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(57) **ABSTRACT**

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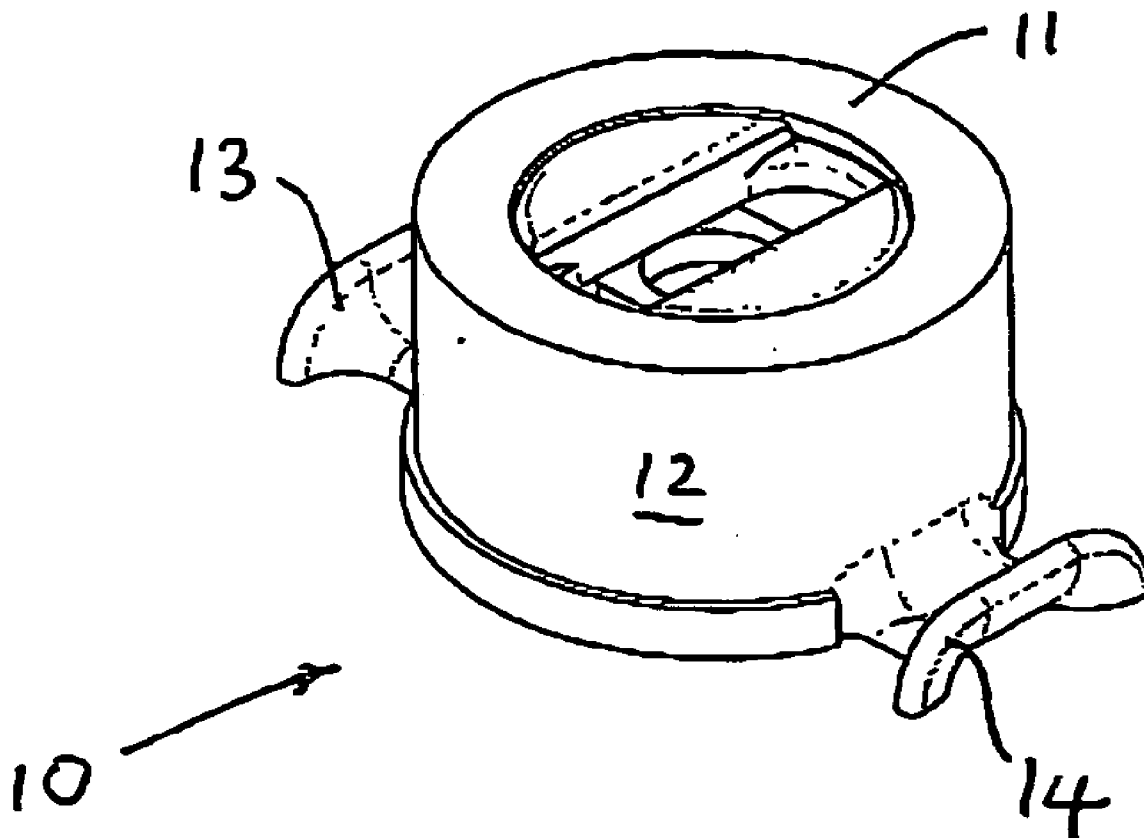
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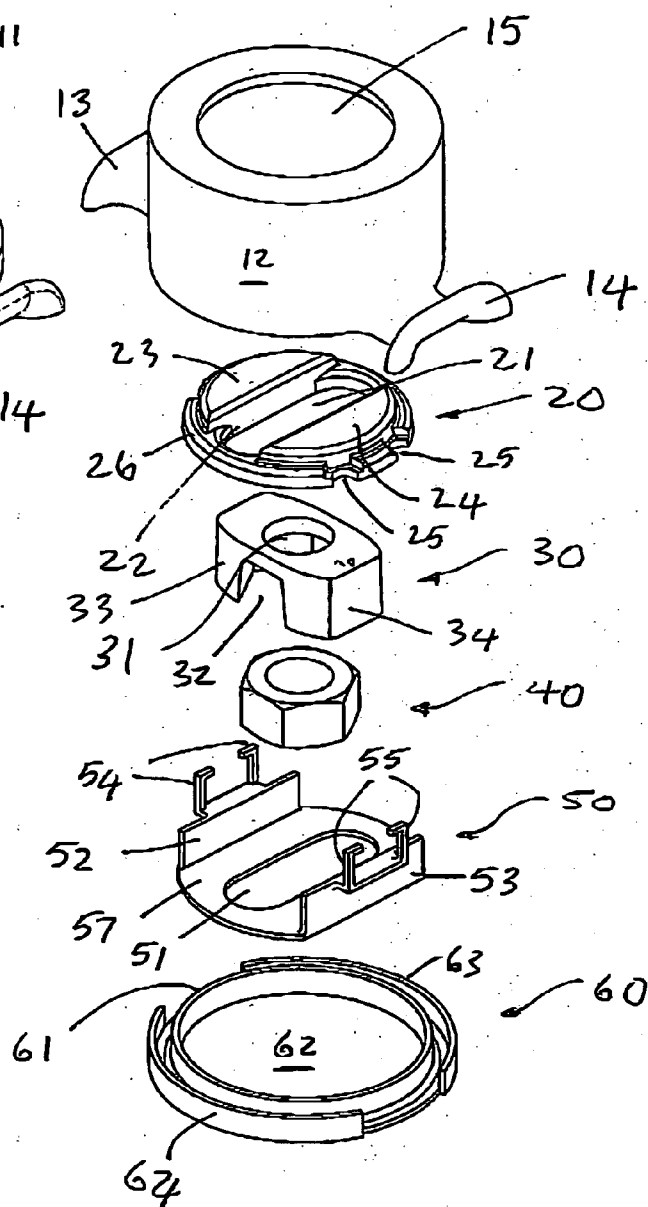
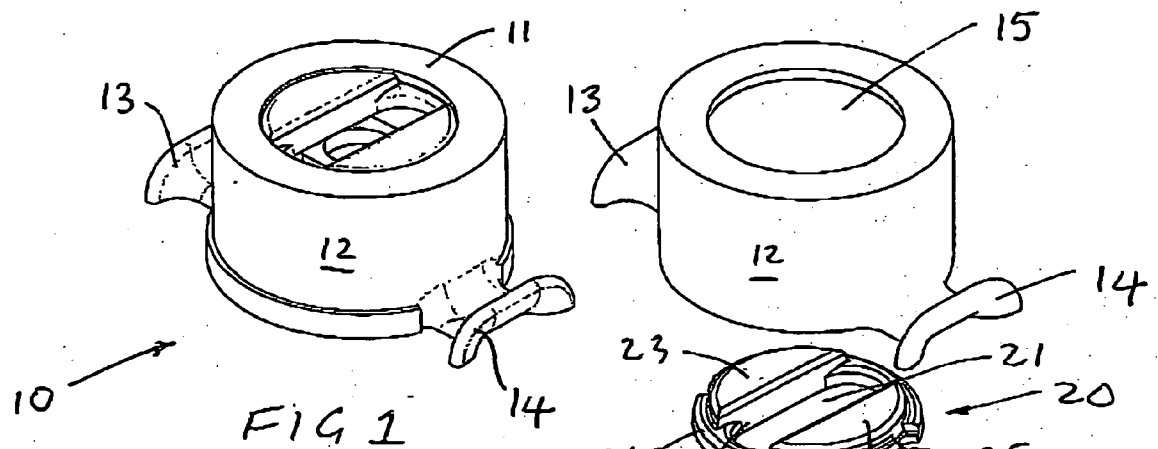
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An anchor for embedding into a concrete slab and to which fittings may be secured. The anchor has a housing with an access opening and a base opening, a cover adapted to normally close off the base opening, a fastener carriage, a fastener held by the carriage, a carriage support and a cap. The fastener carriage, fastener, cap and carriage support may rotate as a unit relative to the housing and the fastener may move across the housing.





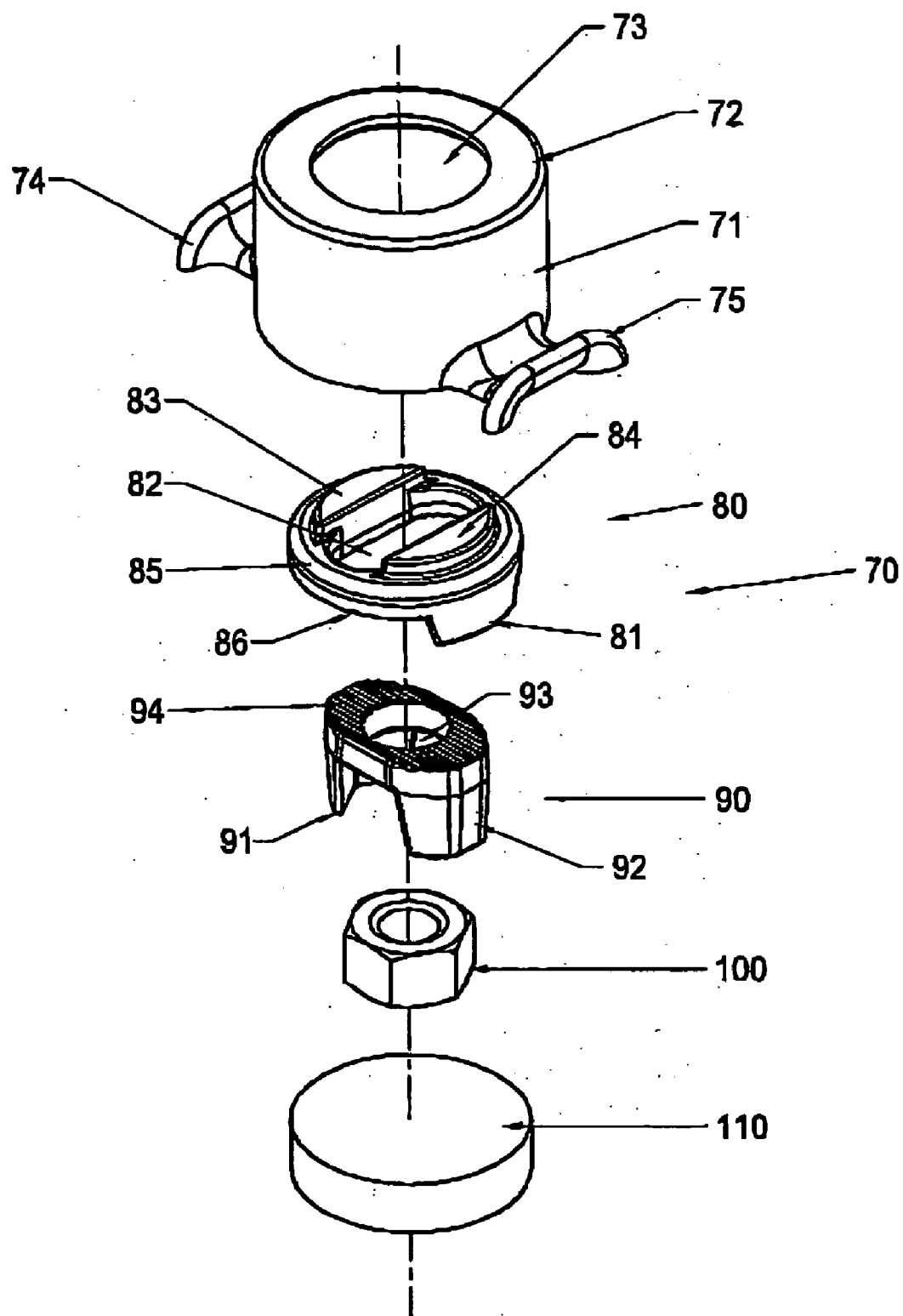


FIG 3

ANCHOR

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] Priority is claimed from Australian Provisional Patent Application No. PS0049 filed Jan. 21, 2002 and PCT Application No. PCT/AU03/00051 filed Jan. 20, 2003.

BACKGROUND OF THE INVENTION

[0002] This invention relates to an anchor which may be imbedded into a concrete slab and to which fittings may be secured.

[0003] The invention will be described by way of example in relation to its use in a concrete wall but it should be appreciated that this is by way of example only and the slab may be a floor or ceiling.

BACKGROUND ART

[0004] In the construction of concrete buildings wall slabs are either cast in situ or prefabricated and there is a need for attaching fittings such as steel framework or the like to the wall to allow the building to be constructed.

[0005] Anchors of a variety of types are imbedded into the slab by being positioned and fixed relative to reinforcement prior to the pouring of the concrete for making the slab. A face of the anchor is located against formwork used in the slab construction. Once the slab has cured the formwork may be removed to expose the anchors to have fittings to be secured to them.

[0006] It is essential that the anchors be accurately positioned at desired locations in the resultant slab. Some anchors are able to be adjusted so that slight misalignment or mis-positioning can be tolerated.

SUMMARY OF THE INVENTION

[0007] It is an object of the invention to provide an anchor which may form a viable alternative to the anchors mentioned above.

[0008] According to one aspect of the invention there is provided an anchor for imbedding into a concrete slab and to which fittings may be secured, the anchor having:

[0009] a housing with an access opening and a base opening;

[0010] a cover adapted to normally close off the base opening of the housing;

[0011] a fastener carriage;

[0012] a fastener held by the carriage;

[0013] a carriage support and a cap whereby the fastener carriage, the fastener, the cap and the carriage support may rotate as a unit relative to the housing and in addition the fastener and the fastener carriage may move across the housing.

[0014] The housing may have any desired peripheral shape and has at least one peripheral wall. The housing may have a circular peripheral shape and the peripheral wall may be substantially cylindrical although this is not essential.

[0015] The housing has a base opening and an access opening spaced from the base opening. Preferably the access opening is formed by a return wall projecting inwardly from the or each peripheral wall. Where the peripheral wall is circular in shape, the return wall may have an annular appearance.

[0016] The housing may have at least one anchor portion for allowing the housing to be secured to reinforcement normally forming part of the slab in which it is embedded. Preferably, two anchor portions are present. The anchor portions may comprise lugs extending outwardly of the housing. Where the housing has a circular peripheral wall, the lugs may extend outwardly from the wall at diametrically spaced locations on the wall.

[0017] The anchor includes a cover. The cover normally seals the base opening of the housing. The cover is preferably formed as a part separate from the housing and is fitted to the housing to close off the base opening. The cover, where the peripheral wall of the housing is circular is also circular in shape and has an outwardly extending flange which may locate relative to the housing. Preferably the flange is received within the housing and closely adjacent an inner surface of the peripheral wall of the housing. The cover preferably has two concentric part cylindrical flanges which receive the wall of the housing between them.

[0018] The cover has a main panel from which the flanges may extend. If desired, one or more spacing projection may be present on the panel and located inwardly of the inner most flange. The or each spacing projection serve to the carriage support slightly from the main panel of the cover.

[0019] The anchor has a cap which is located relative to the housing and adjacent the access opening. The cap is located within the housing and partially closes off the access opening. It is preferred that the cap has a lip which locates relative to the underside of the return wall.

[0020] The cap preferably has a slot extending part way across it. The slot may have arcuate ends although this is not necessary.

[0021] The anchor has a carriage support. The support may have spaced upstanding opposed side flanges for receiving the fastener carriage and for guiding movement of the fastener carriage across the support. Preferably the support is substantially U shaped and has a wall extending between the opposed side flanges. The wall may have a slot.

[0022] The fastener carriage may be substantially U shaped with a connecting wall and opposed side arms. Outer faces of the side arms may be shaped or have flat profiles for engaging the opposed flanges of the carriage support. In this way the fastener carriage is free to move along the support but is held against rotation relative to the support by the opposed flanges on the support.

[0023] The support may be provided by outwardly projecting flanges extending from the cap and towards the fastener carriage. The carriage support in this embodiment is formed integrally with the cap. Preferably two diametrically opposed flanges are present.

[0024] In an alternative embodiment the carriage support is formed as a discrete component.

[0025] The support when provided as a discrete component, has locating members for engagement with the cap to

ensure that the cap, the support and the fastener carriage held between them may rotate as a unit within the housing. The locating members are present as fingers projecting from the flanges on the support and the cap is provided with locating recesses for receiving the fingers. If desired, fingers may project from the cap and the flanges may have locating recesses.

[0026] The fastener is received by the fastener carriage and is held against rotation relative to the fastener carriage. In a preferred embodiment, the fastener is a threaded nut. In that embodiment the fastener carriage has an aperture through which a bolt may project to mate with the nut. Alternatively, the fastener may be a bolt with the head of the bolt being received between the side arms of the fastener carriage and held against rotation and with the shank of the bolt extending outwardly through the aperture in the fastener carriage.

BRIEF DESCRIPTION OF THE DRAWINGS

[0027] A particular preferred embodiment of the anchor of the invention will now be described by way of example with reference to the drawings in which.

[0028] FIG. 1 is a perspective view of an anchor according to an embodiment of the invention; and,

[0029] FIG. 2 is an exploded view of the anchor of FIG. 1; and

[0030] FIG. 3 is an exploded view of an anchor according to another embodiment of the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0031] The anchor 10 has a cylindrical body 12 with an annular inwardly directed return wall 11 defining an access opening 15. The opposite end of the body is open. Anchor portions 13, 14 project outwardly from diametrically opposed locations of the body 12.

[0032] The anchor 10 includes a cap 20, a fastener carriage 30, a fastener 40, a carriage support 50 and a cover 60.

[0033] The cap 20 has raised portions 23, 24 which are received within opening 15. A flange or lip 26 extends around the portions 23, 24 and prevents the cap 20 from passing through the opening 15. A channel 22 is present between portions 23, 24 and a slot 21 is located within the channel 22.

[0034] The cap 20 has recesses 25 formed in the lip 26. Four such recesses are present arranged in pairs on opposed sides of the cap.

[0035] Fastener carriage 30 is U shaped and has a connecting wall with an aperture 31 extending through it.

[0036] The carriage 30 has legs 33, 34 with outer flattened faces. The carriage 30 has a cavity 32 for receiving fastener 40 in such a way that it prevents rotation of the fastener 40 relative to the carriage 30.

[0037] Carriage support 50 has side flanges 52 and 53 extending from a connecting wall 57. The flattened sides of legs 33, 34 engage against the inner surfaces of flanges 52

and 53, such that the carriage is free to move along the support 50 but cannot rotate relative to it. A slot 51 is formed in the wall 57.

[0038] The support 50 has fingers 54 and 55 which project from the flanges 52, 53 and engage with recesses 25 in the cap 20 so that in the assembled condition the cap 20 retains the carriage 30 and the fastener 40 between it and the support 50 as a unit free to rotate within the body 12.

[0039] A cover 60 closes off the bottom of the body 12 once the other parts are positioned within the body. The cover has a main panel 62 from which extends an upwardly directed circular flange 61. The flange is received within the body 12 and hold the cover relative to the body. Two part circular flanges 64, 63 also extend from the panel 62. If desired, the panel 62 may have one or more spacing formations formed on it which serve to space the underside of wall 57 from the panel to provide clearance between wall 57 and panel 62. This allows the shank of a bolt, which engages with fastener 40, to project slightly beyond the underside of the wall 57.

[0040] The anchor 70 of FIG. 3 has a cylindrical body 71 with an annular inwardly directed return wall 72 defining an access opening 73. The opposite end of the body 71 is open. Anchor portions 74, 75 project outwardly from diametrically opposed locations of the body 71.

[0041] The anchor 70 includes a cap 80, a fastener carriage 90, a fastener 100 and a cover 110.

[0042] In the embodiment of FIG. 3, the carriage support is integrally formed with the cap 80 and consists of two (only one of which is visible) legs 81. The fastener carriage 90 is received between these legs 81 and is able to move relative to the flanges and in the direction of the longitudinal axis through slot 82 in the cap 80.

[0043] The cap 80 has raised portions 83, 84 and a lip 85 extending around portion 83 and 84. The underside of the cap 80 in the region between the legs 81 has grooves 86 formed extending between the flanges 81.

[0044] The carriage 90 has legs 91 and 92 between which the fastener 100 may be received and retained against rotation relative to the carriage 90. An aperture 93 extends through the carriage and provides access to the fastener 100. An upper surface of the carriage 90 has grooves 94. These grooves 94 are normally out of engagement with grooves 86 so that the carriage is free to move along the direction of the slot 82. Once the carriage is in its desired position relative to cap 80 and a bolt or the like is engaged with fastener 100 and tightened, the carriage 90 is drawn into engagement with the cap 80 and held at a desired location when grooves 86 and 94 engage with each other.

[0045] A cover 110 closes off the end of the body 71 opposite opening 73. The cover is a plug received within the base opening.

[0046] In use the anchor is secured to reinforcement by ties or the like secured to portions 13, 14 (or 74 and 75). Access opening 15 & 73) may be closed off by an adhesive patch. Formwork used in the casting of a slab may be placed against the anchor abutting wall 11. Concrete may then be poured and allowed to cure with the anchor embedded within the resultant slab. The formwork may then be removed and the adhesive patch removed to expose opening

15 (73). A bolt may then be used to attach fittings to the anchor. The anchor allows for adjustments to ensure that the fittings are located at desired positions relative to the slab. The fastener carriage is free to move from side to side and in addition the unit referred to previously is adopted to rotate relative to the body **12 (71).**

1. An anchor for imbedding into a concrete slab and to which fittings may be secured, the anchor having:

- a housing with an access opening and a base opening;
- a cover adapted to normally close off the base opening of the housing;
- a fastener carriage;
- a fastener held by the carriage;
- a carriage support and a cap whereby the fastener carriage, the fastener, the cap and the carriage support may rotate as a unit relative to the housing and in addition the fastener and the fastener carriage may be free to move across the housing.

2. The anchor of claim 1 wherein the housing is cylindrical in shape.

3. The anchor of claim 1 wherein the housing has an access opening spaced from a base opening to the housing.

4. The anchor of claim 3 wherein the access opening is provided by a return wall projecting inwardly of a peripheral wall of the housing.

5. The anchor of claim 1 having at least one anchor portion projecting outwardly of the housing.

6. The anchor of claim 3 the cover which normally seals off the base opening comprises a plug received within the base opening.

7. The anchor of claim 1 wherein the cap within the housing is adjacent to the access opening.

8. The anchor of claim 7 wherein the cap has a lip which locates relative to an edge of the underside of the access opening.

9. The anchor of claim 7 or 8 wherein the cap has a slot extending part way across it.

10. The anchor of claim 9 wherein the slot in the cap has accurate ends.

11. The anchor of claim 7 including the carriage support is provided by opposed spaced flanges extending outwardly from an underside of the cap.

12. The anchor of claim 11 including grooves on the underside of the cap and extending between the opposed flanges.

13. The anchor of claim 1 wherein the fastener carriage has opposed spaced legs between which the fastener is received and held against rotation relative to the fastener carriage.

14. The anchor of claim 13 wherein the fastener carriage has an upper surface with grooves.

15. The anchor of claim 14 including an aperture through the upper surface of the fastener carriage.

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