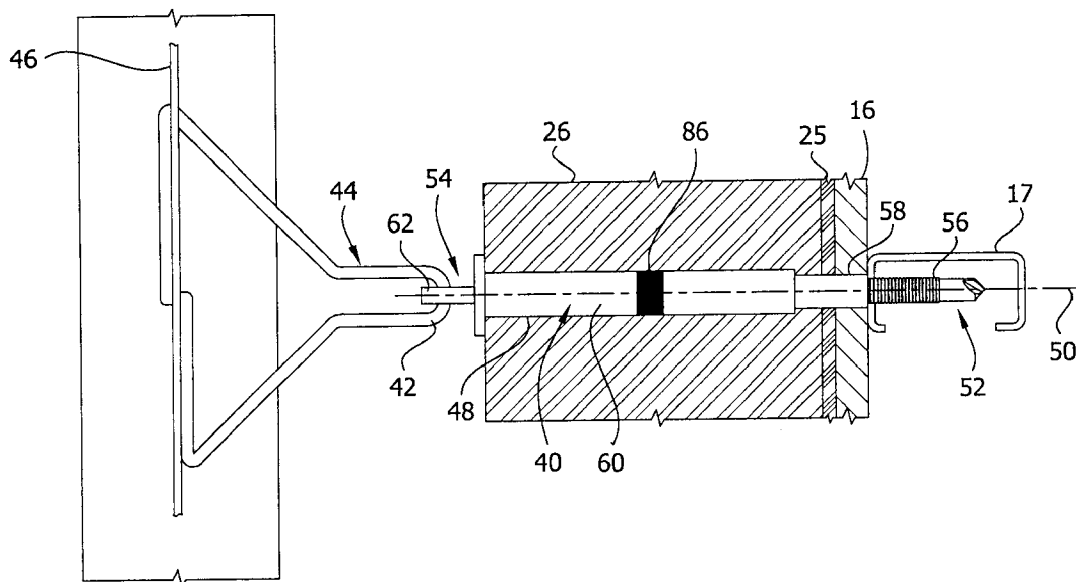




(22) Date de dépôt/Filing Date: 2016/11/17
(41) Mise à la disp. pub./Open to Public Insp.: 2017/06/04
(45) Date de délivrance/Issue Date: 2020/05/12
(30) Priorité/Priority: 2015/12/04 (US14/959,931)

(51) Cl.Int./Int.Cl. *E04F 13/22* (2006.01),
E04B 1/38 (2006.01), *E04B 2/30* (2006.01)
(72) Inventeur/Inventor:
HOHMANN, RONALD P., JR., US
(73) Propriétaire/Owner:
MITEK HOLDINGS, INC., US
(74) Agent: SMART & BIGGAR LLP

(54) Titre : ANCRAGE MURAL THERMIQUE
(54) Title: THERMAL WALL ANCHOR



(57) **Abrégé/Abstract:**

A wall anchor for use in a cavity wall to connect to a veneer tie to join an inner wythe and an outer wythe of the cavity wall includes an elongate body having a longitudinal axis, a driven end portion and a driving end portion. The driven end portion is adapted to be threadedly mounted on the inner wythe of the cavity wall. The driving end portion includes a drive head including a receptor opening for capturing a portion of a veneer tie. The receptor opening extends transverse to the longitudinal axis of the elongate body through the drive head. A thermal spacer is attached to the elongate body. The thermal spacer has a conductivity less than a thermal conductivity of the elongate body and is configured and arranged to reduce thermal transfer in the cavity wall along the elongate body.

MLP 7744.CA,

ABSTRACT

A wall anchor for use in a cavity wall to connect to a veneer tie to join an inner wythe and an outer wythe of the cavity wall includes an elongate body having a longitudinal axis, a driven end portion and a driving end portion. The driven end portion is adapted to be threadedly mounted on the inner wythe of the cavity wall. The driving end portion includes a drive head including a receptor opening for capturing a portion of a veneer tie. The receptor opening extends transverse to the longitudinal axis of the elongate body through the drive head. A thermal spacer is attached to the elongate bod. The thermal spacer has a conductivity less than a thermal conductivity of the elongate body and is configured and arranged to reduce thermal transfer in the cavity wall along the elongate body.

THERMAL WALL ANCHOR

FIELD OF THE INVENTION

[0001] The present invention generally relates to anchoring systems for insulated cavity walls, and more specifically, a thermal wall anchor that creates a thermal break in a cavity wall.

BACKGROUND

[0002] Anchoring systems for cavity walls are used to secure veneer facings to a building and overcome seismic and other forces (e.g., wind shear, etc.). Anchoring systems generally form a conductive bridge or thermal pathway between the cavity and the interior of the building through metal-to-metal contact. Optimizing the thermal characteristics of cavity wall construction is important to ensure minimized heat transfer through the walls, both for comfort and for energy efficiency of heating and air conditioning. When the exterior is cold relative to the interior of a heated structure, heat from the interior should be prevented from passing through to the outside. Similarly, when the exterior is hot relative to the interior of an air conditioned structure, heat from the exterior should be prevented from passing through to the interior.

SUMMARY

[0003] In one aspect, a wall anchor for use in a cavity wall to connect to a veneer tie to join an inner wythe and an outer wythe of the cavity wall includes an elongate body having a longitudinal axis, a driven end portion and a driving end portion. The driven end portion is adapted to be threadedly mounted on the inner wythe of the cavity wall. The driving end portion includes a drive head including a receptor opening for capturing a portion of a veneer tie. The receptor opening extends transverse to the longitudinal axis of the elongate body through the drive head. A thermal spacer is attached to the elongate body. The thermal spacer has a conductivity less than a thermal conductivity of the elongate body and is configured and arranged to reduce thermal transfer in the cavity wall along the elongate body.

[0004] In another aspect, a wall anchor for use in a cavity wall to connect to a veneer tie to join an inner wythe and an outer wythe of the cavity wall includes an elongate body having a longitudinal axis, a driven end portion, a driving end portion, and at least one barrel portion positioned between the driven end portion and the driving end portion. The driven end portion is adapted to be threadedly mounted on the inner wythe of the cavity wall and includes a threaded portion. The driving end portion includes a drive head having a receptor opening for capturing a portion of a veneer tie. The receptor opening extends transverse to the longitudinal axis of the elongate body through the drive head. The at least one barrel portion comprises a hollow body having a circumferential wall defining a hollow interior.

[0004a] In another aspect, a wall anchor for use in a cavity wall to connect to a veneer tie to join an inner wythe and an outer wythe of the cavity wall, the wall anchor comprising: an elongate body having a longitudinal axis, a driven end portion and a driving end portion, the driven end portion being adapted to be threadedly mounted on the inner wythe of the cavity wall, the driving end portion including a drive head including a receptor opening for capturing a portion of a veneer tie, the receptor opening extending transverse to the longitudinal axis of the elongate body through the drive head, the elongate body including first and second thermally-conductive portions; a thermal spacer attached to the elongate body, the thermal spacer having a conductivity less than a thermal conductivity of the elongate body and being configured and arranged to reduce thermal transfer in the cavity wall along the elongate body, the thermal spacer being positioned between the first and second thermally-conductive portions to create a thermal break between the first and second thermally-conductive portions; and a threaded stud interconnecting the thermal spacer with at least one of the first and second thermally-conductive portions of the elongate body.

[0004b] In another aspect, a wall anchor for use in a cavity wall to connect to a veneer tie to join an inner wythe and an outer wythe of the cavity wall, the wall anchor comprising an elongate body having a longitudinal axis, a driven end portion, a receptor portion, at least one barrel portion positioned between the driven end portion and the receptor portion and connecting the receptor portion to the driven end portion, and a thermal spacer interposed between the barrel portion and a section of the drive end portion, the driven end portion being adapted to be threadedly mounted on the inner wythe of the cavity wall and including a barrel

attachment portion, the receptor portion including a receptor opening for capturing a portion of the veneer tie, the receptor opening extending transverse to the longitudinal axis of the elongate body through the receptor portion, the at least one barrel portion comprising a hollow body having a circumferential wall defining a hollow interior extending between opposite ends of the at least one barrel portion, the barrel attachment portion being received in the hollow interior, the barrel attachment portion and the circumferential wall defining a gap therebetween in the hollow interior of the barrel portion, wherein the at least one barrel portion comprises at least one opening extending through the circumferential wall to the hollow interior.

[0005] Other objects and features will be in part apparent and in part pointed out hereinafter.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] FIG. 1 is a perspective of an anchoring system as applied to a cavity wall with an inner wythe of an insulated dry wall construction and an outer wythe of brick;

[0007] FIG. 2 is an enlarged fragmentary schematic elevation, partially in section, illustrating the anchoring system in use;

[0008] FIG. 3 is a front view of a thermal wall anchor according to an embodiment of the present invention, the rear view being a mirror image thereof;

[0009] FIG. 4 is a top plan view thereof, the bottom plan view being identical thereto;

[0010] FIG. 5 is a front view of a thermal wall anchor according to a second embodiment, the rear view being a mirror image thereof;

[0011] FIG. 6 is a top plan view thereof, the bottom plan view being identical thereto;

[0012] FIG. 7 is a front view in partial section of a third embodiment of a thermal wall anchor;

[0013] FIG. 8 is a top plan view in partial section of the thermal wall anchor of Fig. 7;

[0014] FIG. 9 is a front view in partial section of a thermal wall anchor according to a fourth embodiment, the rear view being identical thereto;

[0015] FIG. 10 is a top plan view thereof, the bottom plan view being identical thereto;

[0016] FIG. 11 is a partial section taken through line 11-11 of Fig. 10; and

[0017] FIG. 12 is a partial section taken through line 12-12 of Fig. 9.

[0018] Corresponding reference characters indicate corresponding parts throughout the drawings.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0019] Referring to Figs. 1 and 2, an anchoring system for cavity walls is shown generally at 10. A cavity wall structure generally indicated at 12 comprises an inner wythe or drywall backup 14 with sheetrock or wallboard 16 mounted on metal columns or studs 17 and an outer wythe or facing wall 18 of brick 20 construction. Between the inner wythe 14 and the outer wythe 18, a cavity 22 is formed. An air/vapor barrier 25 and insulation 26 are attached to an exterior surface of the inner wythe 14 and located in the cavity 22.

[0020] Successive bed joints 32 are substantially planar and horizontally disposed and, in accordance with building standards, are approximately 0.375 inches (9.525 mm) in height in a typical embodiment. Selective ones of bed joints 32, which are formed between courses of bricks 20, are constructed to receive the insertion portion of a veneer tie 44. It is understood that the described and illustrated wall structure 12 is exemplary only. Other structures may be used without departing from the scope of the present invention. A wall anchor 40 is threadedly mounted on the inner wythe 14 and is supported by the inner wythe. As described in greater detail below, the wall anchor 40 is configured to provide a thermal break in the cavity wall structure 12. The anchoring system 10 is constructed and configured to minimize air and moisture penetration around the wall anchor system/inner wythe juncture and limit thermal transfer.

[0021] For purposes of the description, an exterior cavity surface 24 of the inner wythe 14 contains a horizontal line or x-axis 34 and an intersecting vertical line or y-axis 36. A horizontal line or z-axis 38, normal to the xy-plane, passes through the coordinate origin formed by the intersecting x- and y-axes.

[0022] In the illustrated embodiment, the anchoring system 10 includes wall anchor 40, veneer tie 44, and an optional wire or outer wythe reinforcement 46. At intervals along the exterior surface 24 of the inner wythe 14, wall anchors 40 are driven into place in anchor-receiving channels 48 (see Fig. 2). Anchor-receiving channels 48 can be pre-drilled, or, alternatively, wall anchor 40 can be used to drill its own channel. The wall anchors 40 are positioned so that a longitudinal axis 50 of the wall anchor is normal to the xy-plane and taps into stud 17. Veneer tie 44 is shown in Figure 1 as being placed on a course of bricks in preparation for being embedded in the mortar of bed joint 32. The veneer tie 44 is formed of wire and includes an attachment portion or U-shaped rear leg portion 42, as is known in the art. The wire reinforcement 46 is also constructed of a wire, as is known in the art, and preferably conforms to the joint reinforcement requirements of ASTM Standard Specification A951-00, Table 1. Wall anchors and veneer ties can be configured in other ways within the scope of the present invention.

[0023] In a first embodiment illustrated in Figs. 1-4, the wall anchor 40 includes an elongate body that extends along a longitudinal axis 50 of the wall anchor from a driven end portion 52 to a driving end portion 54. The driven end portion 52 includes a threaded portion 56 (e.g., a self-drilling screw portion). The threaded portion 56 can be configured for attachment to a metal stud, a wooden stud, a concrete backup wall, or alternative backup wall constructions. In use, the driven end portion 52 is driven into an inner wythe (e.g., a stud of an inner wythe) of a cavity wall, mounting the wall anchor 40 on the inner wythe.

[0024] The elongate body of the wall anchor 40 includes a non-threaded barrel extending between the driven end portion 52 and the driving end portion 54. In the embodiment of Figs. 3 and 4, the wall anchor 40 includes a dual-diameter barrel having a smaller diameter barrel or first shaft portion 58 toward the driven end portion 52 and a larger diameter barrel or second shaft portion 60 toward the driving end portion 54. A drive head 62 is located at the driving end portion 54 of the anchor 40. The elongate body includes a flange 64 at the junction of the drive head 62 and the larger diameter barrel portion 60. The drive head 62 defines a receptor or aperture 68 for receiving an attachment portion of a veneer tie, such as the U-shaped rear leg portion 42 of the veneer tie 44. As shown in Figs. 1 and 2, the

rear leg 42 of the veneer tie 44 is inserted into the aperture 68 of the drive head 62, thereby securing the veneer tie to the wall anchor 40.

[0025] The wall anchor 40 includes a thermal spacer 86 that is configured to provide a thermal break in the wall anchor. The main components of the wall anchor 40 are preferably made of metal (e.g., steel) to provide a high-strength anchoring system. Alternatively, the wall anchor can be made of plastic or other suitable material. In one embodiment, the main components of the wall anchor are made of stainless steel. Through the use of a thermal spacer 86, the thermal transmission values of the wall anchor are lowered. The thermal spacer 86 is preferably a non-conductive material. For example, the thermal spacer 86 can be ceramic, plastic, epoxy, carbon fiber, a non-conductive metal, or other non-conductive material.

[0026] As seen in Figs. 3 and 4, the larger diameter barrel portion 60 includes first and second thermally-conductive portions 70, 72 separated by the non-conductive thermal spacer 86. The thermal spacer 86 is attached to both the first and second thermally-conductive portions 70, 72 (e.g., glued). The thermal spacer 86 is configured to provide a thermal break between the first and second thermally-conductive portions 70, 72. Thus, when the wall anchor 40 is attached to an inner wythe as part of the anchoring system 10, the thermal spacer interrupts the thermal pathway through the cavity wall. In other words, the transmission of heat between the outer wythe (via a veneer tie attached to the outer wythe and attached to the wall anchor 40) and the inner wythe (via the wall anchor attached to the inner wythe) of a cavity wall is reduced. The thermal spacer 86 preferably has a thickness selected to provide a thermal break between thermally-conductive portions 70, 72 attached to the thermal spacer. For example, in one embodiment, the thermal spacer 86 has a thickness t of about 0.250 inches (6.35 mm).

[0027] The thermal spacer 86 of the wall anchor 40 causes the cavity wall 12 to obtain a lower transmission value (U -value), thereby providing an anchoring system with the benefits of thermal isolation. The term U -value is used to describe the transmission of heat through the entire cavity wall (including the anchor, the insulation, and other components), *i.e.*, the measure of the rate of transfer of heat through one square meter of a structure divided by the difference in temperature across the structure. The lower the U -value, the better the

thermal integrity of the cavity wall, and the higher the U-value, the worse the thermal performance of the building envelope. The U-value is calculated from the reciprocal of the combined thermal resistances of the materials in the cavity wall, taking into account the effect of thermal bridges, air gaps and fixings. Several factors affect the U-value, such as the size of the cavity, the thickness of the insulation, the materials used, etc. In one exemplary test, a cavity wall structure was modeled to measure the U-value in an anchoring system 10 as described, with a thermal spacer 86 in the wall anchor 40. The wall included, from the exterior face to the interior face, an outer wythe comprising standard 3-5/8 inch thick brick veneer, a 1.5 inch slightly ventilated air cavity, 4 inches of mineral wool exterior insulation, 5/8 inch exterior sheathing, a 3-5/8 inch steel stud, and ½ inch gypsum board. In the model, veneer ties are embedded into the brick mortar and wall anchors penetrated through the insulation and into the steel stud. The effective assembly U-value was 0.053 BTU/(hr·ft²·°F) (0.302 W/m²K), for a thermal efficiency of 89.0%. In another model, an anchoring system included a dual diameter barrel wall anchor without a thermal spacer, and the effective assembly U-value was 0.058 BTU/(hr·ft²·°F) (0.332 W/m²K), for a thermal efficiency of 81.0%. Although only an illustrative model, the test results indicate that the U-value of the cavity wall structure is reduced through use of a wall anchor including a thermal spacer.

[0028] A second embodiment of a wall anchor with thermal spacer is illustrated in Figs. 5 and 6. Wall anchor 140 is substantially similar to wall anchor 40 described above, with differences as pointed out herein. Parts of the wall anchor 140 corresponding to those of the anchor 40 are given the same reference numeral, plus "100."

[0029] Wall anchor 140 includes an elongate body that extends along the longitudinal axis 150 of the anchor from a driven end portion 152 to a driving end portion 154. The driven end portion 152 includes a threaded portion 156 configured for attachment to an inner wythe (e.g., a metal stud). Wall anchor 140 is used as described above with reference to wall anchor 40. Wall anchor 140 includes a dual-diameter barrel having a smaller diameter barrel or first shaft portion 158 and a larger diameter barrel or second shaft portion 160. A drive head 162 is located at the driving end portion 154 of the anchor 140. The elongate body includes a flange 164 at the junction of the drive head 162 and the barrel 160. The drive head 162 defines a receptor or aperture 168 for receiving a portion of a veneer tie, as described above.

[0030] The wall anchor 140 includes a thermal spacer 186 that is configured to provide a thermal break in the wall anchor. The main components of the wall anchor are preferably made of metal (e.g., steel) to provide a high-strength anchoring system. Alternatively, the wall anchor can be made of plastic or other suitable material. In one embodiment, the main components of the wall anchor are made of stainless steel. Through the use of a thermal spacer 186, the thermal transmission values of the wall anchor are lowered. The thermal spacer 186 is preferably a non-conductive material. For example, the thermal spacer 186 can be ceramic, plastic, epoxy, carbon fiber, a non-conductive metal, or other non-conductive material.

[0031] As seen in Figs. 5 and 6, the larger diameter barrel portion 160 includes first and second thermally-conductive portions 170, 172 separated by the non-conductive thermal spacer 186. The thermal spacer 186 is attached to both the first and second thermally-conductive portions 170, 172. As illustrated, the thermal spacer 186 is attached to each of the first and second thermally-conductive portions by threaded engagement. The first thermally-conductive portion 170 includes a threaded stud 190. The second thermally-conductive portion 172 includes a threaded stud 192. The threaded studs 190, 192 can be made of stainless steel, plastic, fiberglass, epoxy or any other suitable material. The thermal spacer 186 includes a threaded opening 194 configured to receive the studs 190, 192. As illustrated in Figs. 5 and 6, when both of the threaded studs 190, 192 are received in the threaded opening 194, the studs are spaced from each other and do not make contact. Thus, when the wall anchor 140 is attached to an inner wythe as part of an anchoring system, the thermal spacer 186 interrupts the thermal pathway through the cavity wall. In other words, the transmission of heat between the outer wythe (via a veneer tie attached to the outer wythe and attached to the wall anchor 140) and the inner wythe (via the wall anchor attached to the inner wythe) of a cavity wall is reduced. The thermal spacer 186 preferably has a thickness selected to provide a thermal break between thermally-conductive portions 170, 172 attached to the thermal spacer. For example, in one embodiment, the thermal spacer 186 has a thickness t of about 0.250 inches (6.35 mm). Other configurations are within the scope of the present invention. For example, the studs 190, 192 can be separate from both the larger diameter barrel portion 160 and the thermal spacer 186, which can each include a threaded opening to

receive the studs. Alternatively, the studs 190, 192 can be formed as a part of the thermal spacer 186 and the first and second thermally-conductive portions 170, 172 can include threaded openings configured to receive the studs. In one embodiment, a single stud made of stainless steel, plastic, or other suitable material extends through the thermal spacer to attach the first and second thermally-conductive portions 170, 172 to each other. Alternatively, one or two hollow threaded rods made of stainless steel, plastic, or other suitable material can connect the thermal spacer 186 and the thermally-conductive portions 170, 172.

[0032] A third embodiment of a wall anchor with thermal spacer is illustrated in Figs. 7 and 8. Wall anchor 240 is substantially similar to wall anchors 40, 140 described above, with differences as pointed out herein. Parts of the wall anchor 240 corresponding to parts of the anchor 40 are given the same reference numeral, plus "200."

[0033] Wall anchor 240 includes an elongate body that extends along the longitudinal axis 250 of the anchor from a driven end portion 252 to a driving end portion 254. The driven end portion 252 includes a threaded portion 256 configured for attachment to an inner wythe (e.g., a metal stud). Wall anchor 240 is used as described above with reference to wall anchor 40. Wall anchor 240 includes a single diameter barrel 260. The barrel 260 comprises a hollow body having a circumferential wall 259 defining an open interior 261. A drive head 262 is located at the driving end portion 254 of the anchor 240. The elongate body includes a flange 264 at the junction of the drive head 262 and the barrel 260. The drive head 262 defines a receptor or aperture 268 for receiving a portion of a veneer tie, as described above. The elongate body includes an axial end surface 263 at a free end of the barrel 260 opposite the drive head 262.

[0034] The wall anchor 240 includes a thermal spacer 286 that is configured to provide a thermal break in the wall anchor. The main components of the wall anchor 240 are preferably made of metal (e.g., steel) to provide a high-strength anchoring system. Alternatively, the wall anchor can be made of plastic or other suitable material. In one embodiment, the main components of the wall anchor are made of stainless steel. Through the use of a thermal spacer 286, the thermal transmission values of the wall anchor are lowered. The thermal spacer 286 is preferably a non-conductive material. For example, the

thermal spacer 286 can be ceramic, plastic, epoxy, carbon fiber, a non-conductive metal, or other non-conductive material.

[0035] As seen in Figs. 7 and 8, the thermal spacer 286 is positioned adjacent the axial end surface 263 of the barrel 260. The thermal spacer 286 is attached to the threaded portion 256 of the wall anchor 240. For example, the thermal spacer 286 is threadedly mounted on the threaded portion 256. As illustrated, the threaded portion 256 includes a barrel attachment portion 290 and an inner wythe attachment portion 292. The thermal spacer 286 includes a threaded opening 294 configured to receive the barrel attachment portion 290 and the inner wythe attachment portion 292. One end of the barrel attachment stud 290 is attached to the barrel 260. Specifically, the barrel attachment stud 290 is threadedly attached to the barrel 260, such as by threaded engagement with a nut 291 positioned at the free end of the elongate body of the wall anchor 240. The other end of the barrel attachment portion 290 is threadedly attached to the thermal spacer 286. As illustrated in Figs. 7 and 8, when both the barrel attachment portion 290 and the inner wythe attachment portion 292 are received in the threaded opening 294 of the thermal spacer 286, the portions 290, 292 are spaced from each other and do not make contact. Other attachment configurations are within the scope of the present invention. For example, the threaded portion 256 can be a single threaded screw that is attached to both the barrel 260 and the thermal spacer 286. The threaded portion 256 can be made of stainless steel, plastic, fiberglass, or other suitable material. In one embodiment, the threaded portion 256 is hollow.

[0036] The thermal spacer 286 is configured to provide a thermal break between the barrel 260 and an inner wythe to which the barrel is attached. Thus, when the wall anchor 240 is attached to an inner wythe as part of an anchoring system, the thermal spacer 286 interrupts the thermal pathway through the cavity wall. In other words, the transmission of heat between the outer wythe (via a veneer tie attached to the outer wythe and attached to the wall anchor 240) and the inner wythe (via the wall anchor attached to the inner wythe) of a cavity wall is reduced. The thermal spacer 286 preferably has a thickness selected to provide a thermal break between the wall anchor 240 and an inner wythe. For example, in one embodiment, the thermal spacer 286 has a thickness t of about 0.688 inches (17.475 mm).

[0037] A fourth embodiment of a wall anchor with thermal spacer is illustrated in Figs. 9-12. Wall anchor 340 is substantially similar to wall anchors 40, 140, 240 (and

particularly to anchor 240) described above, with differences as pointed out herein. Parts of the anchor corresponding to parts of the anchor 240 are given the same reference numeral, plus "100."

[0038] Wall anchor 340 includes an elongate body that extends along the longitudinal axis 350 of the anchor from a driven end portion 352 to a driving end portion 354. The driven end portion 352 includes a threaded portion 356 configured for attachment to an inner wythe (e.g., a metal stud). Wall anchor 340 is used as described above with reference to wall anchor 40. Wall anchor 340 includes a single diameter barrel 360. The barrel 360 comprises a hollow body having a circumferential wall 359 defining an open interior 361. A drive head 362 is located at the driving end portion 354 of the anchor 340. The elongate body includes a flange 364 at the junction of the drive head 362 and the barrel 360. The drive head 362 defines a receptor or aperture 368 for receiving a portion of a veneer tie, as described above. The elongate body includes an axial end surface 363 at a free end of the barrel 360 opposite the drive head 362.

[0039] The wall anchor 340 includes a thermal spacer 386 that is configured to provide a thermal break in the wall anchor. The main components of the wall anchor 340 are preferably made of metal (e.g., steel) to provide a high-strength anchoring system. Alternatively, the wall anchor can be made of plastic or other suitable material. In one embodiment, the main components of the wall anchor are made of stainless steel. Through the use of a thermal spacer 386, the thermal transmission values of the wall anchor are lowered. The thermal spacer 386 is preferably a non-conductive material. For example, the thermal spacer 386 can be ceramic, plastic, epoxy, carbon fiber, a non-conductive metal, or other non-conductive material.

[0040] As seen in Figs. 9-12, the thermal spacer 386 is positioned adjacent the axial end surface 363 of the barrel 360. The thermal spacer 386 is attached to the threaded portion 356 of the wall anchor 340. For example, the thermal spacer 386 is threadedly mounted on the threaded portion 356. As illustrated, the threaded portion 356 includes a barrel attachment portion or stud 390 and an inner wythe attachment portion 392. The thermal spacer 386 includes a threaded opening 394 configured to receive the barrel attachment portion 390 and the inner wythe attachment portion 392. One end of the barrel attachment stud 390 is attached

to the barrel 360. Specifically, the barrel attachment stud 390 is threadedly attached to the barrel 360, such as by threaded engagement with a nut 391 positioned at the free end of the elongate body of the wall anchor 340. The other end of the barrel attachment stud 390 is threadedly attached to the thermal spacer 386. As illustrated in Figs. 9-12, when both the barrel attachment stud 390 and the inner wythe attachment portion 392 are received in the threaded opening 394 of the thermal spacer 386, the portions 390, 392 are spaced from each other and do not make contact. Other attachment configurations are within the scope of the present invention. For example, the threaded portion 356 can be a single threaded screw that is attached to both the barrel 360 and the thermal spacer 386. The threaded portion 356 can be made of stainless steel, plastic, fiberglass, or other suitable material. In one embodiment, the threaded portion 356 is hollow.

[0041] The thermal spacer 386 is configured to provide a thermal break between the barrel 360 and an inner wythe to which the barrel is attached. Thus, when the wall anchor 340 is attached to an inner wythe as part of an anchoring system, the thermal spacer 386 interrupts the thermal pathway through the cavity wall. In other words, the transmission of heat between the outer wythe (via a veneer tie attached to the outer wythe and attached to the wall anchor 340) and the inner wythe (via the wall anchor attached to the inner wythe) of a cavity wall is reduced. The thermal spacer 386 preferably has a thickness selected to provide a thermal break between the wall anchor 340 and an inner wythe. For example, in one embodiment, the thermal spacer 386 has a thickness t of about 0.688 inches (17.475 mm).

[0042] At least one opening 396 extends through the wall 359 of the barrel 360. As illustrated in Figs. 9 and 10, a plurality of openings 396 extend through the wall 359. The openings 396 reduce the mass of the wall anchor 340. The reduction in mass in the wall anchor 340 correspondingly reduces the amount of thermal transfer between the wall anchor and a veneer tie attached to the wall anchor. In one embodiment, the total surface area of the wall 359 of the barrel 360 is reduced by an amount in a range of about 5% to about 95% by the openings 396 as compared to what the total surface area of the wall would be if the hollow body did not include any openings. In one embodiment, the total surface area of the wall 359 is reduced by an amount in a range of about 5% to about 75%, such as by 5%, by 10%, by 20%, by 25%, by 30%, by 35%, or by any other suitable amount.. As illustrated, the wall

anchor 340 includes openings 396 spaced along the length of the barrel 360. The openings 396 are uniformly spaced along the length of the barrel 360. The openings 396 are uniformly spaced around a circumference of the barrel 360. Each opening 396 extends through the circumferential wall 359 to the hollow interior 361. Each opening 396 aligns with a corresponding diametrically opposed opening 396. Each opening 396 is generally circular and is generally the same size. Other opening configurations and arrangements are within the scope of the present invention. For example, the openings 396 may not be uniformly sized or arranged to be uniformly spaced along the length and/or around the circumference of the barrel 360. The anchor 340 can include more openings 396 than illustrated, or fewer openings than illustrated. The openings 396 can have other shapes or configurations, or may have varying shapes, sizes, spacing, and configurations.

[0043] The anchors as described above serve to thermally isolate the components of the anchoring system, thereby reducing the thermal transmission and conductivity values of the anchoring system as a whole. The anchors provide an insulating effect and an in-cavity thermal break, severing the thermal pathways created from metal-to-metal contact of anchoring system components. The present invention maintains the strength of the metal and further provides the benefits of a thermal break in the cavity.

[0044] Having described the invention in detail, it will be apparent that modifications and variations are possible without departing from the scope of the invention defined in the appended claims.

[0045] When introducing elements of the present invention or the preferred embodiment(s) thereof, the articles "a", "an", "the" and "said" are intended to mean that there are one or more of the elements. The terms "comprising", "including" and "having" are intended to be inclusive and mean that there may be additional elements other than the listed elements.

[0046] In view of the above, it will be seen that the several objects of the invention are achieved and other advantageous results attained.

[0047] As various changes could be made in the above products without departing from the scope of the invention, it is intended that all matter contained in the above description and shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

CLAIMS:

1. A wall anchor for use in a cavity wall to connect to a veneer tie to join an inner wythe and an outer wythe of the cavity wall, the wall anchor comprising:

an elongate body having a longitudinal axis, a driven end portion and a driving end portion, the driven end portion being adapted to be threadedly mounted on the inner wythe of the cavity wall, the driving end portion including a drive head including a receptor opening for capturing a portion of a veneer tie, the receptor opening extending transverse to the longitudinal axis of the elongate body through the drive head, the elongate body including first and second thermally-conductive portions;

a thermal spacer attached to the elongate body, the thermal spacer having a conductivity less than a thermal conductivity of the elongate body and being configured and arranged to reduce thermal transfer in the cavity wall along the elongate body, the thermal spacer being positioned between the first and second thermally-conductive portions to create a thermal break between the first and second thermally-conductive portions; and

a threaded stud interconnecting the thermal spacer with at least one of the first and second thermally-conductive portions of the elongate body.

2. The wall anchor of claim 1, wherein the thermal spacer is a material selected from the group consisting of ceramic, plastic, epoxy and carbon fiber.

3. The wall anchor of claim 1, wherein the threaded stud is a material selected from the group consisting of stainless steel, plastic, epoxy and fiberglass.

4. The wall anchor of claim 1, wherein the threaded stud is a first threaded stud interconnecting the thermal spacer and the first thermally-conductive portion of the elongate body, the wall anchor further comprising a second threaded stud interconnecting the thermal spacer and the second thermally-conductive portion of the elongate body.

5. The wall anchor of claim 1, wherein the threaded stud is thermally-conductive.

6. The wall anchor of claim 4, wherein the first and second threaded studs are thermally-conductive.

7. A wall anchor for use in a cavity wall to connect to a veneer tie to join an inner wythe and an outer wythe of the cavity wall, the wall anchor comprising an elongate body having a longitudinal axis, a driven end portion, a receptor portion, at least one barrel portion positioned between the driven end portion and the receptor portion and connecting the receptor portion to the driven end portion, and a thermal spacer interposed between the barrel portion and a section of the drive end portion, the driven end portion being adapted to be threadedly mounted on the inner wythe of the cavity wall and including a barrel attachment portion, the receptor portion including a receptor opening for capturing a portion of the veneer tie, the receptor opening extending transverse to the longitudinal axis of the elongate body through the receptor portion, the at least one barrel portion comprising a hollow body having a circumferential wall defining a hollow interior extending between opposite ends of the at least one barrel portion, the barrel attachment portion being received in the hollow interior, the barrel attachment portion and the circumferential wall defining a gap therebetween in the hollow interior of the barrel portion,

wherein the at least one barrel portion comprises at least one opening extending through the circumferential wall to the hollow interior.

8. The wall anchor of claim 7, wherein the thermal spacer is a material selected from the group consisting of ceramic, plastic, epoxy and carbon fiber.

9. The wall anchor of claim 7, wherein the driven end portion is a material selected from the group consisting of stainless steel, plastic, epoxy and fiberglass.

10. The wall anchor of claim 7, wherein the at least one barrel portion comprises a plurality of openings extending through the circumferential wall to the hollow interior.

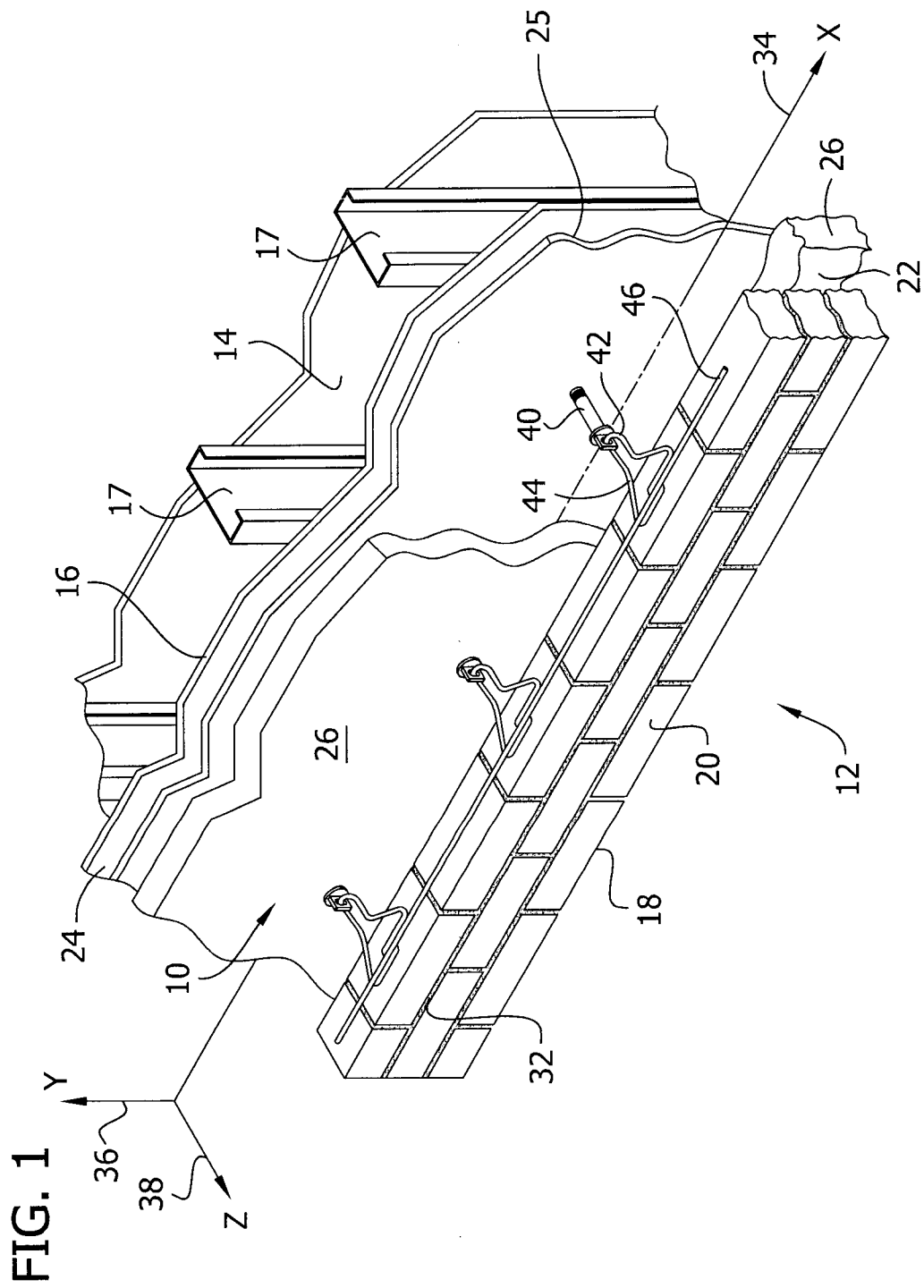
11. The wall anchor of claim 10, wherein the plurality of openings reduces the material of the hollow body by an amount in a range of about 5% to about 35%.
12. The wall anchor of claim 7, wherein the thermal spacer mounts the section of the driven end portion on the barrel portion.
13. The wall anchor of claim 7, wherein the driven end portion further includes an inner wythe attachment portion, the thermal spacer being interposed between the barrel attachment portion and the inner wythe attachment portion.
14. The wall anchor of claim 13 wherein the thermal spacer connects the inner wythe attachment portion to the barrel attachment portion.
15. The wall anchor of claim 13, wherein the inner wythe attachment portion is threadably attached to the thermal spacer.
16. The wall anchor of claim 15, wherein the barrel attachment portion is threadably attached to the thermal spacer and spaced from the inner wythe attachment portion by the thermal spacer.
17. The wall anchor of claim 16, wherein the at least one barrel portion has an axially facing end surface and the thermal spacer has a conductivity less than a thermal conductivity of the elongate body, the thermal spacer being configured and arranged to reduce thermal transfer in the cavity wall along the elongate body, an axially facing end surface of the thermal spacer engaging the axially facing end surface of the at least one barrel portion, the thermal spacer extending axially therefrom away from the receptor portion, the thermal spacer being attached to the driven end portion such that the thermal spacer is disposed between the axially facing end surface of the at least one barrel portion and a the section of the driven end portion and provides a barrier to communication of thermal energy from the section of the driven end portion and the barrel portion.

18. The wall anchor of claim 16, wherein the thermal spacer includes internal threads for connecting to the barrel attachment portion and for connecting to the inner wythe attachment portion.

19. The wall anchor of claim 18, wherein the barrel attachment portion is threadably attached to the barrel portion.

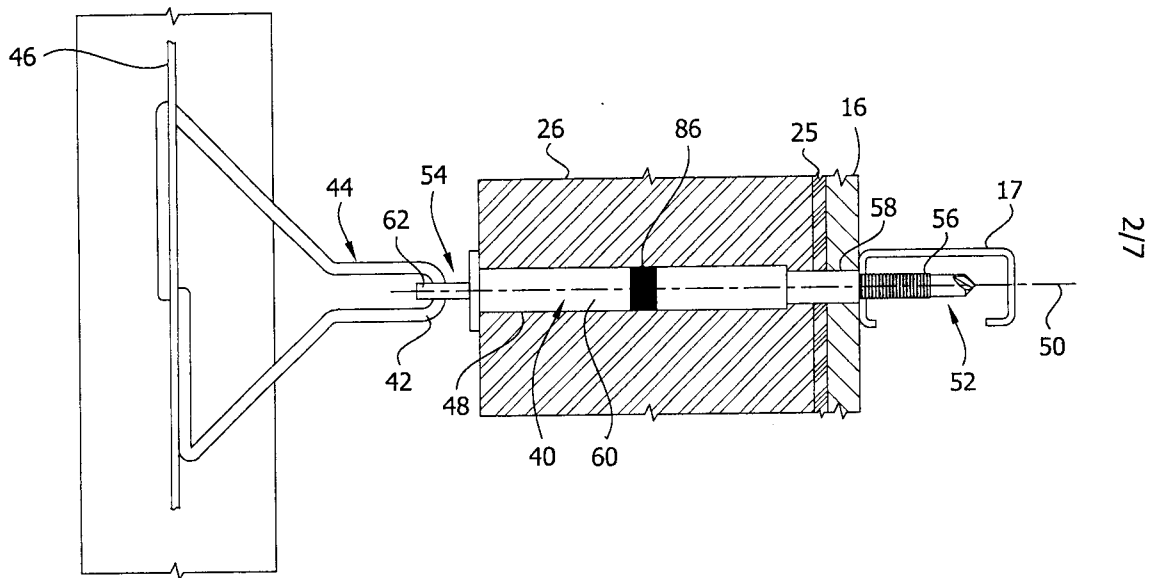
20. The wall anchor of claim 17, wherein the at least one barrel portion comprises a plurality of openings extending through the circumferential wall to the hollow interior.

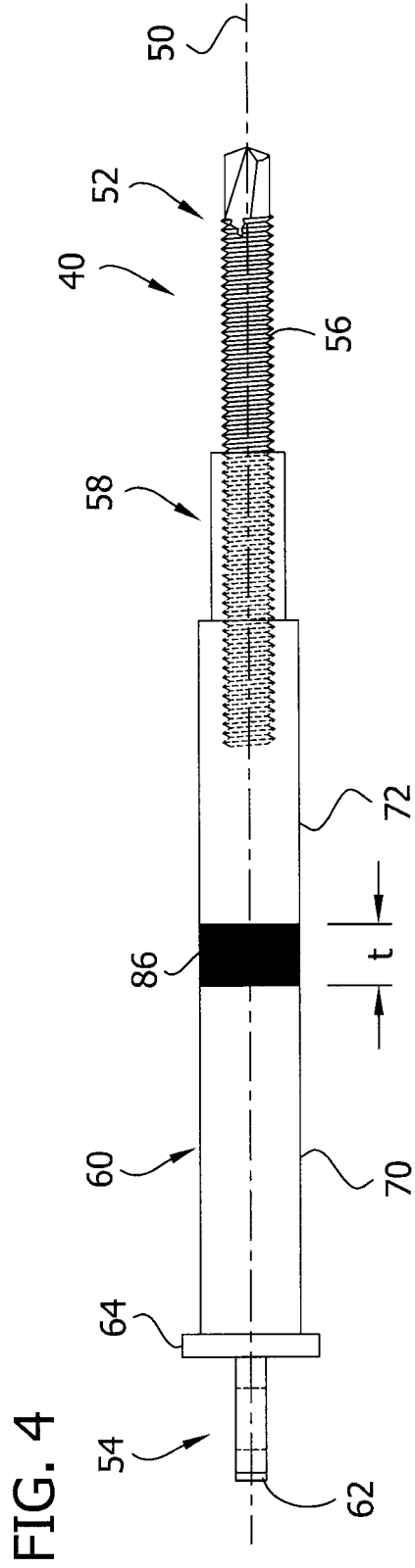
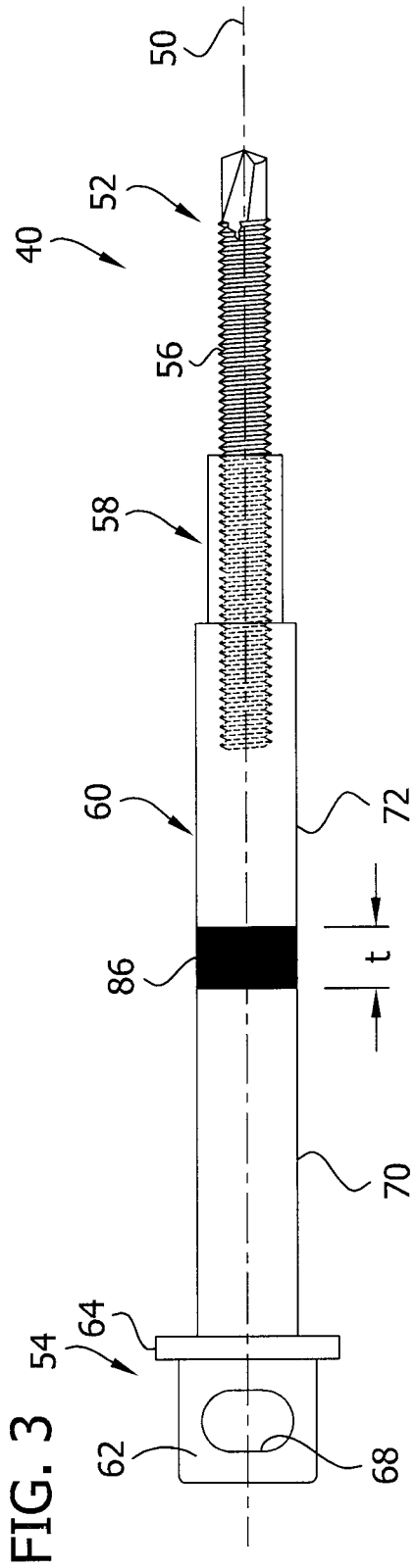
21. The wall anchor of claim 20, wherein the plurality of openings reduces the material of the hollow body by an amount in a range of about 5% to about 35%.

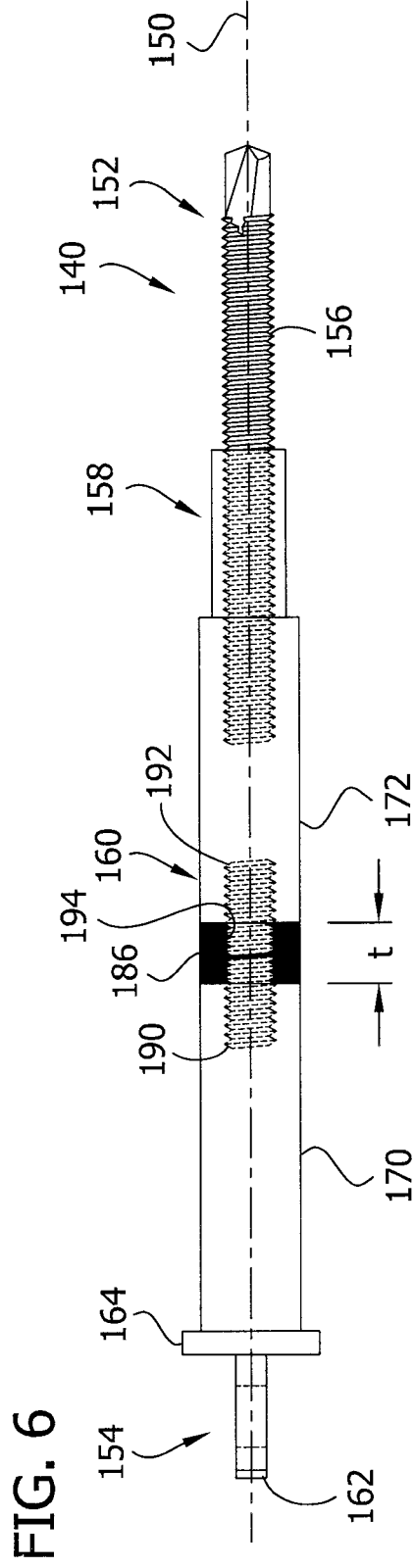
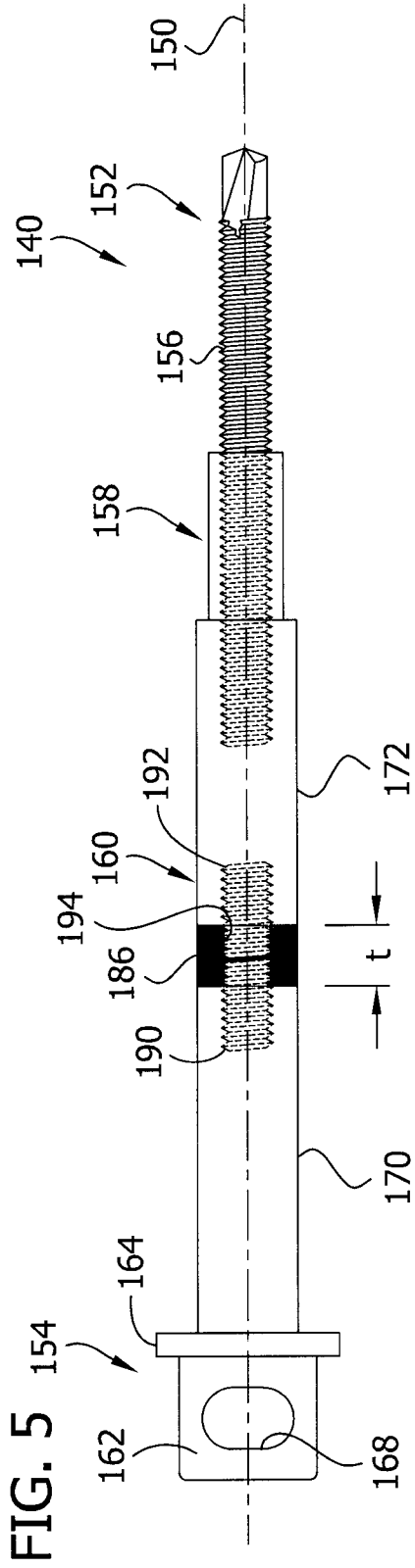


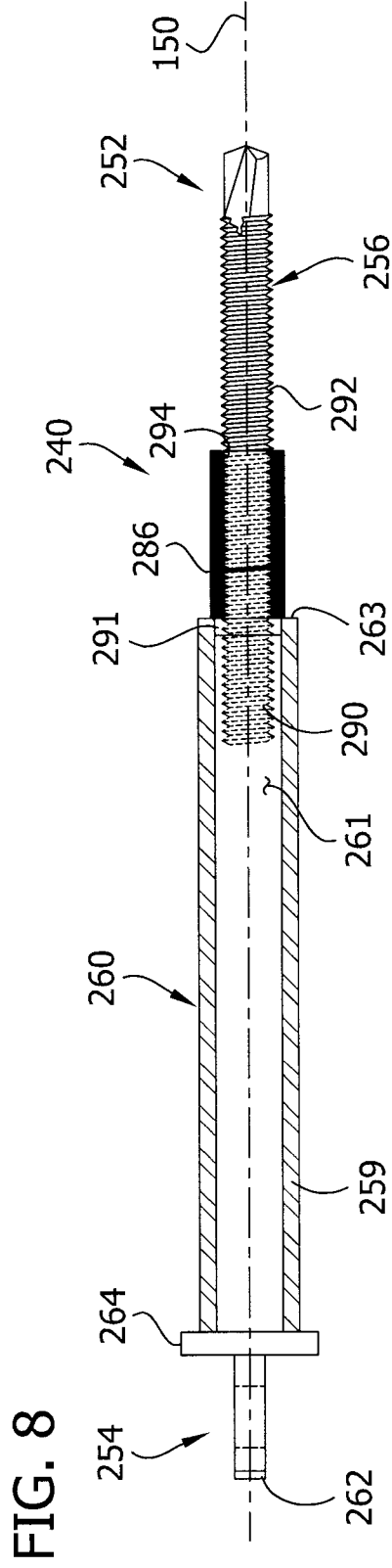
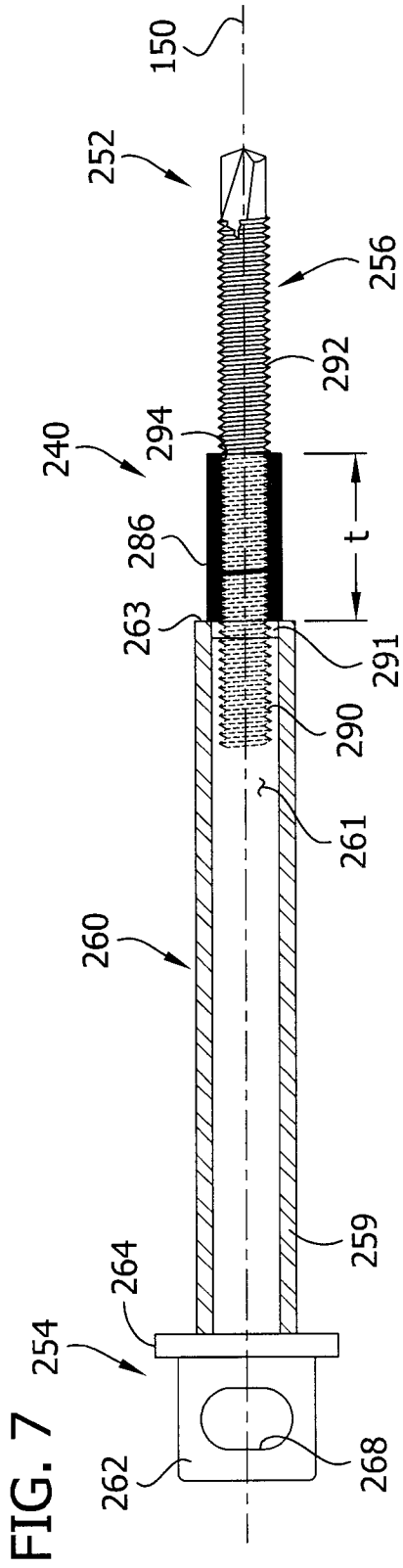
2/7

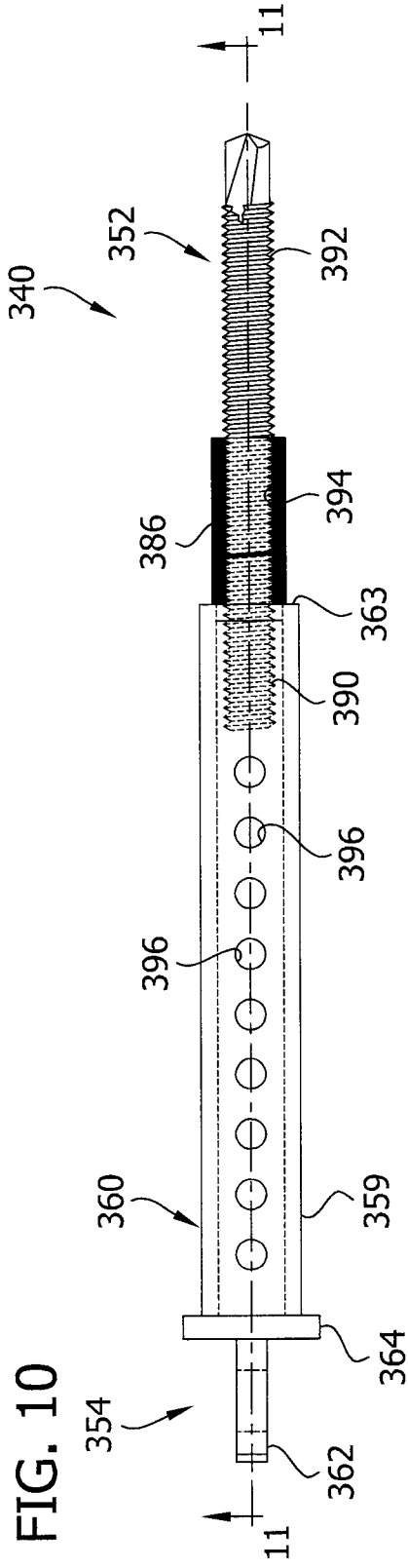
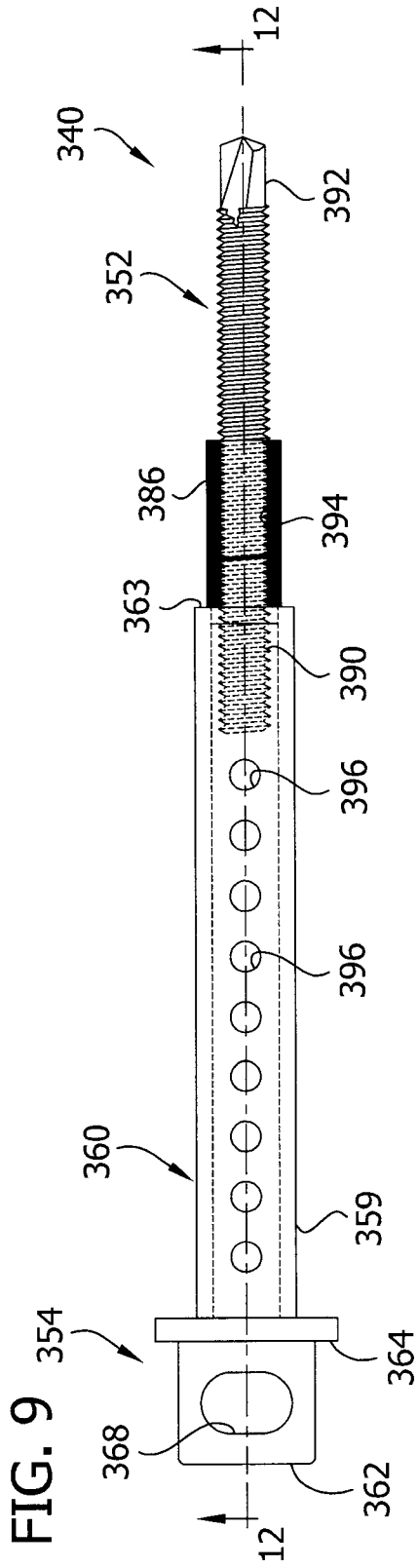
FIG. 2











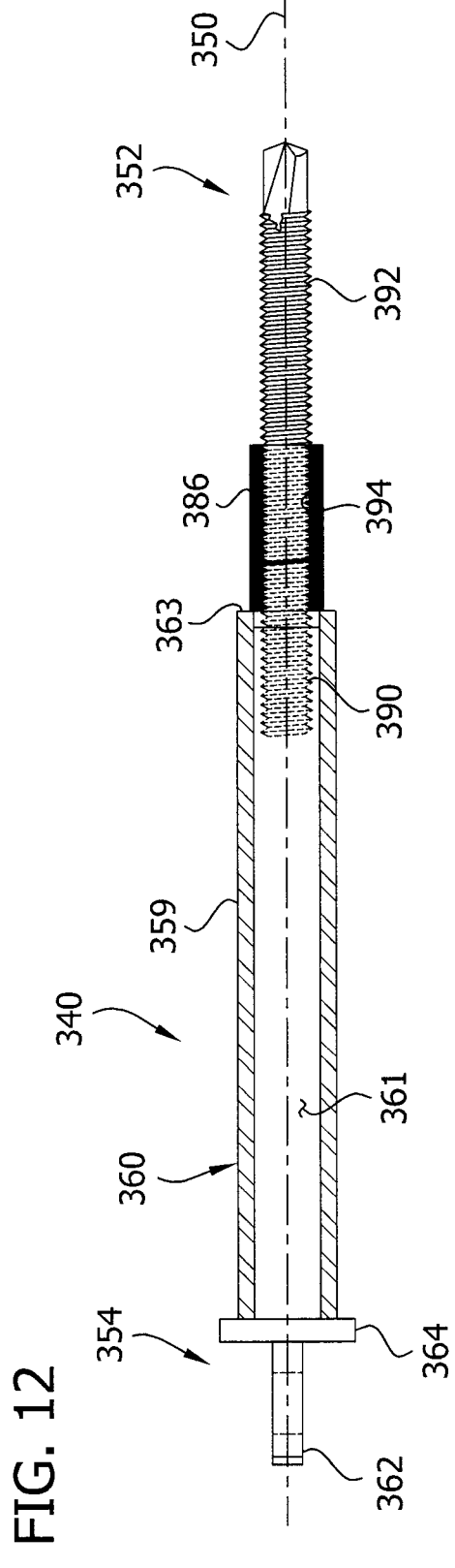
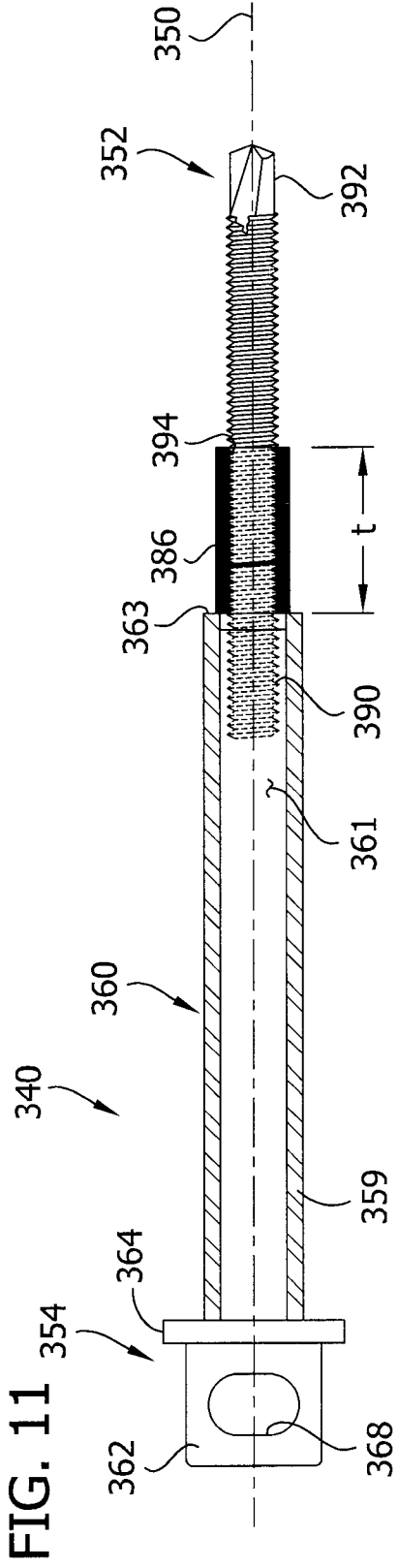


FIG. 11

FIG. 12

