ANCHOR DEVICE FOR WEAK SUBSTRATES

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Appl. No.: 10/335,430
Filed: Jan. 3, 2003

Publication Classification

Int. Cl. A47K 1/00

U.S. Cl. 248/547, 248/217

ABSTRACT

An anchoring device to support an object upon weak substrates such as wallboard, plaster walls or paperboard. A frame supports multiple long fasteners such as nails at an angle relative to the substrate. The frame includes angled fastener channels formed in segments by opposed mold core elements. The mold cores create slots that are parallel to a mold pull direction, and further are angled relative to the fastener channels. The slots expose sides of the fastener channels, alternating channel sidewalls being exposed in adjacent segments of each channel. Tabs are provided along a perimeter of the frame to create full slots to hold a wire or other thin part of an object to be supported. A recess creates a gap under each fastener head to enable a thin prying tool to remove the fastener.
ANCHOR DEVICE FOR WEAK SUBSTRATES

FIELD OF THE INVENTION

[0001] The present invention relates to supporting devices. More precisely the present invention relates to an anchoring device for mounting objects to weak substrates.

BACKGROUND OF THE INVENTION

[0002] An anchoring system for weak substrates is disclosed in U.S. Pat. Nos. 4,911,396 and 5,346,169 to Polonsky. According to these disclosures an anchoring method includes driving nails into a substrate where the nails surround, and are guided by, a frame of an anchoring device. The design of both these references includes a cover fitted over the frame so that the nails are secured between the frame and the cover. The nails are held at one or more angles with respect to each other, and with respect to the substrate, so that they will not pull out of the substrate when tied together by the anchoring device. The fixed array of nails spreads out over a wide area; generally well beyond a perimeter of the frame for the nail portions that are embedded in the substrate. This nail array serves to spread a load applied to the anchoring device over a wide area of the substrate. An improvement of '169 over '396 is to have the cover piece and frame piece permanently assembled together during the manufacture of the device. However these elements are clearly made separately as stated on col. 3, second paragraph, “The base 12 and the cover 14 are molded as two separate pieces in order to mold the slots in the angular base.”

[0003] According to the preferred embodiment of '169 the nails are held in a conical configuration by a round conical device. There is no illustrated or described structure that would facilitate removal of the nails. Further the concave face into which the nails are to be seated will likely interfere with a hammerhead when trying to fully seat the nails.

SUMMARY OF THE INVENTION

[0004] It would be a significant improvement over the prior art to provide a structure wherein a base of an attaching device could be molded as a single piece while including multiple angled enclosed channels in the base. In the present invention a novel recessed slot design allows a simply molded part to comprise a single piece frame that includes a plurality of differently angled fastener channels that are elongated in a longitudinal direction. The fastener channels are formed by a series of alternating upward facing recesses and downward facing recesses in the body of the frame. Therefore parallel and opposed mold core elements may form the fastener channels even as the fastener channels are longitudinally oriented at an angle with respect to the mold parting line. Angled in the present disclosure means generally other than perpendicular or parallel.

[0005] Each nail seating area includes a recess on part of the seat face to enable a prying tool to reach under the nail head to remove the nail if desired. The seat face and surrounding area are flat to better fit a hammerhead. Slots are positioned around the perimeter of the frame to enable the frame to hold a wire or similar element of an object to be supported. The slots comprise adjacent or proximate shelves that are offset along the perimeter so that tabs forming the shelves do not overlap when viewed in a vertical direction.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] FIG. 1 is an isometric view of an anchoring device.

[0008] FIG. 2 is a top elevation of the anchoring device of FIG. 1.

[0009] FIG. 3 is a bottom elevation of the anchoring device.

[0010] FIG. FIG. 4 is a view, partly in section, of the anchoring device of FIG. 3.

[0011] FIG. 5 is a side elevation of the anchoring device.

DETAILED DESCRIPTION OF THE ILLUSTRATED EMBODIMENT

[0012] In the illustrated embodiment the anchor includes a substantially conical frame with a generally hexagonal shape. Other shapes may be used including octagonal, round, etc. Frame 10 includes angled nail fastener channels 14. In the Figures there are six fastener channels in the frame. More or fewer may be used as desired, possibly with corresponding geometry for the frame, such as eight fastener channels using an octagonal conical shape. The illustrated embodiment is a polygonal external shape; a round or other shape for the outer perimeter may be used as a design choice. Bottom face 27 at a bottom portion of the frame is generally planar to closely abut a substrate. Other particular surface shapes may be desired to fit non-flat substrates.

[0013] Sectional FIG. 4 is helpful to view the structure of fastener channels 14. An upper portion of fastener channel 14 includes a lower sidewall 14d. Bottom slots 36 extend to upper sidewall 14c of fastener channel 14 to define a next segment of fastener channel 14. Top slots 32 extend downward to lower sidewall 14b to define a further segment of fastener channel 14. Similarly upper sidewall 14d lies in a final segment of fastener channel 14 and is visible in FIG. 3. Therefore in the illustrated embodiment there are four segments to fastener channel 14. A minimum of three is required to fully confine a fastener 100 axially in the fastener channel. However fewer segments may be desired in some designs if elements external to the frame are used to fix the fastener in some respects. Importantly every portion of each fastener channel 14 can be fully viewed from the combination of top view FIG. 2 and bottom view FIG. 3. Fastener channel 14 is divided into sequential segments that are alternately exposed either from the top or from the bottom of the frame. It is therefore possible to fabricate the differently angled fastener channels 14 of frame 10 by the use of substantially parallel and opposed mold core elements. The mold can include two halves that open in a single pull direction without the use of angled sliding cores. Such a
mold includes a mold separation or pull direction that acts about a parting line. This direction is perpendicular to face 27, or at least to an average general orientation of a frame bottom face. The pull direction is also parallel to the extended direction of slots 32 and 36. A “plane” of face 27 shall be considered to be perpendicular to the mold pull direction even if face 27 is not precisely planar. Recesses 23 may be included to reduce thick material sections.

[0014] Frame 10 includes a recessed center area with fixture mounting hole 20 in the center of a planar area. Hole 20 may receive a threaded or other fastener that serves to attach an object to frame 10. Planar landings 11 are at a top portion of the frame and surround the area including hole 20 to provide a limit for an enlarged head of fastener 100, FIG. 4. Recess 13 in landing 11 creates a lowered portion of landing 11. This lowered portion provides a gap under the head so that a thin prying tool can access the underside of the head to pull fastener 100 out from its landed position.

[0015] A further method for frame 10 to support an object is by hanging a wire, string, strip, edge, shaped edge or similar thin element of the object to be supported by frame 10. A slot, notch, shelf or other feature is needed to retain the thin element on the frame. According to the illustrated embodiment there are six such slots 16 formed by (upward facing) lower shelf 18 and adjacent (downward facing) upper shelf 19. Slots 16 are positioned around the external perimeter of frame 10. More or fewer slots may be included. Shelves 18 and 19 are offset from each other around the perimeter. In the particular design shown in the Figures lower shelf 18 is visually a continuous element of an existing face of frame 10, while upper shelf 19 is a distinct element of rib 17. Since adjacent opposed shelves are offset along the perimeter, not overlapping in the vertical direction, slot 16 can be molded by means of simple adjacent mold cores with no need for mold slides. Optionally the upper and lower shelves may not be adjacent but only proximate. For example an extension of the bottom of the frame could protrude near the position of the centerline in FIG. 3 in addition to or in place of shelf 18. As long as the thin element contacts both the upper and lower shelves, and the shelves do not overlap as viewed vertically, for example as in FIGS. 2 and 3, the shelves can be made in a simple mold and they will properly support the thin element. By including opposed shelves 18 and 19, a wire that is held in slot 16 will not slide behind frame 10, for example between the frame and a wall to which frame 10 is attached. This contrasts with notch 116 of FIG. 5 of reference ’169, in which no lower shelf is present to fully hold a wire in a notch.

1. A device for anchoring objects to a substrate wherein:
   a one piece frame includes a top portion and a bottom portion, the bottom portion defining a substantially planar attaching face;
   a plurality of elongated fastener channels extend from openings in the top portion to openings in the bottom portion, a longitudinal orientation of the fastener channels being angled with respect to the attaching face, and at least some of the fastener channels further being angled with respect to other of the fastener channels;
   elongated slots extending into the frame in a vertical direction substantially perpendicular to the attaching face, the slots angled with respect to the longitudinal orientation of the fastener channels, the slots extending into the fastener channels to create openings in sidewalls of the fastener channels;
   the fastener channels being divided into segments of fastener channel length by the slots, adjacent segments of the fastener channels alternately being exposed toward the bottom face and being exposed away from the bottom face, the exposure being through the openings in the sidewalls of the fastener channels created by the slots.
   2. The anchoring device of claim 1 wherein the fastener channels axially confine elongated fasteners, and a portion of each fastener is exposed by each slot.
   3. The anchoring device of claim 1 wherein the openings in the top portion are through planar fastener landings of the frame, a plane of each fastener landing facing parallel to the longitudinal orientation of the fastener channels.
   4. The anchoring device of claim 3 wherein elongated fasteners are axially confined by the fastener channels, the fasteners include enlarged heads with an underside of the heads contacting the landings, a recess extends into each landing to create a gap under part of each head.
   5. The anchoring device of claim 1 wherein the frame includes an external perimeter, at least one upper tab extends outward from the perimeter to form a downward facing shelf, at least one lower tab extends outward to form an upward facing shelf proximate along the perimeter to the upper tab, the opposed shelves forming a slot that extends along the perimeter of the frame, the upper and lower tabs not overlapping in the vertical direction.
   6. A method to manufacture a device for anchoring objects to a substrate including the steps of:
   creating a mold cavity by means of two opposed mold halves, the mold halves being separated at a parting line, the mold halves further separating in a single pull direction, a molded material being inserted into the mold cavity to form an attaching device frame;
   molding a plurality of elongated fastener channels of the frame that extend from openings in a top portion of the frame to openings in a bottom portion of the frame, a longitudinal orientation of the fastener channels being angled with respect to the pull direction, and at least some of the fastener channels further being angled with respect to other of the fastener channels;
   forming elongated slots of the frame by means of mold cores extending into the mold cavity in the pull direction, further creating elongated slots of the frame by means of mold cores extending into the mold cavity opposite to the pull direction, the slots thereby angled with respect to the longitudinal orientation of the fastener channels, the slots extending into the fastener channels to create openings in sidewalls of the fastener channels;
   dividing the fastener channels into segments of fastener channel length by the slots, alternately exposing adjacent segments of the fastener channels in the pull direction and opposite to the pull direction, the exposure being through the openings in the sidewalls of the fastener channels created by the slots.
   7. The anchoring device of claim 6 including the step of installing elongated fasteners into the fastener channels of the frame.
8. A device for anchoring objects to a substrate wherein:
a frame includes a top portion and a bottom portion, the
bottom portion defining a substantially planar attaching
face;
a plurality of elongated fastener channels extend from
openings in the top portion to openings in the bottom
portion, a longitudinal orientation of the fastener chan-
nels being angled with respect to the attaching face, and
at least some of the fastener channels further being
angled with respect to other of the fastener channels;
the frame includes an external perimeter, at least one
upper tab extends outward from the perimeter to form
a downward facing shelf, at least one lower tab extends
outward to form an upward facing shelf proximate
along the perimeter to the downward facing shelf of the
upper tab, the opposed shelves forming a slot that
extends along the perimeter of the frame, the upper and
lower tabs not overlapping in the vertical direction.
9. The anchoring device of claim 8 wherein the opposed
shelves are immediately adjacent to each other.
10. The anchoring device of claim 8 wherein a plurality of
slots are spaced along the perimeter of the frame.
11. A device for anchoring objects to a substrate wherein:
a frame includes a top portion and a bottom portion, the
bottom portion defining a substantially planar attaching
face;
a plurality of elongated fastener channels extend from
openings in the top portion to openings in the bottom
portion, a longitudinal orientation of the fastener chan-
nels being angled with respect to the attaching face, and
at least some of the fastener channels further being
angled with respect to other of the fastener channels;
the openings in the top portion are through planar fastener
anchorings of the frame, a plane of each fastener landing
facing parallel to the longitudinal orientation of the
fastener channels,
a recess extends into each landing to create lowered
portion of the landing.
12. The anchoring device of claim 10 wherein elongated
fasteners are axially confined by the fastener channels,
the fasteners include enlarged heads with an underside of the
heads contacting the landings, the lowered underside provides
a gap under part of each head.

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