64 (described in connection with FIG. 6) which frictionally engages the walls of the kerf in the periphery of the facing material. It will be noted that the flange 82 is somewhat shorter than the strut abutting flange 83. Strut abutting flange 83 is provided with a hole through which passes a cap nut 86, said cap nut being threadedly engaged with a spring nut assembly (not shown in FIG. 12) so as to secure the clip at any desired position along the channel strut 20. Such a spring nut assembly is shown in FIGURE 13 and comprises a nut 87 having grooves 88 and 89 which receive the edges of the re-entrant portions 27, the spring 90 resiliently holds the locking nut 87 at any desired position along channel strut 20. The long leg 83 of the sheet metal clip is secured by the cap nut 86 in abutting relationship to the edges 24 of the channel strut 20.

Referring now to FIGURE 13, a cap clip anchor, similar in configuration to the bedding clip anchor disclosed in FIGURE 12 with the exception of the modification shown to the long leg 83'. The long leg 83' in this instance is provided with an elongated slot 91 and the spring ribs 92. Since the facing material which is anchored by this clip arrangement is already anchored by one of the intermediate joint clip anchors or a bedding joint anchor the clip anchor shown in FIGURE 13 is installed after the facing material has been so placed. Thus, it will be seen that the cap screw 86 moves into slot 91 when the clip is driven in place. Spring ribs 92 hold the clip in place by engagement with the cap screw 86 after the clip has moved to a position where the kerf engaging flange is seated within the kerf of the facing material.

FIG. 14 is an isometric view of wall assembly incorporating the invention. The bed, or bottom anchor joint, at section V—V, may be of a load bearing type as is illustrated in FIG. 2 or may be a nonload bearing type, as illustrated in FIG. 12. The anchor joint taken on the line W—W may be a load bearing intermediate anchor joint as illustrated in the cross-sectional view of FIG. 5 or a nonload bearing intermediate joint as is illustrated in FIGS. 10 and 11. The cap, or top joint, taken along the line T—T may be the assembly shown in FIG. 5 turned around so that the channel 31 opens downwardly or may be the nonload bearing joint or clip illustrated in FIG. 13. Alternatively, the cap joint may be the clip member illustrated in FIG. 12 inverted. Likewise, the intermediate nonload bearing clip illustrated in FIG. 6 may be employed at the intermediate anchor joints taken along the lines W—W and W'—W' of FIG. 14.

Although there is shown and described preferred embodiments for anchoring facing materials, it will be understood that various other modifications are feasible which still fall within the spirit and scope of the invention and accordingly the invention is not intended to be limited except as set forth in the following claims.

What is claimed is:

1. An anchoring system for slab facing materials having kerfs formed in the peripheral edges thereof comprising a plurality of U-shaped channel struts each having re-entrant portions formed on the legs thereof, and secured in spaced relation with respect to each other to structural members forming the structure on which said slabs are to be anchored, a clip element having a generally rectangular body portion, a pair of oppositely turned kerf engaging portions formed on the edges of one end of said body portion, each of said pair of oppositely turned kerf engaging projections including a spring tongue integral with said rectangular body portion and deformable by the kerfs of a slab fitted over said projections, and means forming friction notches on the opposite end of said rectangular body portion for frictionally securing the same to the re-entrant portions of said U-shaped channel strut said means forming friction notches comprising a short arm integral with said body member and transversely struck from the plane thereof, a long spring arm element opposite said short arm and struck in the same direction from said body member as said short arm, said long spring arm element and said short arm, cooperating to grip the re-entrant portions of said U-shaped channel strut.

2. An anchoring system for slab facing materials having kerfs formed in the peripheral edges thereof comprising a plurality of U-shaped struts each having re-entrant portions formed on the legs thereof, and secured in spaced relation with respect to each other to structural members forming the structure to which said slabs are to be anchored, a plurality of extruded clip elements, each clip element comprising a T-shaped extrusion, the stem of said T-shaped extrusion remote from the arms of said T-shaped extrusion being thickened, said thickened portion having a transverse groove formed therein, said groove having a width equal to the width of said re-entrant portions of said U-shaped struts and a pair of notches formed in the lateral edges of said groove for frictional engagement with the re-entrant portions of the legs of said channel strut and the arms of said T-shaped extrusion being adapted to fit within the kerfs of a pair of facing slabs, each of the arms of said T-shaped extrusion being provided with a raised ridge for securing a tight frictional engagement of said arms in the kerfs of said slabs.

3. An anchor clip for supporting slab facing materials having a kerf formed in the peripheral edges thereof from a U-shaped channel strut having re-entrant portions formed on the legs thereof, comprising, a U-shaped sheet of metal, one leg of said U-shaped sheet of metal being turned inwardly upon itself to form a kerf-engaging spring finger,

the other leg of said U-shaped sheet metal being longer than said kerf-engaging spring finger, said long leg of said U-shaped grip member having an elongated slot intermediate the edges thereof,

a spring rib running along said long leg normal to the direction of said elongated slot and intersecting said slot,

and means for securing the long leg of said clip anchor in abutting relation with the outside edges of said U-shaped channel strut comprising a cap screw, means for securing said cap screw on said strut member so that the head thereof projects outwardly therefrom whereby when said U-shaped clip anchor is positioned in abutting relationship with the edges

of said U-shaped strut and said cap screw head is within said elongated slot, said spring rib resists removal thereof.

References Cited by the Examiner

UNITED STATES PATENTS

581,940	5/1897	Pelton	52—509
2,108,107	2/1938	DeWees	52—701
2,340,911	2/1944	Urbain	52—488
2,345,650	4/1944	Attwood	52—710 X
2,737,268	3/1956	Smith	287—189.35 X
2,900,677	8/1959	Yetter	52—492

FRANK L. ABBOTT, *Primary Examiner.*

R. S. VERMUT, *Assistant Examiner.*