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EXPANSION ANCHOR

BACKGROUND OF THE INVENTION

1. Field of the Invention

Expansion anchors.

2. Description of the Prior Art

The prior art abounds with expansion anchors which are intended to provide equal radial expansion of the anchor and accordingly provide cross-sectional construction which is symmetrical.

SUMMARY OF THE INVENTION

The present invention uniquely provides not only an unsymmetrical construction for unequal expansion but provides also a preliminary collapse before expansion.

The present invention provides remarkably superior holding power in both solid and hollow wall fastenings, without danger of breakage of the fastener in hollow wall use.

Briefly, and not by way of limitation, the present invention provides a plurality of longitudinal slots extending alternately through the tip and short of the tip of the anchor. A plurality of outwardly extending longitudinal ribs are asymmetrically disposed annularly of the anchor upon insertion into a wall hole. The collapsed portions provide a plurality of inwardly directed splines in the bore of the anchor for improved engagement by the screw threads of the anchor.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side view of an expansion anchor constructed in accordance with the invention and showing alternately extending slots.

FIG. 2 is a side view of the anchor of FIG. 1 shown rotated about its longitudinal axis and centered upon a downwardly extending slot.

FIG. 3 is a top view of the anchor of FIG. 2 showing in phantom the outwardly extending longitudinal ribs.

FIG. 4 is a cross-sectional view taken across line 4—4 of FIG. 3 and showing alternate slots.

FIG. 5 is a cross-sectional view taken across line 5—5 of FIG. 1 and showing the bore configuration.

FIG. 6 is a cross-sectional view taken across line 6—6 of FIG. 4 and showing alternating slots and asymmetric outer ribs.

FIG. 7 is a view similar to that of FIG. 6 but showing the anchor asymmetrically collapsed after insertion into a wall hole and prior to insertion of a screw.

FIG. 8 is a view, partly in cross section, of an anchor constructed in accordance with the invention and showing a screw inserted therein and expanding the anchor against the wall of a full length hole.

FIG. 9 is a cross-sectional view taken across line 9—9 of FIG. 8.

FIG. 10 is a view of an anchor constructed in accordance with the invention shown expanded in a hollow wall.

DESCRIPTION OF PREFERRED EMBODIMENT OF THE INVENTION

Referring to the drawing, expansion anchor 10 has a head 12 and a body portion 14 with tip 16 at the end of body portion 14 opposite head 12. A plurality of slots in and longitudinally of body portion 14 alternate between downwardly extending slots 18 which extend down toward tip 16 and upwardly extending slots 20 which extend up toward head 12. As may be seen in FIG. 10, the result is a plurality of legs 22 separated by downwardly extending slots 18. Each leg 22 has an upwardly extending slot 20.

A plurality of ribs 24 extend on the outside of body portion 14 longitudinally thereof, each leg 22 being provided with at least one such rib 24 asymmetrically located; that is, located closer to one side edge than the other. Thus, as shown in FIGS. 6 and 7, each upwardly extending slot 20 is centered between two downwardly extending slots 18 and rib 24 is located on

one side of and substantially parallel to upwardly extending slot 20. Rib 24 tapers from head 12 down toward tip 16 for ease of insertion into a hole, although it should be noted that such taper is not an essential feature of the invention.

Expansion anchor 10 is provided with a longitudinal bore 26 which tapers from its entrance at head 12 down toward tip 16. A wood screw 28 or some other similar screw expands anchor 10 when inserted into bore 26.

Expansion anchor 10 is used by inserting it into a hole in a wall and securing a member by means of screws 28, the anchor expanding against the side of the hole. If the hole is of substantially the same diameter as the outside diameter without ribs 24 of body portion 14 the unique advantage of the present invention will be utilized most advantageously. The outside diameter of body portion 14 including ribs 24 being larger than the diameter of the hole in the wall, body portion 14 will be compressed radially inwardly at each rib 24 or forced insertion of the anchor into the hole. Because of the asymmetrical location of ribs 24 as above described, collapse of the anchor will be similarly asymmetric and will result in the inward twisting of each leg 22 as may clearly be seen in FIG. 7. Corresponding to each rib 24 there will be formed inwardly and longitudinally of bore 26 a spline 30 which is an inner edge of each leg 22. A screw entering bore 26 will first engage its threads with splines 30 for quicker, surer, and otherwise improved holding power. The initial bite provided by splines 30 for the threads of the screw is not to be found in any known prior device of the kind.

While the foregoing is illustrative of a preferred embodiment of the invention, it is clear that other embodiments and modifications may be provided. For example, while six slots and three outer ribs are shown in the drawing any number of slots and ribs satisfying the foregoing description may be employed. Also, upwardly extending slots need not more than approach the anchor head, and downwardly extending slots need not more than approach the anchor tip.

The expansion anchor may be made of nylon or any other suitable material.

A still further advantage of the present invention is that breakage of the anchor, as may occur from the insertion of an expander of oversize diameter, it restricted to the head portion. Such a rupture, which would be at an upwardly extending slot in the head portion, does not affect holding power of the anchor.

Although an enlarged head is shown in the drawing it is obvious that the head end portion may not be anything more than the entrance of the anchor.

What is claimed is:

1. An expansion anchor comprising:
 - a. a hollow body portion and an expander adapted to enter and expand said body portion;
 - b. said body portion having a head at one end and a plurality of legs arranged in pairs and extending longitudinally from said head toward the opposite end of said body portion;
 - c. the legs constituting each pair of legs being integrally connected to the head and to each other at their respective upper ends adjacent the head and being further integrally connected to each other at their respective lower ends, and being free from each other intermediate said upper and lower ends;
 - d. each pair of legs being also free from the other pairs of legs throughout their entire length except at their upper ends where they are integrally connected to the head; and
 - e. all of said legs being relatively flexible and free to bow inwardly intermediate their respective ends upon insertion into a bore and being free to bow outwardly intermediate their respective ends upon insertion of the expander.
 - f. the expander being a screw-threaded member having a head with a screwdriver-engaging formation;
 - g. a longitudinally extending rib being formed on the outer surface of one leg of each pair of legs;
 - h. the ribbed legs alternating with the unribbed legs;

3

- i. the ribbed legs being caused to bow inwardly to a greater extent than the unribbed legs when the body portion is inserted into a bore; and
- j. thereby forming inwardly projecting, longitudinally ex-

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tending splines on alternate legs of the body portion which are readily engageable by the threads of the expander.

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