Oct. 28, 1969 L. K. CHEATWOOD 3,474,589

TOGGLE TYPE CONCRETE ANCHOR CONSTRUCTION

Filed Dec. 21, 1967 2 Sheets-Sheet 1

Fig-1

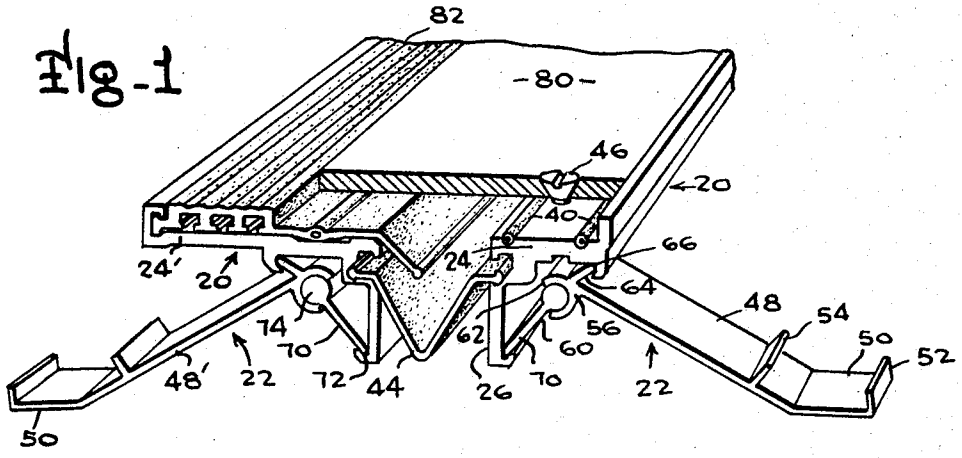


Fig-2

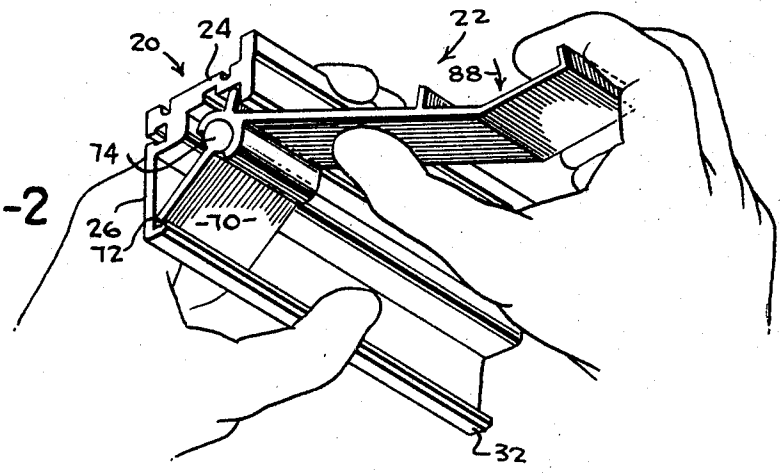
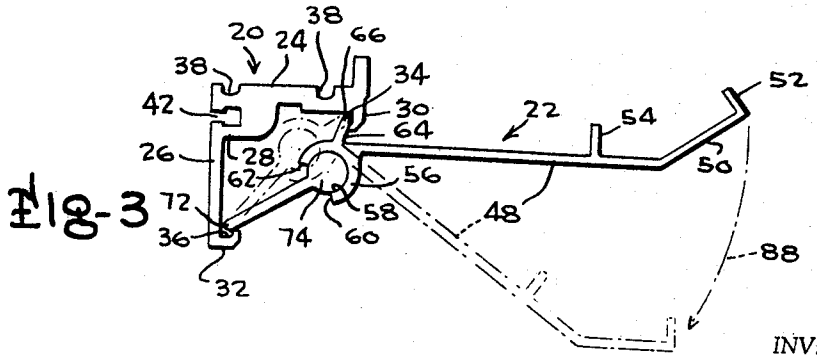


Fig-3



INVENTOR

LOWELL K. CHEATWOOD

BY

Mason, Fenwick & Lawrence

ATTORNEYS

Oct. 28, 1969 L. K. CHEATWOOD 3,474,589

TOGGLE TYPE CONCRETE ANCHOR CONSTRUCTION

Filed Dec. 21, 1967

2 Sheets-Sheet 2

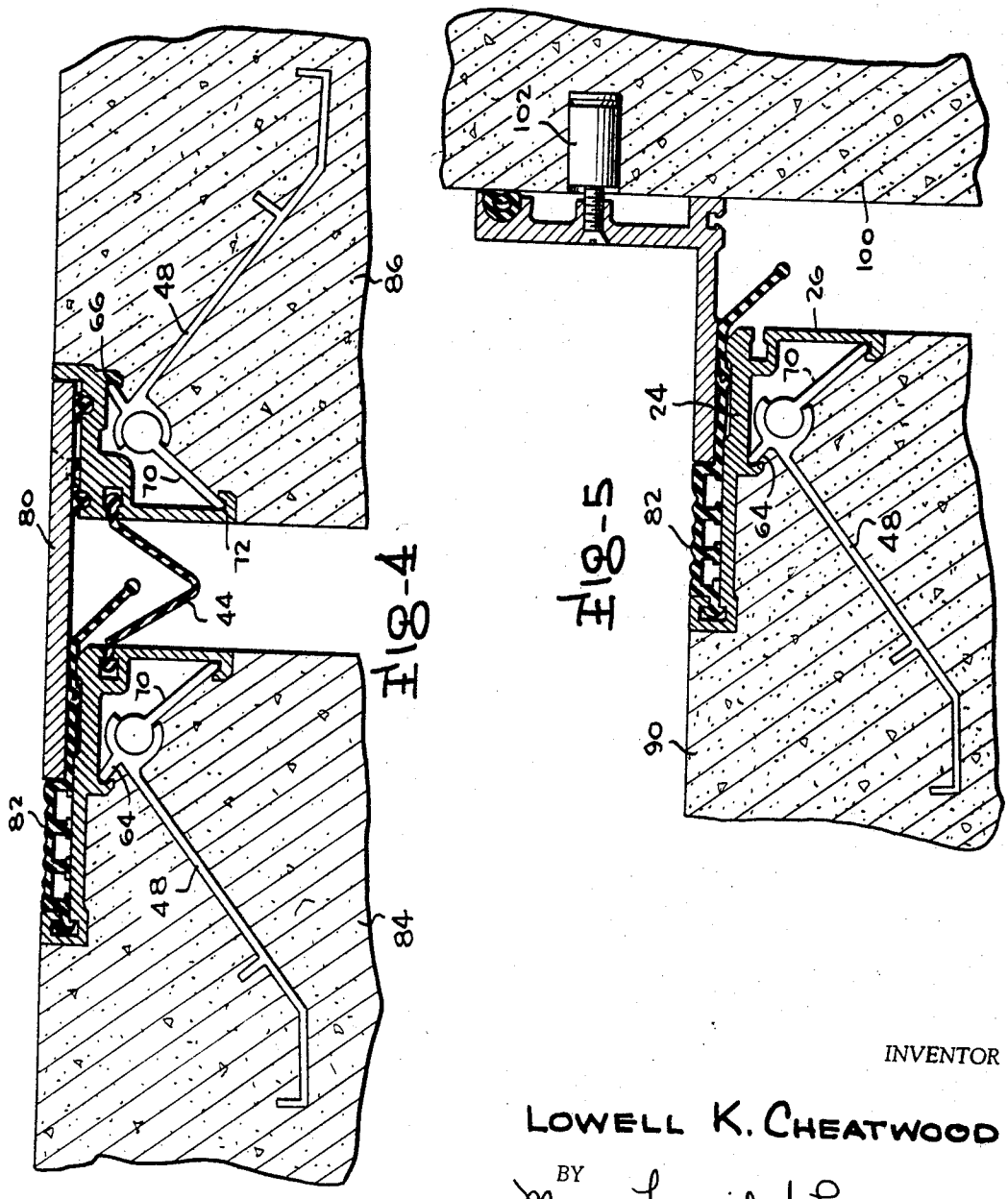


FIG-4

FIG-5

INVENTOR

LOWELL K. CHEATWOOD

BY

Mason, Fenwick & Lawrence

ATTORNEYS

United States Patent Office 3,474,589 Patented Oct. 28, 1969

3,474,589

TOGGLE TYPE CONCRETE ANCHOR CONSTRUCTION

Lowell K. Cheatwood, Oklahoma City, Okla., assignor to Metalines, Incorporated, Oklahoma City, Okla., a corporation of Oklahoma

Filed Dec. 21, 1967, Ser. No. 692,508
Int. Cl. E04c 5/18, 1/38
U.S. Cl. 52—698 18 Claims

ABSTRACT OF THE DISCLOSURE

A concrete anchor and base member assembly having an over-center toggle formed on one end of the anchor to enable insertion and snap-locking of the anchor at any point along the length of the base member.

Background of the invention

This invention is related to the field of concrete anchors and associated base members. More specifically, the invention is related to a concrete anchor that can be connected at any point along the length of a base member by a simple toggle action. Such base members are used for mounting a variety of devices such as expansion joint covers, for example, and any desired number of anchors can be attached to the base member in accordance with the length of such.

Base members formed of extruded metal such as aluminum and having a constant cross-sectional shape have been employed in the construction industry for a number of years. Such base members are formed with a variety of means for connecting concrete anchor lugs which will be incorporated into a concrete wall, floor slab or the like for retaining the base member in position. Such base members can be of considerable length and the previously known concrete anchors have been fastenable thereto in a wide variety of ways. Unfortunately the previously employed attachments have been overly complex, expensive and/or difficult to install. For example, many of the previously known devices require separate attachment screws or clamps for attaching the anchor to the base member. Such construction is time consuming in assembly and also results in a more complex and expensive device. Moreover, many of the prior devices can be fastened at only a single location as determined by threaded taps or other fixed location connector means in the base member.

Another deficiency of many of the prior art devices is that the concrete anchor cannot be attached to the base member by merely inserting such at a point of attachment and then actuating the clamping or fastening means. This is true because it is necessary to insert the anchor member at an extreme end of the base member and slide it along the length of the member until the desired location is reached. The attaching means can then be actuated to retain the anchor in position at the desired location. An example of such a device is U.S. Patent No. 2,976,782 which discloses an anchor member 40, 42 which must be inserted on the end of a base member and moved along the length of the base member until the desired location of attachment is reached. Obviously, the installation of such devices can be quite time consuming when the base member is of considerable length since a large number of manipulations will be required.

The subject invention avoids the problems of the prior art by the provision of a simple concrete anchor which can be snapped into position at any position along the length of a base member. Moreover, the subject invention is uniquely simple in design and therefore, economical to manufacture and produce.

Summary of the invention

This invention comprises a concrete anchor and base member combination in which the concrete anchor is provided with a pair of toggle members on one end which can be connected at any point to axially extending recesses extending along the length of the base member. This construction enables rapid assembly of the base member and associated concrete anchor with a minimum of difficulty and a maximum of reliability.

It is, therefore, a primary object of this invention to provide a new and improved concrete anchor and base member construction.

Description of the Drawings

FIGURE 1 is an end perspective view of the subject invention employed in association with an expansion joint cover assembly attached to a pair of base members;

FIGURE 2 is a perspective view illustrating the manner in which the concrete anchor is attached to the base members;

FIGURE 3 is an end view illustrating the attachment of the concrete anchor to the base member with a dotted line illustration representing the position of the parts when such have been manipulated into an over-center toggle action attached position;

FIGURE 4 is an end view of two examples of the subject invention as mounted in two concrete slabs; and

FIGURE 5 is an end view of the subject invention as employed for mounting a base member in one concrete slab for use in conjunction with a second slab oriented perpendicularly to the first slab.

Description of the preferred embodiment

Two examples of the preferred embodiment are illustrated in FIGURE 1 in conjunction with an expansion joint cover member.

The preferred embodiment consists of a base member **20** formed of an extruded aluminum or other suitable material and one or more concrete anchors **22** which are similarly formed of extruded aluminum or other suitable metals or alloys.

Base member **20** is substantially L-shaped cross-sectional configuration and has a first leg **24** connected to a second leg **26** by a relatively thin connection portion **28** illustrated in FIGURE 3. The outer extremities of legs **24** and **26** are respectively provided with transversely extending abutments **30** and **32** respectively. Moreover, the outer ends of abutments **30** and **32** bend inwardly as shown in FIGURE 3. This construction, in effect, provides a first axially extending recess **34** defined by the intersection of leg **24** and abutment **30** and a second axially extending recess **36** defined by the intersection of leg **26** and abutment **32**.

The outer surface of leg **24** is provided with axially extending grooves **38** which can receive tubular seal means **40** when employed in the manner illustrated in FIGURE 1. Similarly, a recess **42** is provided adjacent the intersection of leg **24** and **26** for receiving a flexible sealing strip **44**. It should be understood that the exterior portions of legs **24** and **26** can include other grooves, recesses or threaded opening such as, for example, the threaded opening receiving a screw **46** shown in FIGURE 1. The exact nature of such grooves, recesses or the like can vary extensively and will depend upon the specific nature of the item to be attached to the base member. However, the interior portion of the base member must always be of substantially the same construction as that illustrated in the drawings in order that the concrete anchor can be snapped into place in the axially extending recesses to be retained in place by toggle action.

The concrete anchor **22** consists of an elongated embed-

ment lug **48** of substantially planar construction which is to be embedded in the concrete slab. The extreme end of the embedment lug is provided with a bent offset portion **50** which terminates in a transversely extending concrete engaging flange **52**. A second transversely extending concrete engaging flange **54** is located inwardly of the bent portion **50** is shown in FIGURE 3, and the other end of the embedment lug is provided with a pivot bearing **56** which has an inner cylindrical surface **58** that is interrupted by the edges **60** and **62** of an axially extending slot. Edges **60** and **62** are spaced apart a distance less than the diameter of the cylindrical surface **58**.

A transversely extending latch lug **64** having an outer axially extending end termination in the form of an edge **66** extends transversely from the embedment lug at a portion adjacent the pivot bearing **56** as shown. Latch lug **64** is of generally planar construction and is oriented in a plane extending radially from the center of curvature of cylindrical surface **58**.

A pivot plate **70** having an outer end termination edge **72** and an inner axially extending cylindrical rod **74** along its other edge is pivotally attached to the embedment lug by virtue of the fact that the cylindrical rod **74** is concentrically received within the confines of the cylindrical surface **58**. It should be noted that the pivot plate **70** is pivotable between two extreme positions limited by the engagement of plate **70** with the edges **60** and **62** of the slot interrupting the cylindrical surface **58**. These positions consist of a first position illustrated by the solid line position in FIGURE 3 and a second position which is shown by the dashed line position in FIGURE 3. Moreover, the second position is also illustrated in FIGURES 1, 4 and 5 whereas the first position is also illustrated in FIGURE 2.

FIGURE 1 illustrates the combinational end portions of two of the anchor members associated with two different base plate constructions for use as an expansion joint cover including a rigid cover plate **80** and a flexible sealing member **82** respectively connected to the two base members. It should be noted that the leftmost base member is provided with an extension **24'** for accommodating the flexible sealing member **82**. However, that portion of the base member with which the anchor member **22** is associated is identical with the corresponding portion of the righthand base member. The number of anchor members employed in any particular application depends upon the length of the particular base members with which the anchor members are used and upon the nature of the service in which the application is made. Obviously, in applications wherein the base member is subjected to unusual forces and strains, it would be necessary to employ more anchors than would be required in a less taxing environment.

Connection of an anchor to the base member is accomplished by inserting the edge **72** of pivot plate **70** into recess **36**. The pivot plate is pivoted to the limit of its counter-clockwise movement as illustrated in FIGURE 3 so that the edge **66** of latch lug **64** can move inwardly into the vicinity of recess **34**. The embedment lug **48** is then pivoted downwardly to the dashed line position illustrated in FIGURE 3 by movement in the direction indicated by arrow **88**. The anchor is locked in the base member by the toggle action of plate **70**, bearing **56** and latch lug **64**. It should be noted that the initial distance between the edges **66** and **72** while such are being inserted into the base member is less than the distance between recesses **34** and **36**. Therefore, the anchor can easily be inserted into the base member. However, the toggle locking movement between the solid line to dashed line positions of FIGURE 3 causes an over-center pivoting of plate **70** and latch plate **64** so that the dashed line position of edges **72** and **66** results in a distance between these edges which is greater than the normal distance between the recesses **34** and **36**. It is necessary that the legs **24** and **26** be capable of a small amount of flexing with respect to each other and this movement is enabled by the thin portion **28** connecting the legs. Reactive biassing of the legs aids in maintaining the anchor member locked in position with respect to the base member as is evidenced by inspection of the drawings.

When all of the anchor members have been connected to a respective base member, the assembly is positioned in the form and concrete is poured to immerse the embedment member as shown in FIGURE 4. Hardening of the concrete obviously results in a permanent fixed positioning of the assembly components.

FIGURE 5 illustrates another use of an anchor member and base plate for providing an expansion joint connection between slabs **90** and **100**. In this use, the anchor member and base member combination forming the invention are used in conjunction with another type of anchor member **102** for the purpose of illustrating the versatility of the subject invention. The base member illustrated is identical with the leftmost base member illustrated in FIGURE 4.

Therefore, it will be obvious that the subject invention is of great versatility and ease of use in that it can be snapped into position at any point along the base member without the use of any tool and with a minimum of manual dexterity. Moreover, a wide variety of devices can be attached to the base member in accordance with the particular location in which such is employed. The use of expansion joint covers in illustrating this invention is merely for the purpose of illustration and it should be understood that the invention can be employed for mounting a wide variety of other different devices.

Therefore, since many modifications will be apparent to those skilled in the art, it is to be strictly understood that the scope of this invention is limited solely by the appended claims.

What is claimed is:

1. A cam-locking concrete anchor connectable to a base member having first and second spaced diagonally facing recesses spaced a given distance apart, said anchor comprising, an elongated embedment lug having a generally transversely extending latch lug extending from one end thereof with an outer end termination and a pivot bearing adjacent said latch lug, a pivot plate pivotably received within said pivot bearing and having an outer end termination, movement limiting means formed adjacent said bearing for limiting the extent of movement of said pivot plate to movement between a first position in which said end terminations are spaced apart a distance less than the distance between said spaced recesses of said base member and a second over-center position in which said termination would normally be spaced apart a distance slightly greater than said distance between said spaced recesses so that said end terminations can be inserted in said recesses when said pivot plate is in its first position and said pivot plate can then be pivoted to its second position to remain in said second position by virtue of toggle action of said pivot plate and said latch lug.

2. The invention of claim **1** wherein said pivot bearing comprises a cylindrical surface interrupted by an axially extending slot and the end of said pivot plate received within said pivot bearing comprises a cylindrical pivot rod concentrically embraced by said cylindrical surface.

3. The invention of claim **2** wherein said pivot plate includes a planar portion extending from said cylindrical pivot rod through said slot.

4. The invention of claim **3** wherein said movement limiting means comprises the sides of said slot.

5. The invention of claim **4** wherein said latch lug is of generally planar shape with the plane of the lug being oriented in radial relationship with respect to the center of curvature of said cylindrical surface.

6. The invention of claim **5** wherein said elongated embedment lug, said pivot bearing and said latch lug are of unitary metal construction and wherein said pivot

plate and said pivot rod are of unitary metal construction.

7. A cam-locking concrete anchor connectable to a base member having first and second spaced diagonally facing recesses spaced a given distance apart, said anchor comprising an elongated embedment lug having toggle means comprising two relatively pivotable members adjacent one end thereof, said relatively pivotable members each having an outer end termination, and means associated with said one end for limiting the amount of pivotable movement possibly by said relatively pivotable members so that the outer end terminations of said relatively pivotable members are spaced apart a distance less than the distance between said recesses when said pivotable members are in one extreme limit of pivotable movement and are spaced apart a distance greater than the said distance between said recesses when said pivotable members are in an opposite over-center extreme position of pivotable movement so that said embedment member can be affixed to said base member by toggle action when said pivotable members are moved from said first position to said second position.

8. The invention of claim 7 wherein one of said pivotable members comprises a planar pivot plate having a cylindrical pivot rod on one edge opposite to its end termination with said rod being received within the confines of a cylindrical pivot bearing formed in the end of said embedment lug with which said pivotable members are associated.

9. The invention of claim 8 wherein said movement limiting means comprises the sides of an elongated slot extending along the length of said cylindrical surface and wherein said pivot plate extends from said cylindrical pivot rod through said slot.

10. The invention of claim 9 wherein said second relatively pivotable member comprises a substantially planar latch lug oriented in a radial plane from the center of curvature of said cylindrical surface and formed integrally with said anchor.

11. An assembly for attachment to a concrete slab, said assembly comprising a base member having first and second spaced diagonally facing recesses spaced a given distance apart, an anchor comprising an elongated embedment lug having a generally transversely extending latch lug extending from one end thereof with an outer end termination and a pivot bearing adjacent said latch lug, pivot plate pivotably received within said pivot bearing for pivotable movement between first and second positions, wherein the outer end termination of said latch lug and the outer end termination of said pivot plate are positionable in said recesses when said pivot plate is in one of its extreme positions of movement and wherein the movement of said pivot plate to its other extreme position of movement causes said end terminations to be spaced a greater distance apart to be biassed into snug

fitting relationship with said recesses so that said pivot plate and said elongated embedment member remains in their second position due to an over-center toggle action between said pivot plate, said pivot bearing and said latch lug.

12. The invention of claim 11 wherein said pivot bearing comprises a cylindrical surface interrupted by an axially extending slot and the end of said pivot plate received within said pivot bearing comprises a cylindrical pivot rod concentrically embraced by said cylindrical surface.

13. The invention of claim 12 wherein said pivot plate includes a planar portion extending from said cylindrical pivot rod through said slot.

14. The invention of claim 13 wherein said pivot plate movement is limited by the sides of said slots.

15. The invention of claim 14 wherein said latch lug is of generally planar shape with the plane of the lug being oriented in radial relationship with respect to the center of curvature of said cylindrical surface.

16. The invention of claim 11 wherein said base member is of substantially L-shaped configuration and said recesses are formed by the intersection of each leg of the L-shaped base member with transversely extending abutments extending inwardly from each of said legs.

17. The invention of claim 16 wherein said pivot bearing comprises a cylindrical surface interrupted by an axially extending slot and the end of said pivot plate received within said pivot bearing comprises a cylindrical pivot rod concentrically embraced by said cylindrical surface.

18. The invention of claim 17 wherein said pivot plate includes a planar portion extending from said cylindrical pivot rod through said slot.

References Cited

UNITED STATES PATENTS

65,273	5/1868	Rice	298—214
1,554,391	9/1925	Town	298—215
2,860,716	11/1958	Flock	248—25 X
2,918,244	12/1959	Laney	248—214
2,976,782	3/1961	Thom	94—32 X
3,203,149	8/1965	Soddy.	
3,394,639	7/1968	Uiehmann	94—18

FOREIGN PATENTS

181,995	1/1936	Switzerland.

FRANK L. ABBOTT, Primary Examiner

S. D. BURKE III, Assistant Examiner

U.S. Cl. X.R.

52—58, 288, 464, 471; 94—18, 32