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(54) **SLOTTED INSERT WITH CAPTURED NUT ANCHOR**

(57) A slotted insert based upon a non-metallic void former including a neck portion defining a longitudinally elongated slot, the neck portion having a first transverse width, and a channel portion defining a longitudinally elongated channel, the channel having a second transverse width substantially greater than the first transverse width. The insert includes a metal nut, captured within the channel, having an aperture and a third transverse width substantially greater than the first transverse width.

The longitudinally elongated slot and longitudinally elongated channel are interconnected with the aperture of the captured metal nut accessible through the slot to provide an adjustable anchoring or connection point to other structural components. Various attachment features allow the insert to be positioned within formworks with or without direct attachment to the forming surface of a concrete form

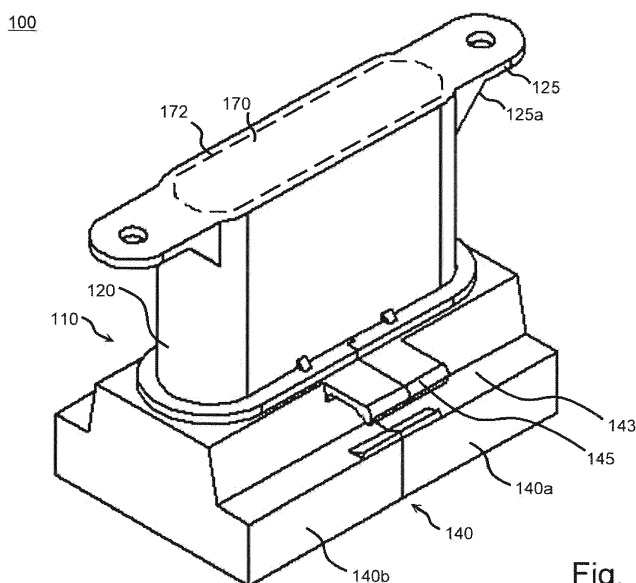


Fig. 1

Description

TECHNICAL FIELD

[0001] The present disclosure relates to concrete forming systems, and more particularly to slotted inserts used to provide cast concrete elements with adjustable attachment points for wall panels, architectural panels, structural framing, decking, and other precast or premanufactured structural components. The slotted insert is embedded within a precast or site-cast concrete element, with the captured nut providing an adjustable, threaded-bolt-type connection for adjoining precast or premanufactured structural components.

BACKGROUND

[0002] Slotted inserts are used in concrete construction, most typically in precast construction, to provide adjustable anchoring or connection points amongst precast and premanufactured structural components or between site-cast foundations or walls and such structural components. Such inserts typically have a metal body defining both a longitudinally elongated slot and a plurality of transversely projecting legs, such as in the P30 Core-wall® Nut Type Slotted Insert (manufactured by Dayton Superior Corporation of Miamisburg, Ohio, USA). A metal nut is captured behind the elongated slot and within a housing defining elongated channel, with the captured nut being slidably positionable along the length of the slot and channel to provide a longitudinally-adjustable connection. The cap and elongated slot may face horizontally and extend vertically, *e.g.*, be embedded within the face of a wall to provide a vertically adjustable connection point to a precast panel, or face vertically and run horizontally, *e.g.*, be embedded within a floor to provide a horizontally adjustable connection point to a precast panel, however it will be appreciated that the insert may be molded in and/or ultimately positioned in any orientation, without limitation, as required by the intended connection. The insert may be attached to a concrete form so that the elongated slot is positioned against the inner face of the forming surface, or may be emplaced within a casting bed, with the cap and elongated slot facing upward and positioned proximate the free surface of the concrete, via attachment to a support member or even manual setting within the wet concrete. The captured nut is frequently protected from exposure to poured concrete by a removable cap positioned within the slot or could alternately be protected by a means for forming a seal against the inner face of the forming surface. Rebar is frequently clipped or tied to the transversely projecting legs of the steel body, between the legs and the inner face of the forming surface, to help to anchor the insert and resist pull-out from the surrounding concrete.

[0003] Wet concrete is poured and cured within an assembled formwork around the attached insert. The formwork is subsequently stripped from the formed concrete

and embedded insert, with the elongated slot of the insert ending up essentially flush with the surface of the formed concrete element. The removable cap, if present, is removed to expose the elongated slot and the captured nut, which remains longitudinally adjustable within the elongated slot but captured within the insert and the surrounding concrete. Precast or premanufactured structural components such as wall panels, structural framing, decking, and the like may be connected to the nut, insert, and surrounding concrete by a threaded bolt or by a threaded-bolt-type connection such as a threaded strap anchor. The resulting connection is both adjustable, to accommodate variation in the dimensions of other components and the positions of their connection points, and ductile, for use as a structural connection in seismically active regions.

SUMMARY

[0004] The applicants have devised an improved slotted insert which functions similarly to known slotted inserts, but does not require a metal body like that used in existing inserts. Instead, the slotted insert uses a multi-part, non-metallic void former housing a metal nut. The void former defines an elongated slot with a first transverse width and a recessed, elongated channel with a second, substantially greater transverse width. In use, the metal nut, also having a transverse width substantially greater than the first transverse width, bears against concrete surrounding the void former rather than against a metal body member. Consequently, the void former or insert body may be manufactured entirely from molded plastics or other non-metallic materials. Thus construction reduces the weight of the resultant insert, the cost of manufacturing the insert, and the susceptibility of the insert to galvanic or oxidative corrosion.

[0005] In a first aspect, a slotted insert comprises a non-metallic void former including a neck portion defining a longitudinally elongated slot, the neck portion having a first transverse width, and a channel portion defining a longitudinally elongated channel, the channel having a second transverse width substantially greater than the first transverse width. The insert further comprises a metal nut, captured within the channel, having an aperture and a third transverse width substantially greater than the first transverse width. The longitudinally elongated slot and longitudinally elongated channel are interconnected and mutually aligned such that the longitudinal axis of the slot and the longitudinal axis of the channel are parallel to each other, with the aperture of the captured metal nut accessible through the slot.

[0006] In a second aspect, a formwork construction comprises an insert including a non-metallic neck portion defining a longitudinally elongated slot, the neck portion having a first transverse width, a non-metallic channel portion defining a longitudinally elongated channel, the channel having a second transverse width substantially greater than the first transverse width, a metal nut cap-

tured within the channel, the metal nut having an aperture and a third transverse width substantially greater than the first transverse width, and a removable cap portion configured to seal the longitudinally elongated slot opposite the longitudinally elongated channel. The longitudinally elongated slot and longitudinally elongated channel are interconnected and mutually aligned such that the longitudinal axis of the slot and the longitudinal axis of the channel are parallel to each other, with the aperture of the captured metal nut accessible through the slot upon removal of the removable cap portion. The formwork further comprises a pair of metal reinforcing bars, bracketing the void former proximate the longitudinally elongated channel and extending parallel to the longitudinal axis of the channel. The insert is preferably affixed to the metal reinforcing bars via a plurality of clips projecting outwardly from the void former channel portion.

[0007] In a third aspect, a formwork construction comprises an insert including a non-metallic neck portion defining a longitudinally elongated slot, the neck portion having a first transverse width, a non-metallic channel portion defining a longitudinally elongated channel, the channel having a second transverse width substantially greater than the first transverse width, and a metal nut, captured within the channel, having an aperture and a third transverse width substantially greater than the first transverse width. The longitudinally elongated slot and longitudinally elongated channel are interconnected and mutually aligned such that the longitudinal axis of the slot and the longitudinal axis of the slot are parallel to each other, with the aperture of the captured metal nut accessible through the slot. The formwork further comprises a support member, which may be a concrete form, wherein the neck portion is affixed to an inner surface of support member via a plurality of fasteners inserted through a projecting tab or flange and into the inner surface.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008]

FIG. 1 is a perspective view of an embodiment of the void former.

FIG. 2 is an exploded perspective of the embodiment of FIG. 1 which further illustrates the longitudinally elongated slot, longitudinally elongated channel, and captured metal nut.

FIG. 3 is a perspective view of a formwork assembly including metal reinforcing bars affixed to the void former.

FIG. 4 is a perspective view of a formwork assembly including a void former affixed to the inner surface of a support member.

DETAILED DESCRIPTION

[0009] As shown in FIGS. 1 and 2, an insert 100 comprises a non-metallic void former 110 including a neck portion 120 defining a longitudinally elongated slot 130 and a channel portion 140 defining a longitudinally elongated channel 150. The insert 110 also includes a metal nut 160 captured within the channel 150. The channel 150 is substantially wider than the neck portion 120, with "substantially" meaning for the purposes of this application an average, along the respective longitudinally elongated structures, of 1/4 inch wider or more on each side, so as to permit the metal nut 160 to bear against concrete surrounding the neck portion 120 of the void former 110. As shown specifically in FIG. 2, the neck portion 120 may have a first transverse width 122, the defined channel 150 a second transverse width 152 substantially greater than the first transverse width 122, and the metal nut 160 a third transverse width 162 substantially greater than the first transverse width 122. The third transverse width 162 is preferably, but not necessarily, essentially equal to the second transverse width 152. The longitudinally elongated slot 130 and longitudinally elongated channel 150 (*i.e.*, the voids, not the void-forming structures) are interconnected and mutually aligned such that the longitudinal axis of the slot and the longitudinal axis of the channel are parallel to each other.

[0010] The neck portion 120 and the channel portion 140 are preferably separate portions of the insert 100 so that different neck portions 120 having different depths 124 may be affixed to the same channel portion 140 in order to provide an adjustable, threaded-bolt-type connection 164 at different depths from the surface of the concrete "S" (indicated in Fig. 3). The portions 120, 140 may be releaseably interlocking with each other for interchangeability. For example, a channel-facing end 126 of the neck portion 120 may include an outwardly-projecting peripheral flange 128, and a neck-facing end 144 of the channel portion 140 may include an inwardly-open circumferential track 146 which engages the peripheral flange 128 to interlock the neck portion 120 and channel portion 140 together. It will be appreciated that the channel-facing end 126 of the neck portion 120 could include such a track, and the a neck-facing end 144 of the channel portion 140 include such a projecting peripheral flange, to provide the same functionality. The neck portion 120 may be flexible enough that the channel-facing end 126 and flange 128 may be compressed to fit within the circumferential track 146. However, the channel portion 140 may comprise separable halves 140a, 140b and be connectable by respective latching tabs 148a and ridged lands 149a (shown in Fig. 2) or U-shapes latch arms 148b and locking ramps 149b (shown in Fig. 4). This construction permits the channel portion halves 140a, 140b to be snapped around the peripheral flange 128 of the neck portion 120, and enables easy insertion of the metal nut 160 into the channel 150 formed by the halves during manufacturing or user assembly. Those of skill in the art

will appreciate that the neck portion 120 and/or channel portion(s) 140 or 140a and 140b may be affixed to each other by solvent welding, ultrasonic welding, adhesives, and similar known means for joining materials so as to negate the need for one or more of the structures and features specifically described in this paragraph.

[0011] In some embodiments, the insert portion 100 includes a removable cap portion 170 configured to seal the longitudinally elongated slot 130 opposite the longitudinally elongated channel 150. The removable cap portion 170 may be a frangible part of the neck portion 120, defined by a thinned web or line of perforation 172 (both indicated by the illustrated dashed line) proximate the periphery of the elongated longitudinal slot 130. The cap portion 170 may be removed by puncturing the portion with a tool such as a screw driver and breaking the frangible web or line of perforation 172. The removable cap portion 170 might include a pull-tab, e.g. a molded loop and stem attached to the cap portion via a living hinge, configured to enable tool-less removal. Alternately, the removable cap portion 170 might be a separate non-metallic or metallic cap which snap-fits into engagement with the neck portion 120 opposite the channel portion 140. A separate, metallic removable cap 170, such as a steel cap, could be detected by an appropriately calibrated metal detector and/or reused with other inserts 100 in subsequent forming activities.

[0012] In some embodiments, the neck portion 120 includes a plurality of outwardly-projecting tabs 125 opposite the channel-facing end 126. As shown, the tabs include reinforcing gussets 125a and project longitudinally from the neck portion 120. However, it will be appreciated that gussets 125a are optional and that tabs 125 may project longitudinally from the neck portion 120, transversely from the neck portion 120, and/or at non-orthogonal angles with respect to the longitudinal axis of the elongated longitudinal slot 130. The tabs 125 are illustrated as including apertures, but it will be appreciated that the apertures may instead be thin webs or even omitted, with fasteners such as nails serving to form their own aperture when used to secure the insert 100 against a concrete form via the tabs. In other embodiments, the neck portion 120 includes an outwardly-projecting peripheral flange, opposite the peripheral flange 128 at the channel-facing end 126, which may include similar apertures or thin webs for receiving fasteners. For the purposes of the application and claims, this peripheral flange shall be considered a generic case which encompasses one or more outwardly-projecting tabs 125 of varying size.

[0013] In some embodiments, the channel portion 140 includes a plurality of outwardly-projecting clips 145. The clips may serve to affix the insert 100 to metal reinforcing bars or "rebar" positioned within the concrete form, removing the need to directly secure the insert 100 to a concrete form. It will be appreciated that the insert 100 may be positioned directly adjacent a concrete form, such as under a cap form or beside a wall form, through the

clip-connection while not being directly secured to the form itself. In some embodiments (not shown), mutually opposing pairs of clips 145 may be disposed on the laterally outermost or longitudinally outermost sides of the channel portion 140. In the illustrated embodiment, clips 145 are configured to receive metal reinforcing bars running parallel to the longitudinal axis of the channel 150, and also to project across a longitudinally-running, laterally-projecting bearing surface 143 in the channel portion 140. The bearing surface may further include a clip-opposing saddle 147 to maintain the metal reinforcing bar in position. As explained below, in this embodiment the metal nut 160 may bear against the reinforcing rod to resist pull-out of the nut from the insert 100 and surrounding concrete.

[0014] The metal nut 160 is preferably a rectangular nut, but not necessarily a hyperrectangle or orthotope (i.e., not necessarily a strictly rectangular box). In some embodiments, metal nut 160 may be a rectangular nut with rounded edges, such as a conventional square nut. In other embodiments, the metal nut 160 may include a rectangular portion but also include an integral shaft structure, such as in a T-slot nut, to provide greater load capacity to the aperture 164 of the nut. The aperture 164 is typically threaded such that increasing the depth of the aperture will generally increase the load capacity of the metal nut 160. In the illustrated embodiment, the metal nut 160 includes a pair of longitudinally-running, laterally-projecting wings 163 which generally conform to the longitudinally-running, laterally projecting bearing surfaces 143 in the channel portion 140. Metal reinforcing bars positioned upon the bearing surfaces 143 of the channel portion will be disposed proximate the wings 163 of the nut 160, and consequently the nut 160 will bear against those bars when a tensile load is applied to the aperture 162 by a threaded-bolt or threaded-bolt-type connection through the elongated longitudinal slot 130. In each such embodiment, the aperture 162 is accessible through the longitudinally elongated slot 130 or becomes accessible through that slot upon removal of the removable cap portion 170. In some embodiments, the metal nut 160 may include an elastomeric spacer 166, e.g., a spacer formed from an elastomeric open-cell or closed-cell foam, adhered to one of the non-longitudinal sides of the nut. The elastomeric spacer 166 may be adhered to the nut using an adhesive, e.g., a pressure-sensitive adhesive, and serve to increase friction between the metal nut 160 and channel portion 140 in order to prevent unwanted sliding of the metal nut 160 within the channel 150. In other embodiments, the a channel-facing end 126 of the neck portion 120 may include a plurality of elastic fingers 127 configured to project within the longitudinally elongated channel 150. The elastic fingers 127 will interfere with movement of the metal nut 160 within the channel 150, but deflect when force is applied to the nut to move it within the channel 150, e.g., when a tool is used to positively manipulate the nut and/or an connected element is positioned prior to tensioning of the connection. In still

other embodiments, a combination of such features can be used. The metal nut 160 may thus be manipulated to slide longitudinally within the channel 150, but substantially prevented from sliding within the channel due to the force of gravity or minor manipulation of the insert 100 during installation.

[0015] In use, an example of which is shown in Figure 3, a formwork 200 may include the insert 100 and at least a pair of metal reinforcing bars 210 bracketing the void former 110 proximate the channel portion 140 and longitudinally elongated channel 150 (shown in Fig. 2). At least those portions of the metal reinforcing bars 210 proximate the channel portion may be configured to extend parallel to the longitudinal axis of the longitudinally elongated channel 150. In some embodiments, the insert 100 is affixed to the metal reinforcing bars 210 by wrapping the void former 110 and bracketing metal reinforcing bars 210 with wire (not shown), for example in an X-shaped pattern spanning the neck-facing end 144 and opposite end of the channel portion 140, crossing itself midway along the longitudinally elongated channel 150 on the lateral sides of the channel portion 140. Preferably, the metal reinforcing bars 210 are received within a plurality of clips 145 projecting outwardly from the channel portion 140. Each metal reinforcing bar 210 is thus clipped between a bearing surface 143 in the channel portion 140 and one or more clips 145 on each side of the channel portion 210. The metal reinforcing bars 210 may be positioned within surrounding concrete forms, e.g., opposing wall forms 220 (only one of which is shown), and with the channel 150 of the insert 100 at a depth "D" below the planned surface of the concrete - which may be formed by a cap form or, as indicated in the illustration, a free surface of the concrete "S". The removable cap 170 ends up proximate the free surface of the concrete 230, and may be located by identifying the edges of the neck portion 120 proximate the cap, by identifying the cap itself if visible, by striking the set concrete over the cap (which, being at most a thin layer over the non-metallic void former 120, is likely to fracture and chip), or by locating upwardly projecting whiskers 176 located on or near the removable cap 170. The removable cap 170 may subsequently be removed to expose the metal nut for connection to a threaded bolt or threaded-bolt-type connection.

[0016] In another use, an example of which is shown in Figure 4, a formwork 300 may include an insert 100 and at least one support member, such as the previously illustrated wall form 220 or the illustrated support member 230. The insert 100 is secured directly to the member 230, with the neck portion 120 opposite the channel portion 140 positioned against the forming surface. In one embodiment, the insert is secured directly to the member 230 using a plurality of fasteners 240 inserted through one or more outwardly-projecting tabs 125, as described above. The elongated longitudinal slot 130 may be substantially sealed from exposure to concrete by the fit of the neck portion 120 against the member 230, by a re-

movable cap 170, or by other means for forming a seal such as a gasket, a caulk, a putty, a highly viscous grease or gel, etc. As shown in Figure 3 and/or discussed above metal reinforcing bars 210 could also be secured to the insert 100 to reinforce the positioning of the insert and/or to position the metal reinforcing bars 210 at a definite location within the formwork 300. The neck portion 120 opposite the channel portion 140 ends up proximate the formed surface of the concrete, and may be located by identifying the edges of the neck portion 120 and/or the elongated longitudinal slot 130 opening at the formed surface, by identifying any removable cap 170 provided, by striking any concrete skin formed upon the removable cap, etc. The slot opening to the metal nut 160 may then be used for connection to a threaded bolt or threaded-bolt-type connection.

[0017] Having described the invention in detail and by reference to the preferred embodiments, it will be apparent that modifications and variations thereof are possible without departing from the scope of this disclosure.

[0018] When used in this specification and claims, the terms "comprises" and "comprising" and variations thereof mean that the specified features, steps or integers are included. The terms are not to be interpreted to exclude the presence of other features, steps or components.

[0019] The features disclosed in the foregoing description, or the following claims, or the accompanying drawings, expressed in their specific forms or in terms of a means for performing the disclosed function, or a method or process for attaining the disclosed result, as appropriate, may, separately, or in any combination of such features, be utilised for realising the invention in diverse forms thereof.

PREFERRED FEATURES:

[0020]

1. A slotted insert for concrete construction, the slotted insert comprising:

a non-metallic void former including:

a neck portion defining a longitudinally elongated slot, the neck portion having a first transverse width; and

a channel portion defining a longitudinally elongated channel, the channel having a second transverse width substantially greater than the first transverse width; and

a metal nut, captured within the channel, having an aperture and a third transverse width substantially greater than the first transverse width;

wherein the longitudinally elongated slot and longitudinally elongated channel are interconnected and mutually aligned such that the lon-

- gitudinal axis of the slot and the longitudinal axis of the channel are parallel to each other, with the aperture of the captured metal nut accessible through the slot.
2. The slotted insert of clause 1, wherein the third transverse width is equal to the second transverse width.
3. The slotted insert of clause 1 or 2, wherein the neck portion and channel portion are separate portions of the insert, releaseably interlocking with each other.
4. The slotted insert of any preceding clause, wherein a channel-facing end of the neck portion includes an outwardly-projecting peripheral flange, and a neck-facing end of the channel portion includes an inwardly-open circumferential track engaging the peripheral flange to interlock the neck and channel portions together.
5. The slotted insert of any preceding clause, wherein the channel portion comprises separable halves, each half including a latch arm and a locking ramp, with the latch arm of one of the halves opposing and mutually engagable with the locking ramp of the other of the halves, and the locking ramp of the one of the halves opposing and mutually engagable with the latch arm of the other of the halves.
6. The slotted insert of any preceding clause, further comprising a removable cap portion configured to seal the longitudinally elongated slot opposite the longitudinally elongated channel.
7. The slotted insert of any preceding clause, wherein the removable cap portion is a frangible part of the neck portion defined by a thinned web proximate the periphery of the elongated longitudinal slot opposite the longitudinally elongated channel.
8. The slotted insert of any preceding clause, wherein the neck portion includes an outwardly-projecting peripheral flange opposite a channel-facing end of the neck portion.
9. The slotted insert of any preceding clause, wherein the peripheral flange comprises a plurality of outwardly-projecting tabs projecting longitudinally from the neck portion opposite the channel-facing end.
10. The slotted insert of any preceding clause, wherein the channel portion includes a plurality of outwardly-projecting clips configured to affix the insert to metal reinforcing bars bracketing the channel portion.
11. The slotted insert of any preceding clause, wherein the metal nut is a rectangular nut.
12. The slotted insert of any preceding clause, wherein the channel portion includes a pair of longitudinally-running, laterally-projecting bearing surfaces on opposite lateral sides of the channel portion, and the metal nut includes a pair of longitudinally-running, laterally-projecting wings on opposite lateral sides of the nut, the wings of the nut generally conforming to the bearing surfaces of the channel portion.
13. The slotted insert of any preceding clause, wherein the channel portion includes a plurality of outwardly-projecting clips configured to affix the insert to metal reinforcing bars bracketing the channel portion, and the clips project across the longitudinally-running, laterally-projecting bearing surfaces of the channel portion.
14. The slotted insert of any preceding clause, wherein a channel-facing end of the neck portion includes a plurality of elastic fingers, the elastic fingers being configured to project within the longitudinally elongated channel to interfere with movement of the metal nut.
15. A formwork construction comprising:
- an insert including:
- a non-metallic neck portion defining a longitudinally elongated slot, the neck portion having a first transverse width;
- a non-metallic channel portion defining a longitudinally elongated channel, the channel having a second transverse width substantially greater than the first transverse width;
- a metal nut captured within the channel, the metal nut having an aperture and a third transverse width substantially greater than the first transverse width; and
- a removable cap portion configured to seal the longitudinally elongated slot opposite the longitudinally elongated channel;
- wherein the longitudinally elongated slot and longitudinally elongated channel are interconnected and mutually aligned such that the longitudinal axis of the slot and the longitudinal axis of the channel are parallel to each other, with the aperture of the captured metal nut accessible through the slot upon removal of the remov-

able cap portion; and

a pair of metal reinforcing bars bracketing the void former proximate the longitudinally elongated channel and extending parallel to the longitudinal axis of the channel, wherein the insert is affixed to the pair of metal reinforcing bars.

16. The formwork construction of clause 15, wherein the insert is affixed to the pair of metal reinforcing bars via a plurality of clips projecting outwardly from the channel portion.

17. The formwork construction of clause 15 or 16, wherein the channel portion includes a pair of longitudinally-running, laterally-projecting bearing surfaces on opposite lateral sides of the channel portion, and the metal nut includes a pair of longitudinally-running, laterally-projecting wings on opposite lateral sides of the nut, the wings of the nut generally conforming to the bearing surfaces of the channel portion.

18. The formwork construction of any one of clauses 15 to 17, wherein the each of the plurality of outwardly-projecting clips projects across a respective one of the longitudinally-running, laterally-projecting bearing surfaces of the channel portion.

19. A formwork construction comprising:

a void former including:

a non-metallic neck portion defining a longitudinally elongated slot, the neck portion having a first transverse width;

a non-metallic channel portion defining a longitudinally elongated channel, the channel having a second transverse width substantially greater than the first transverse width; and

a metal nut, captured within the channel, having an aperture and a third transverse width substantially greater than the first transverse width;

wherein the longitudinally elongated slot and longitudinally elongated channel are interconnected and mutually aligned such that the longitudinal axis of the slot and the longitudinal axis of the slot are parallel to each other, with the aperture of the captured metal nut accessible through the slot; and

a support member, wherein the neck portion is affixed to the forming member via a plurality of fasteners, inserted through an outwardly-pro-

jecting peripheral flange disposed opposite a channel-facing end of the neck portion and into the forming member.

20. The formwork of clause 19, wherein the outwardly-projecting peripheral flange comprises a plurality of outwardly-projecting tabs projecting longitudinally from the neck portion opposite the channel-facing end.

Claims

1. A slotted insert for concrete construction, the slotted insert comprising:

a non-metallic void former including:

a neck portion defining a longitudinally elongated slot, the neck portion having a first transverse width; and

a channel portion defining a longitudinally elongated channel, the channel having a second transverse width substantially greater than the first transverse width; and

a metal nut, captured within the channel, having an aperture and a third transverse width substantially greater than the first transverse width; wherein the longitudinally elongated slot and longitudinally elongated channel are interconnected and mutually aligned such that the longitudinal axis of the slot and the longitudinal axis of the channel are parallel to each other, with the aperture of the captured metal nut accessible through the slot.

2. The slotted insert of claim 1, wherein the third transverse width is equal to the second transverse width.

3. The slotted insert of claim 1 or 2, wherein the neck portion and channel portion are separate portions of the insert, releaseably interlocking with each other.

4. The slotted insert of any preceding claim, wherein a channel-facing end of the neck portion includes an outwardly-projecting peripheral flange, and a neck-facing end of the channel portion includes an inwardly-open circumferential track engaging the peripheral flange to interlock the neck and channel portions together.

5. The slotted insert of any preceding claim, wherein the channel portion comprises separable halves, each half including a latch arm and a locking ramp, with the latch arm of one of the halves opposing and mutually engagable with the locking ramp of the other of the halves, and the locking ramp of the one of

the halves opposing and mutually engagable with the latch arm of the other of the halves.

6. The slotted insert of any preceding claim, further comprising a removable cap portion configured to seal the longitudinally elongated slot opposite the longitudinally elongated channel; AND/OR wherein the removable cap portion is a frangible part of the neck portion defined by a thinned web proximate the periphery of the elongated longitudinal slot opposite the longitudinally elongated channel; AND/OR wherein the neck portion includes an outwardly-projecting peripheral flange opposite a channel-facing end of the neck portion.
7. The slotted insert of any preceding claim, wherein the peripheral flange comprises a plurality of outwardly-projecting tabs projecting longitudinally from the neck portion opposite the channel-facing end; AND/OR wherein the channel portion includes a plurality of outwardly-projecting clips configured to affix the insert to metal reinforcing bars bracketing the channel portion; AND/OR wherein the metal nut is a rectangular nut.
8. The slotted insert of any preceding claim, wherein the channel portion includes a pair of longitudinally-running, laterally-projecting bearing surfaces on opposite lateral sides of the channel portion, and the metal nut includes a pair of longitudinally-running, laterally-projecting wings on opposite lateral sides of the nut, the wings of the nut generally conforming to the bearing surfaces of the channel portion.
9. The slotted insert of any preceding claim, wherein the channel portion includes a plurality of outwardly-projecting clips configured to affix the insert to metal reinforcing bars bracketing the channel portion, and the clips project across the longitudinally-running, laterally-projecting bearing surfaces of the channel portion; AND/OR wherein a channel-facing end of the neck portion includes a plurality of elastic fingers, the elastic fingers being configured to project within the longitudinally elongated channel to interfere with movement of the metal nut.
10. A formwork construction comprising:
 - an insert including:
 - a non-metallic neck portion defining a longitudinally elongated slot, the neck portion having a first transverse width;
 - a non-metallic channel portion defining a longitudinally elongated channel, the chan-

nel having a second transverse width substantially greater than the first transverse width;

a metal nut captured within the channel, the metal nut having an aperture and a third transverse width substantially greater than the first transverse width; and
a removable cap portion configured to seal the longitudinally elongated slot opposite the longitudinally elongated channel;

wherein the longitudinally elongated slot and longitudinally elongated channel are interconnected and mutually aligned such that the longitudinal axis of the slot and the longitudinal axis of the channel are parallel to each other, with the aperture of the captured metal nut accessible through the slot upon removal of the removable cap portion;

and
a pair of metal reinforcing bars bracketing the void former proximate the longitudinally elongated channel and extending parallel to the longitudinal axis of the channel, wherein the insert is affixed to the pair of metal reinforcing bars.

11. The formwork construction of claim 10, wherein the insert is affixed to the pair of metal reinforcing bars via a plurality of clips projecting outwardly from the channel portion.
12. The formwork construction of claim 10 or 11, wherein the channel portion includes a pair of longitudinally-running, laterally-projecting bearing surfaces on opposite lateral sides of the channel portion, and the metal nut includes a pair of longitudinally-running, laterally-projecting wings on opposite lateral sides of the nut, the wings of the nut generally conforming to the bearing surfaces of the channel portion.
13. The formwork construction of any one of claims 10 to 12, wherein the each of the plurality of outwardly-projecting clips projects across a respective one of the longitudinally-running, laterally-projecting bearing surfaces of the channel portion.
14. A formwork construction comprising:

a void former including:

a non-metallic neck portion defining a longitudinally elongated slot, the neck portion having a first transverse width;
a non-metallic channel portion defining a longitudinally elongated channel, the channel having a second transverse width substantially greater than the first transverse width; and

a metal nut, captured within the channel,
having an aperture and a third transverse
width substantially greater than the first
transverse width;

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wherein the longitudinally elongated slot and
longitudinally elongated channel are intercon-
nected and mutually aligned such that the lon-
gitudinal axis of the slot and the longitudinal axis
of the slot are parallel to each other, with the
aperture of the captured metal nut accessible
through the slot; and

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a support member, wherein the neck portion is
affixed to the forming member via a plurality of
fasteners, inserted through an outwardly-pro-
jecting peripheral flange disposed opposite a
channel-facing end of the neck portion and into
the forming member.

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15. The formwork of claim 14, wherein the outwardly-
projecting peripheral flange comprises a plurality of
outwardly-projecting tabs projecting longitudinally
from the neck portion opposite the channel-facing
end.

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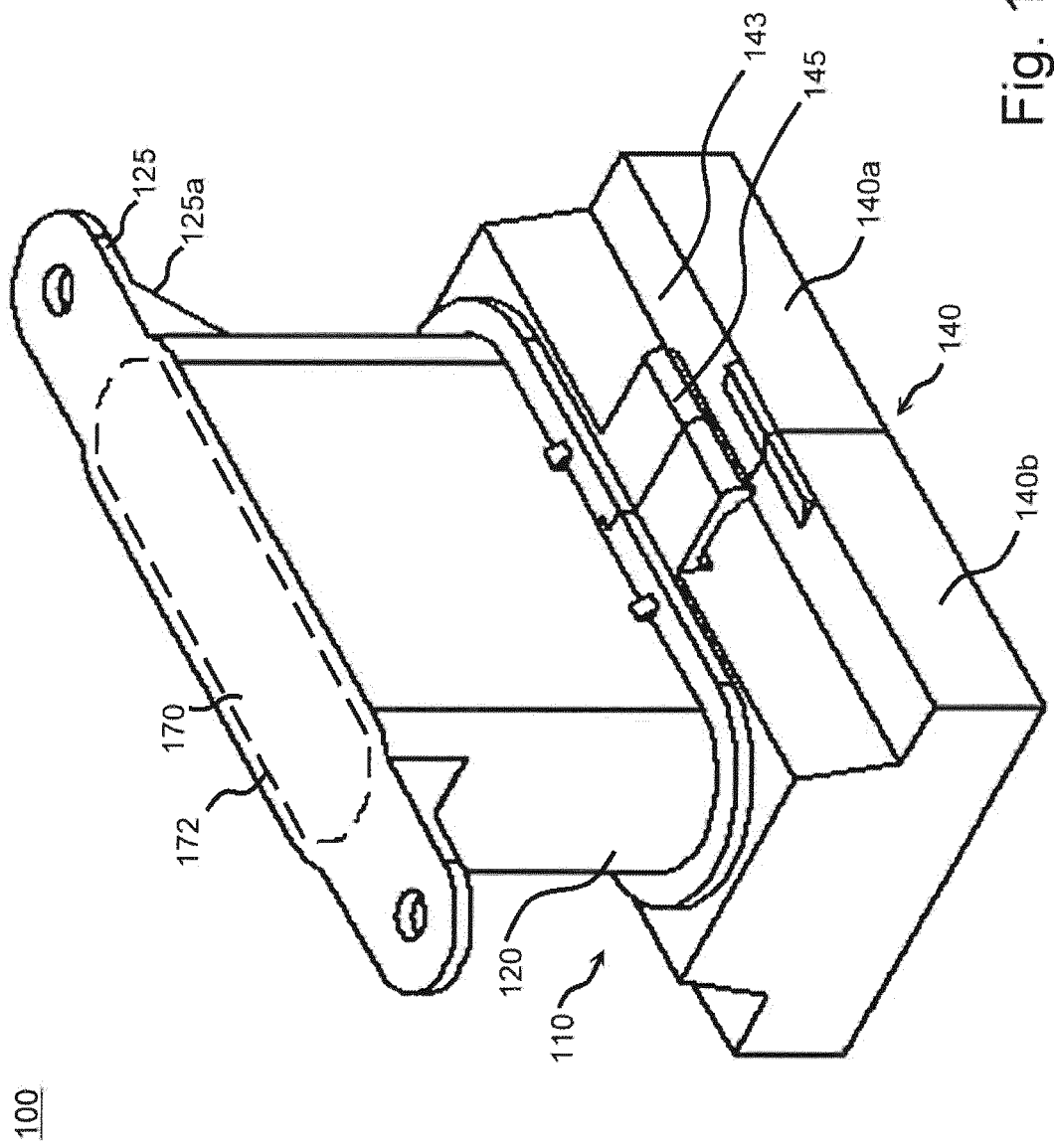
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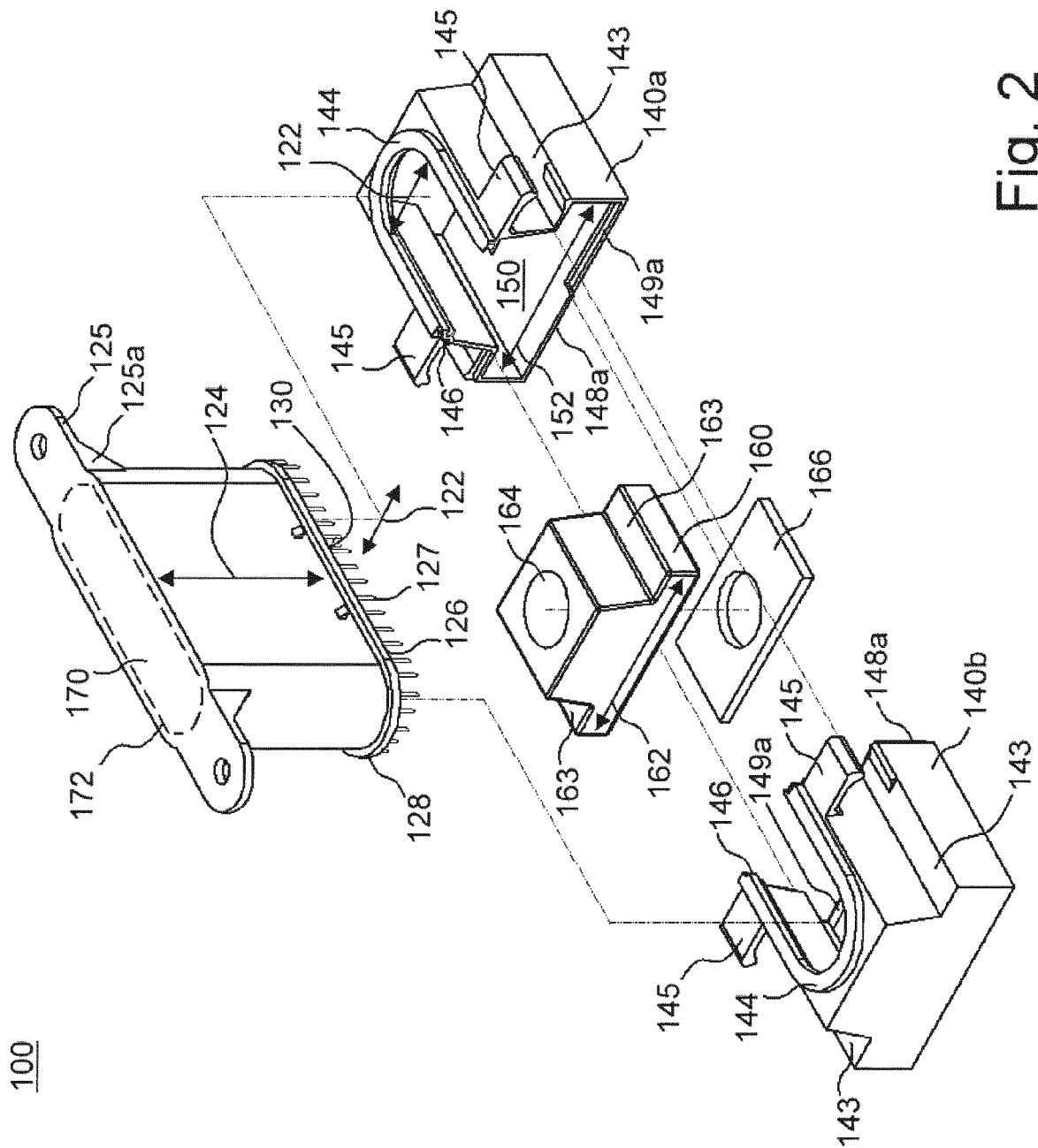


Fig. 2

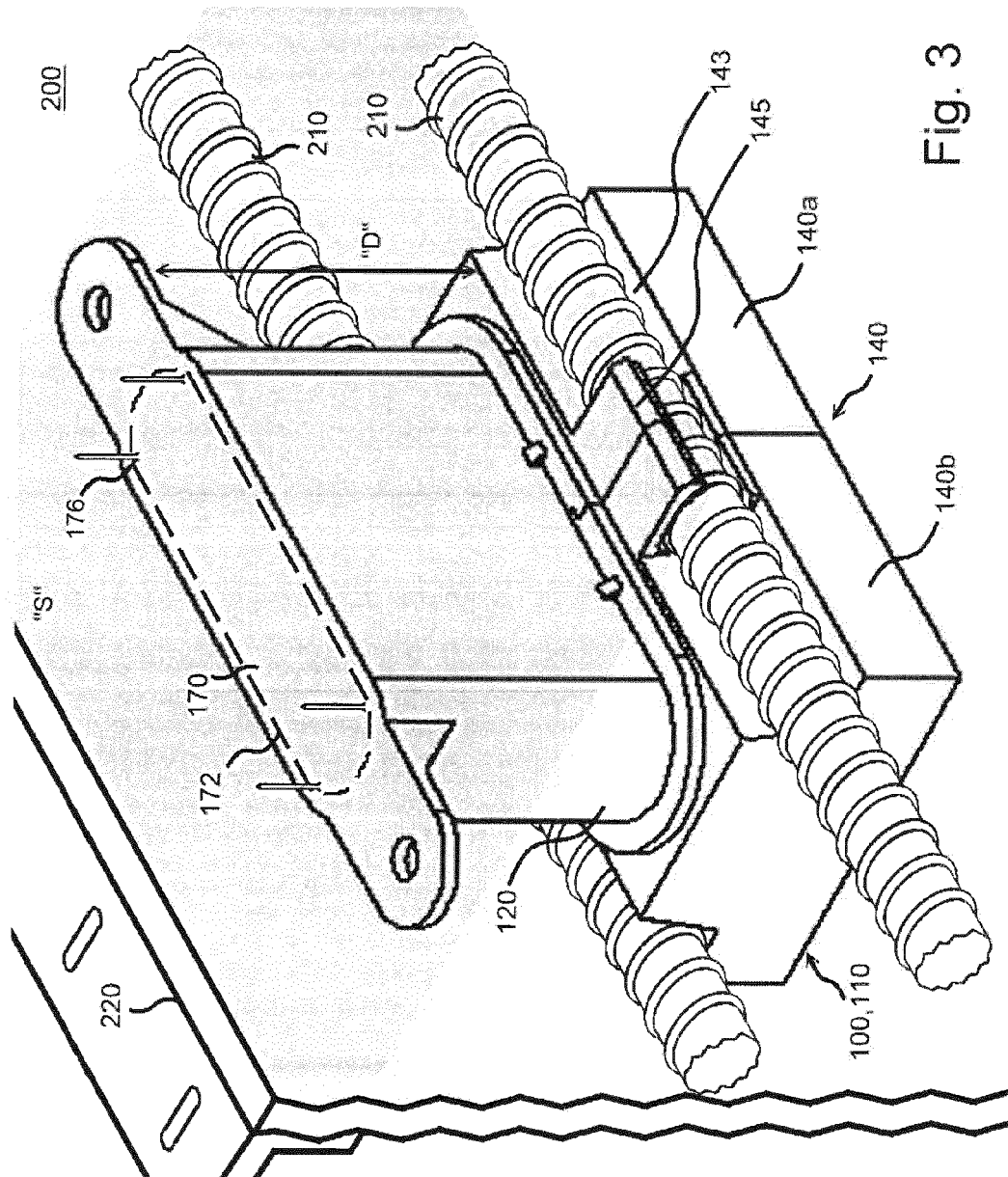


Fig. 3

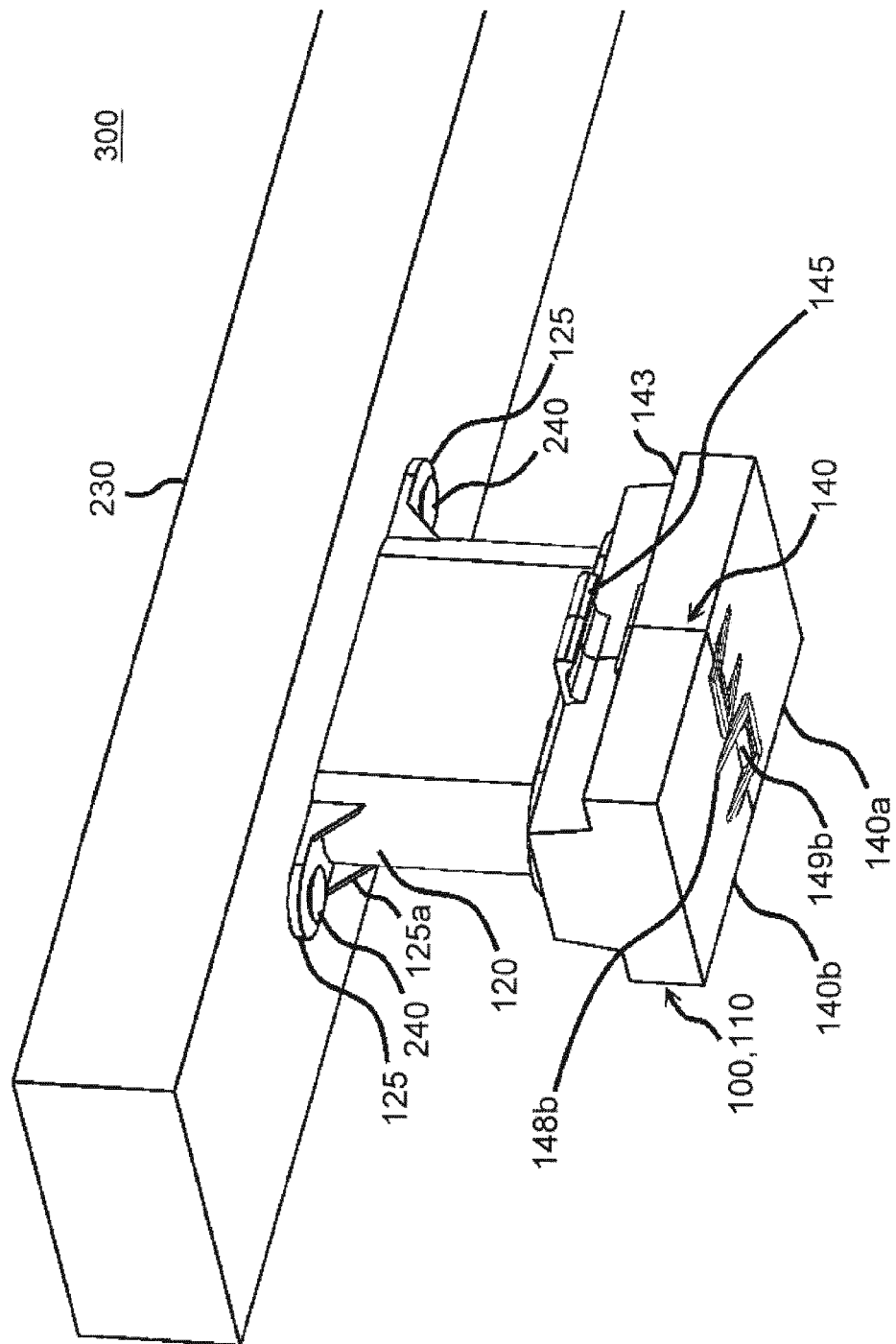


Fig. 4



EUROPEAN SEARCH REPORT

Application Number
EP 15 17 2066

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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