

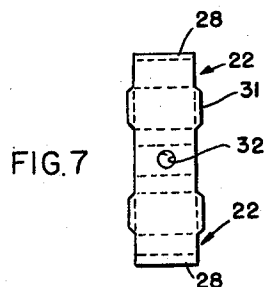
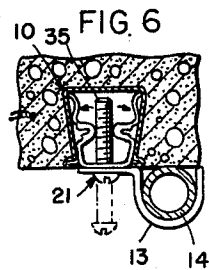
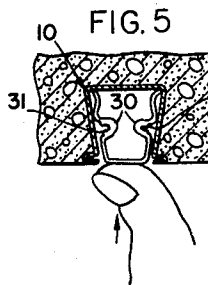
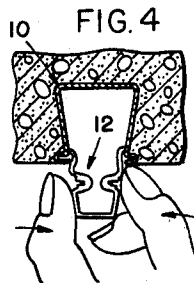
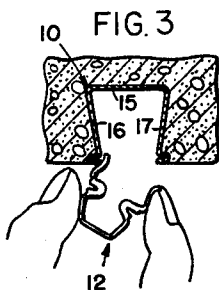
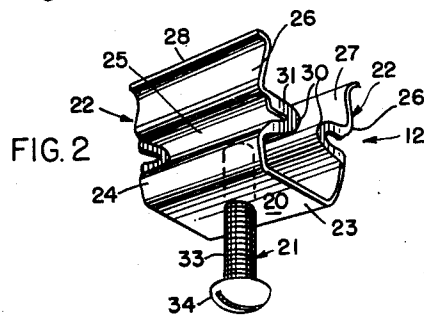
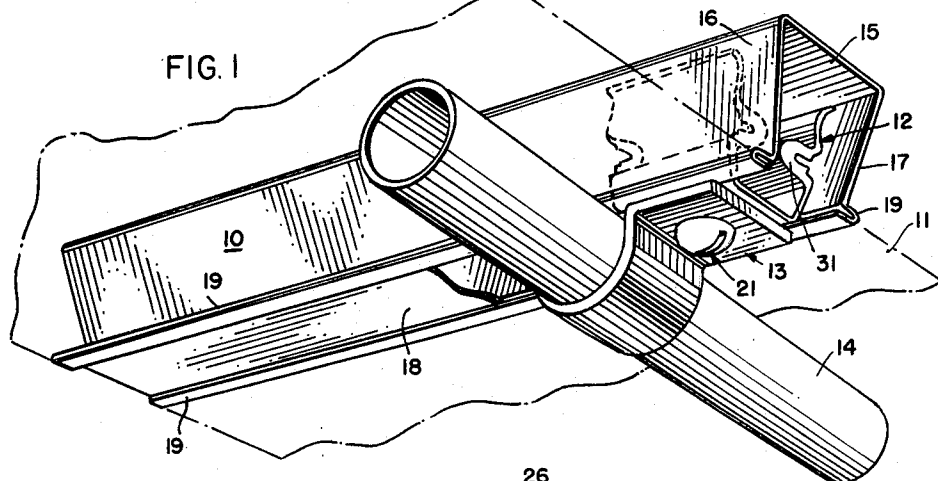
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2,944,313

ANCHOR SLOT CHANNEL ATTACHMENT CLIP

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ANCHOR SLOT CHANNEL ATTACHMENT CLIP

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2 Claims. (Cl. 24—214)

The present invention relates to anchor slot channel attachment devices capable of application to metallic channels of the type which are embedded in the facing sides of concrete structure such as ceilings or overhead beams.

The invention has particular reference to a novel form of anchoring device adapted to be inserted into such outwardly facing dovetail slot of an anchor channel and which is provided with interlocking side surfaces designed for cooperative engagement with the sloping side walls of the metallic channel, the device having associated therewith suspension or attachment means whereby various structural members or objects may be suspended or supported by the device, and thus be indirectly suspended from or supported by the concrete facing in which the channel is embedded.

Channel members of the above type are of considerable length, and since the wide portion of the dovetail channel is embedded deep in the concrete, these channels are firmly lodged in the concrete and will support the weight or thrust of a large number of anchoring devices together with the loads carried thereby. The reason for this is that the weight or thrust afforded by each anchoring device and its load is distributed along the channel over a wide region, instead of being localized at the specific point where the thrust takes place.

The anchor devices of the present invention, as currently manufactured, depend for their interlocking engagement with the channel side walls upon the provision of a resilient metal clip, which is formed of thin spring steel and which is generally of U-shape in transverse cross section and which, in its free state, is provided with sloping outer side wall surfaces designed for interlocking engagement with the channel side walls when the clip is operatively received within the channel, such sloping side wall surfaces existing by virtue of the side flanges associated with the generally U-shaped clip. These side flanges, in the free state of the resilient clip, diverge outwardly and the distal edges thereof are normally spaced apart a distance appreciably greater than the transverse width of the channel mouth but they are capable of being flexed inwardly toward each other to such a degree that the distal edges of the flanges may be inserted into the channel mouth and the entire clip pushed inwardly so that the distal edges engage the web portion or bottom of the channel, after which, upon release of the clip, the side flanges of the clip will spring into frictional engagement with the inside faces of the channel side walls.

By an arrangement of this character, the anchor clip may be inserted into the channel precisely at the desired point along the channel where a given structure or object is to be suspended. In installing the clip, the particular region where installation is desired may be chalk-marked, scribed, or otherwise indicated on the embedded channel member, and thereafter the attachment clip may be brought into register with the marking, compressed, forced into the channel and released without further

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adjustment. Alternatively, the attachment clip may be installed within the channel by compression and subsequent release thereof as outlined above in the approximate position which it is to assume in the final installation, and, after such approximate installation, it may be "bumped" so to speak in one direction or the other and thus brought to its exact position.

The provision of an anchor clip of the character briefly outlined above being among the principal objects of the invention, it is a further object to provide such a clip having associated therewith tightening or spreading means which, after the clip has been inserted within the channel at the desired location, may be rendered effective to positively and effectively force the side flanges of the clip outwardly away from each other and into firm binding contact with the sidewalls of the metallic channel within which the clip is received. A similar and related object of the invention in an anchor clip of this character is to provide such a tightening means which, after the clip has been positioned within the channel, is readily accessible for manipulation and which may be manipulated with a conventional tool such as a screwdriver.

It is another object of the invention to provide an anchor clip of this sort which is formed of spring steel having a relatively high spring rate or factor so that after it has been inserted into the mouth of the dovetail channel slot and prior to manipulation of the tightening means set forth above, it will make tight frictional engagement with the channel walls so that during application of the tightening means it will not slip along the channel and thus become offset from its intended position of installation. In carrying out this object, in order to effect such tight frictional contact between the side flanges of the clip and the inside wall surfaces of the channel, it is necessary that the resistance of the spring material from which the clip is formed be comparatively great, thus to precluding the necessary compressional deformation of the clip by ordinary thumb and forefinger application of force to the clip. However, according to the present invention, the side flanges of the clip are so designed as to conveniently accommodate the fingers of the user and the distal edges of the side flanges are provided with hook portions capable of initial interlocking engagement with the channel rim so that the distal edge of one side flange may initially be applied to the channel rim and, thereafter, the channel rim will serve as a thrust-reaction point so that a relatively high degree of manual thrust may be applied to the other side flange of the clip, tending to compress the clip to such an extent that it may, when compressed, be moved into the channel mouth.

Yet another object of the invention is to provide, in an anchor clip of generally U-shaped configuration having thin metal side flanges, an effective reinforcing means for the said flanges so that the intermediate portions of the flanges are relatively rigid and incapable of localized flexing while at the same time each of them may be flexed relative to the interconnecting base portion of the clip so that the necessary contraction of the clip may be effected prior to insertion of the clip within the channel mouth.

Another object of the invention is to provide an anchor clip having flange-spreading means associated therewith as outlined above, which flange-spreading means forms the dual function of forcing the reinforced portion of the clip side flanges into engagement with the inner face of the channel slot walls and of providing an attachment means whereby various attachment devices or structural members such as clips, brackets, hangers, struts and the like may be applied to the anchor clip after the latter has been moved into position within the channel mouth.

The provision of an anchor device of this character which is extremely simple in its construction and in which the body portion of the clip may be formed as an integral one-piece unit from spring stock by a simple stamping operation thus contributing to low cost of manufacture; one which is rugged, hand durable and which, when assembled in an anchor slot, will withstand a high degree of pull; one which, after assembly, may remain permanently in place and which need not be removed when it is necessary to replace or effect substitution of various forms of hangers which may be associated with the same, and one which otherwise is well adapted to perform the services required of it are further desirable features which have been borne in mind in the production and development and the present invention.

Other objects and advantages of the invention, not at this time enumerated, will become more readily apparent as the following description ensues.

In the accompanying single sheet of drawings forming a part of this specification, a preferred embodiment of the invention has been shown.

In these drawings:

Fig. 1 is a perspective view of an attachment clip constructed in accordance with the principles of the present invention and showing the same operatively installed in an overhead anchor slot;

Fig. 2 is a perspective view of the anchor clip in its free state;

Figs. 3, 4, 5 and 6 are transverse sectional views taken through the installed anchor clip and, when considered collectively, illustrate schematically the manner in which the device may be manually installed within an anchor slot channel member; and

Fig. 7 is a plan view of a blank of resilient spring steel from which the improved anchor clip of the present invention is formed.

Referring now to the drawings in detail and in particular to Fig. 1, a metallic anchor slot channel 10 is shown as being embedded in a concrete ceiling structure 11 with the attachment device of the present invention being operatively installed therein and designated in its entirety at 12 and shown as having applied thereto a clamping racket 13 for supporting an overhead pipe section 14 in an underslung position below the ceiling surface. Although the concrete structure 11 is shown as being in the form of a horizontally extending ceiling from which it is desired to provide one or more suspension means for a suitable object or objects, it will be understood that the structure 11 is intended merely as an illustration and is not to be regarded as a limitation.

Still referring to Fig. 1, the anchor slot channel structure 10 is in the form of a channel or shell having a transverse wall 15 and outstanding side walls 16 and 17 which converge slightly toward each other as is conventional in connection with such channels. The channel is illustrated as being embedded in the underneath side of the concrete ceiling 11 for the purpose of retaining therein one or more of the attachment devices 12 of the present invention, by means of which devices various structural or other objects may be supported from the channel member 10 at selected locations therealong.

The open side of the channel member 10 is adapted to be completely closed and sealed against the ingress of concrete during pouring operations and during the time the freshly poured concrete becomes set, the closure being effected by means of an elongated strip 18 of building paper. The longitudinal edge portion 19 of the side walls 16 and 17 of the channel member 10 are folded upon the outer face of the strip 18 over the outer edges thereof in the usual manner so that the strip is firmly clamped in position and forms an effective seal.

The attachment device 12 of the present invention is comprised of but two parts, namely the spring clip body 20 and a combined spreader and attachment member 21

in the form of an ordinary bolt. The spring clip 20 may be formed from flat resilient spring steel stock, the blank for such clip being illustrated in Fig. 7. The formed attachment clip is generally of U-shaped transverse cross section and includes a pair of irregularly shaped side flanges 22 which are connected together along their proximate edges by a transverse base portion 23 which may be substantially flat. The two side flanges 22 are generally outwardly bowed as at 24 while the medial regions of the two flanges are bowed inwardly as shown in Fig. 2 at 25. The bowed portions 24 and 25 of each side flange 22 merge gradually into each other and the outer edge regions of the inwardly bowed portions 25 merge, as best shown in Fig. 2, with a second outwardly bowed region 26 which, in turn, merge with a second inwardly bowed region 27 having distal edges 28 which are flared outwardly. As thus seen in Figs. 2 and 6, each side flange 22 of the anchor clip body 20 is roughly of serpentine cross section presenting four reverse bends of varying degrees terminating in an outwardly flared edge region.

The medial inwardly bowed regions 25 of the side flanges 22 are relatively deep and the resultant inwardly facing rib-like crest portions 30 which are produced on the inside of the structure oppose each other and are in fairly close proximity for a purpose that will be made clear presently.

In order to substantially reinforce the side flanges 22 and to lend an appreciable degree of rigidity to these flanges so that under normal conditions they are incapable of being medially flexed, the end edges of the inwardly bowed portions 25 are provided with laterally turned flanges or webs 31 which follow the contours of the inwardly bowed portions and which are thus of generally U-shape configuration as viewed from either end of the anchor clip structure. These webs 31 may be flanged over during the stamping operation by means of which the anchor clip is formed from the blank shown in Fig. 7 and, the excess metal which is necessary for the production of these webs 31 is provided by the blank.

Although the webs 31 lend appreciable reinforcement to the individual side flanges 22 of the anchor clip 20 and prevent flexing the medial portion of the side flanges per se, the two side flanges 22 are capable of being flexed bodily toward and away from each other relative to the base portion 23 with the flexing deformation necessary to such movement taking place in the outwardly bowed regions 24 of the side flanges.

The central region of the flat base portion 23 of the anchor clip device may be drilled and tapped as at 32 thus providing a threaded opening adapted to receive therein the threaded shank portion 33 of the bolt 21. The bolt 21 is formed with a slotted head 34 by means of which it may be threaded through the opening 32. The length of the shank portion 33 of the bolt 21 is not critical and in Fig. 6 it is shown as being substantially equal to the depth of the U-shaped anchor clip 20. The minimum length which this shank portion 33 may assume is somewhat in excess of the distance between the general plane of the two internal crests 30 provided by the inwardly bowed portions 25 and the plane of the flat base portion 23 so that when the bolt 21 is substantially fully threaded into the opening 32 as shown in Fig. 6 the end of the bolt will pass outwardly between the two inwardly bowed relatively rigid portions 25. The diameter of the shank portion 33 of the bolt 21 is in excess of the normal distance existing between the two crests 30 of the inwardly bowed portions 25 when the spring anchor clip is in its free condition or state. Thus, during threading operations as previously described when the shank portion 33 of the bolt 21 is fed into the opening 32 by turning of the bolt 21, the distal end of the shank portion 33 will initially engage the crest 30 of the inwardly bowed portions 25 and, as turning operations pro-

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gress, the bolt will spread these inwardly bowed portions 25 apart thus flexing the two flanged portions 22 outwardly relative to the base 20 and increasing the overall transverse dimensions of the spring clip.

In order to install the assembled device 12 within the anchor slot channel 10, the procedure which has progressively been illustrated in Figs. 3, 4, 5 and 6 may be followed. In order to initially introduce the spring sheet metal clip portion 20 of the two-piece assembly 12 through the mouth of the channel slot afforded by the anchor slot channel member 10, the device may be grasped between the thumb and forefinger as shown in Fig. 3. Since the clip 20 offers an appreciable degree of resistance to compressional forces the strength of the average user may be insufficient upon compression of the device, to bring the distal edges 28 into sufficient proximity that they may be inserted through the mouth of the channel slot, and therefore the hook-like portion provided by the distal inwardly bowed portion 27 of one side flange 22 may be caused to engage one beaded edge 19 of the channel member 10 as shown in Fig. 3. Thereafter, as illustrated in Fig. 4, pressure may be applied by the forefinger against the other side flange 22 until the two distal edges 28 are in sufficient proximity that they may be passed through the mouth of the channel slot. After both edges 28 enter the channel slot, the partially installed clip may be entirely released while overhanging the edge of the slot so that a fresh purchase may be had upon the clip by the thumb or other portion of the hand as shown in Fig. 5 and the clip may then be pushed inwardly as indicated by the arrow in Fig. 5 to its home position wherein the two edges 28 engage the bottom wall 15 of the channel 10. Movement of the clip to its home position will be assisted by the camming action exerted between the compressed side flanges 22 and the inclined sides 16 and 17 of the channel 10 so that the clip will snap into position with the base portion 23 thereof lying substantially in the plane of the mouth of the channel slot. Finally, the threaded bolt 21 is fed through the threaded hole 32 in the base portion 23 so that it will pass between the two inwardly directed rib-like bowed portions 25 as previously described and cause the side flanges 22 to be firmly and frictionally driven against the side walls 16 and 17 of the channel member 10. Prior to insertion of the bolt 21, a suitable supporting clip such as the one that has been indicated at 13 for holding the pipe section 14 in position on the ceiling surface 11 may be applied to the bolt and, when the bolt is

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fully received in the opening 32 the head portion 34 thereof will clamp and maintain the clip 13 secure against dislodgement.

The invention is not to be limited to the exact arrangement of parts shown in the accompanying drawings or described in this specification as various changes in the details of construction may be resorted to without departing from the spirit of the invention. Only insofar as the invention has particularly been pointed out in the accompanying claims is the same to be limited.

I claim:

1. An attachment device for engaging the inner side faces of a dovetail anchor slot channel structure, comprising, in combination a channel-shaped clip in the form of a lightweight spring metal stamping including a base portion and a pair of outwardly diverging opposed side flanges yieldably connected to the base and compressible toward each other for insertion into the dovetail slot of said channel structure, the said diverging side flanges of the clip being formed intermediate the said base portion and the distal edges of said flanges with opposed inwardly projecting pressed corrugations formed at their ends with laterally projecting webs for rigidifying the said medial portions of the flanges of the clip, and means for forcing said rigidified medial portions of the clip flanges into rigid wedging engagement with the side walls of the dovetail anchor slot of said channel structure comprising a bolt threaded through said base portion and having wedging engagement with said corrugations to force the clip sides outwardly into said wedging engagement with the walls of said dovetail slot.

2. An attachment device for metallic anchor slot channels as claimed in claim 1 wherein the distal edge region of each of said side flanges is flared outwardly to provide a hook portion which is engageable with an edge portion of the dovetail slot in said anchor slot channel structure to facilitate manual flexing of the clip sides at their junctions with said base during insertion of the clip into said dovetail slot.

References Cited in the file of this patent

UNITED STATES PATENTS

1,476,835	Pleister	Dec. 11, 1923
1,895,657	Geiger	Jan. 31, 1933
2,108,398	Allen	Feb. 15, 1938
2,611,166	Wiley	Sept. 23, 1952

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 2,944,313

July 12, 1960

Frank D. Reiland

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 3, line 15, for "development and" read -- development of --; line 43, for "racket" read -- bracket --; column 4, line 19, for "sepentine" read -- serpentine --.

Signed and sealed this 6th day of December 1960.

(SEAL)

Attest:

KARL H. AXLINE
Attesting Officer

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Commissioner of Patents