United States Patent [19]

Smith

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[54] **PERIMETER GUARD RAIL SYSTEM**

[76] Inventor: **Malcolm K. Smith,** P.O. Box 765, Ormand Beach, Fla. 32017

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[52] **U.S. Cl.** ..... **256/59,** 256/65, 248/226 B

[51] **Int. Cl.** **E04h 17/14**

[58] **Field of Search** ..... 256/1, 59, 65; 248/226 A, 248/226 B; 24/263 B, 126 R

[56] **References Cited**

UNITED STATES PATENTS

268,616	12/1882	Brown	248/226 B
510,323	12/1893	Brammer	248/226 B X
550,443	11/1895	Deal	248/226 B X
757,989	4/1904	Wix	256/48
1,333,728	3/1920	Piggee	256/55
1,564,703	12/1925	Nichols	248/226 B X
2,677,521	5/1954	Willingham	248/226 B
2,769,607	11/1956	Thompson	248/226 B
3,333,807	8/1967	Locatelli	248/226 A
3,351,311	11/1967	Melfi	248/226 A
3,632,089	1/1972	Smith	256/1

Primary Examiner—Dennis L. Taylor

Attorney, Agent, or Firm—Duckworth, Hobby & Allen

[57] **ABSTRACT**

A perimeter guard rail apparatus for rapid installation of a temporary safety barrier provides a clamping system used for clamping a post to a concrete slab with a pair of clamping jaws with at least the upper jaw being set at an acute angle with the post and both jaws having friction pads thereon for engaging a concrete slab. One or both of the jaws are slidably connected to the post and are locked against the concrete slab with a wedge driven into a slot in the post which wedge drives the adjustable jaw against the concrete slab clamping the slab between the jaws. A guard rail holding system is also provided which is attached to the post and has a hook member movably connected to one side of the post for swinging through a slot in the post for engaging a guard rail and holding it against the post. A holding device for toe boards is also provided having a hook for engaging the post and nail holes for attaching toe boards between posts.

4 Claims, 8 Drawing Figures

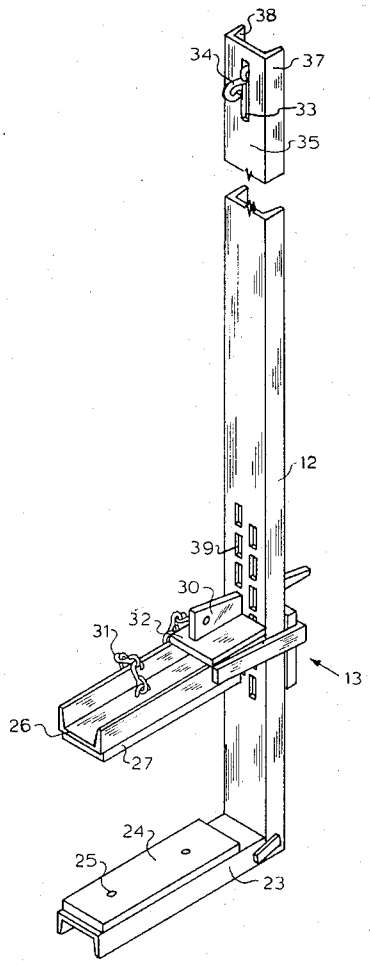


Fig. 1.

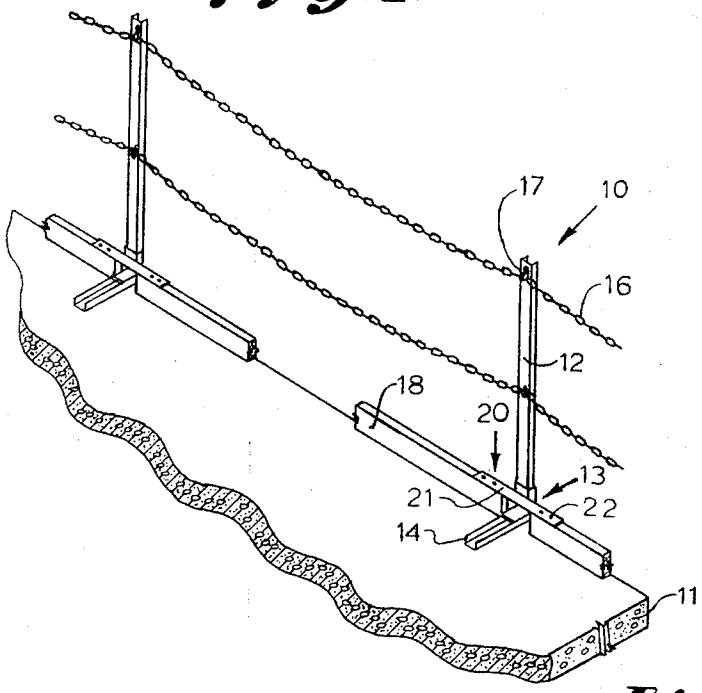

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Fig. 2.

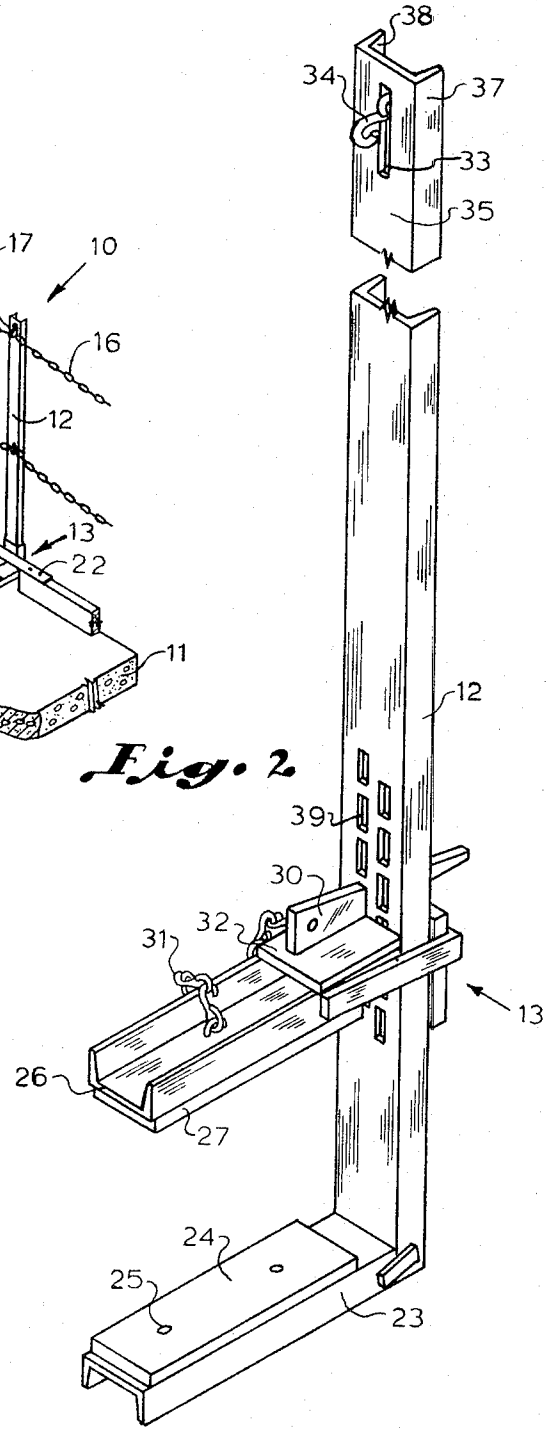

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Fig. 3.

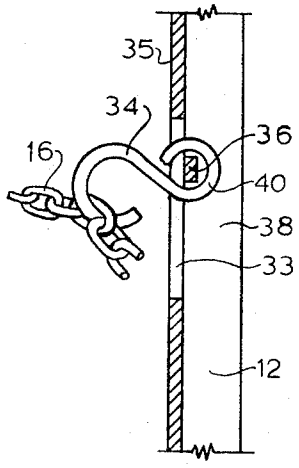


Fig. 4.

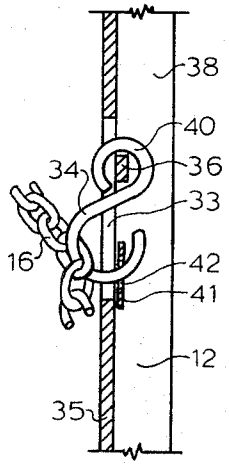


Fig. 5.

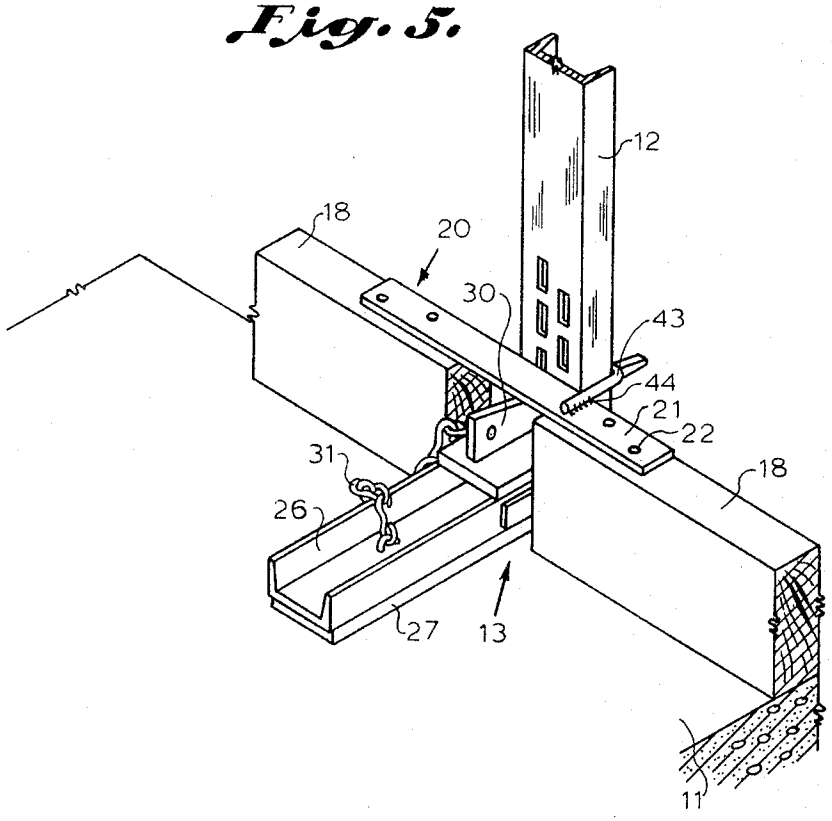


Fig. 6.

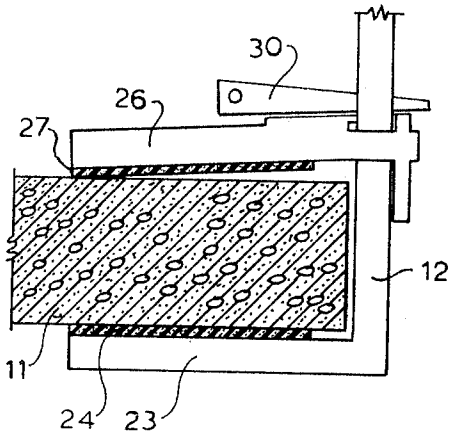


Fig. 7.

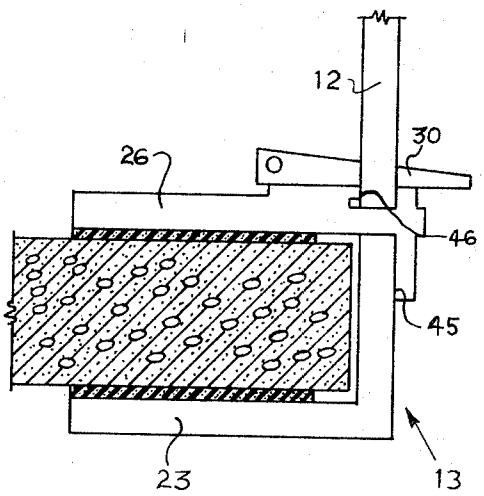
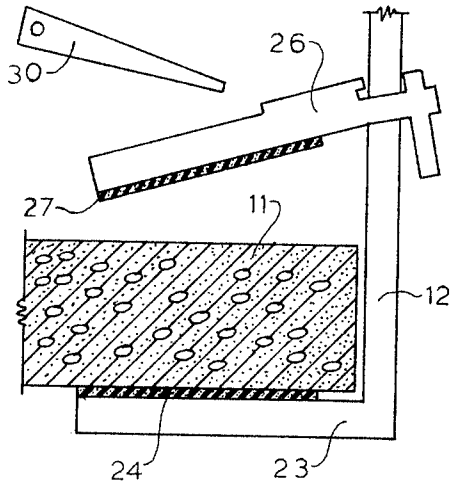


Fig. 8.



PERIMETER GUARD RAIL SYSTEM

BACKGROUND OF THE INVENTION

The present invention relates to safety barriers and more particularly to a perimeter guard rail system adapted for placement around the perimeters of floors above ground level during construction of multi-storied buildings to protect workmen and equipment from falling. The present system is easily movable yet provides a sturdy clamping system along with a system for holding the guard rail or cable to a post, or the like, and a toe board attaching system for providing a complete safety barrier system.

In the past it has been common practice not to provide safety barriers, but Safety Codes now require safety barriers around areas being worked on above ground level during the construction of multi-storied buildings to prevent workmen from falling from the upper stories and also to prevent the accidental dropping of materials or equipment with the potential dangers to other workmen and equipment below Because of the great dangers involved, it is common to provide in building codes for barricades or other safety barriers meeting the safety codes. However, it is still common to provide barriers built from inexpensive lumber assembled at the workside by simply nailing lumber to the slabs. This type of prior art barrier, however, is not uniformly constructed and is generally made from the cheapest lumber available which may be adversely affected by the cumulative effects of rain, dampness, swelling, drying and weakening that may result from re-use of the same materials. To overcome some of these prior art problems it has been suggested to provide a c-clamp such as shown in U.S. Pat. No. 3,351,311 for Support of Guard Rails, in which a post has been connected to the c-clamp and then to have metal guard rails which are attachable to the post by wing nuts, or the like. It has also been suggested in U.S. Pat. No. 3,439,898 to provide a safety barrier and barrier fence posts which posts may be expanded or telescoped to apply pressure to the top of one slab and the bottom of the next slab up, and then attach cables between the posts. This of course assumes working between a pair of slabs and is not applicable to the topmost floor under construction at any given time.

Another safety barrier post may be seen in U.S. Pat. No. 3,480,257, having a clamp and post adapted for attaching wooden rails to.

It is accordingly one advantage of the present invention to provide for a versatile and portable perimeter guard rail system which may be easily and quickly installed or removed without wrenches or special tools for tightening threaded adjusting devices, the only tool being necessary for the present invention being a standard carpenter's hammer such as are generally available on construction sites. The wedge locking system advantageously provides a secure and easily installed or removed post not subject to the problems of rust, dirt and wear that are inherent with threaded devices.

SUMMARY OF THE INVENTION

A perimeter guard rail system is provided for the temporary installation of a safety barrier for placement around the perimeters and openings in floors above ground level during construction of multi-storied buildings and includes components for clamping to a concrete slab, or the like, along with a system for holding the guard rail or cable running between posts and a toe board holding bracket for attaching a toe board between posts. The movable guard rail holding system clamp has an elongated member or post having two ends having a clamp located on the elongated member between the ends. The clamp has a pair of jaws extending from the post, with each jaw having a resilient friction gripping surface or pad thereon to form the gripping surfaces of the jaws. One or both of the jaws are movable on the post and at least one of the jaws extends from the post at an acute angle between the post and the gripping surface of the jaw. An anchoring system for locking clamped jaws to the concrete surface, or the like, with one jaw on either side of the surface, includes a wedge-shaped member which can be driven into an opening or slot in the post and against the movable jaw to lock the movable jaw between the wedge-shaped member and the concrete slab surface so that the slab is clamped between the jaws. The wedge-shaped member is attached by a flexible cord, chain, or the like, to one of the jaws. A holding system for attaching the guard rail to a post is also provided and includes a hook member for loosely swinging out and engaging the guard rail or cable and holding it to the post. The post may be a channel shaped post with a bar extending between the channels for the hook to swing on, with the hook swinging through an opening or slot in the post for engaging the guard rail on the opposite side of the post and holding it against the post. The hook may be locked by sliding a perforated flat member or washer over the end of the hook behind the post if desired. Finally, a toe board holding bracket for attaching and holding tow boards between posts is provided having an elongated toe board attaching member haaing openings in either end thereof through which nails may be driven into the toe boards. A post engaging bracket is fixedly connected between the ends of the elongated member for engaging the post and holding the bracket and the toe boards in a spaced relationship to the post without interfering with the jaws of the clamp.

BRIEF DESCRIPTION OF THE DRAWINGS

Other objects, features and advantages of this invention will be apparent from a study of the written description and the drawings, in which

FIG. 1 is a perspective view of a perimeter guard rail system attached to a concrete slab;

FIG. 2 is a perspective view of the clamping system and post in accordance with the present invention;

FIG. 3 is a sectional view of the guard rail holding member;

FIG. 4 is a sectional view of the guard rail holding member holding a chain in place and having a locking washer thereon;

FIG. 5 is a perspective view of a portion of the clamping system and post attached to a concrete slab, having toe boards attached thereto;

FIG. 6 is a sectional view of the clamping system being placed on a concrete slab;

FIG. 7 shows the clamp attached to the concrete slab; and

FIG. 8 illustrates the clamp being removed from the concrete slab.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to FIG. 1, there can be seen a perimeter guard rail system 10 connected to a concrete slab 11 and having a plurality of guard posts 12 clamped to the edge of the slab 11. Posts 12 are clamped to the slab 11 by means of a clamp system 13 having upper jaws 14 which slide on the post 12 and lower jaws 15 located below slab 11. The posts 12 also have guard rails 16 attached therebetween which may be safety chains or cables connected between the uprights by a guard rail holding member 17. This view also illustrates toe boards 18 connected between posts and held to each post by toe board brackets 20 having an elongated member 21 with openings 22 in each end, having nails driven therethrough into the toe boards 18. The brackets 20 are attached to the posts as will be described in more detail in connection with FIG. 5.

FIG. 2 illustrates the clamping system 13 connected to a post 12 and the guard rail holding system 17 in more detail Clamping system 13 has a lower jaw 23 which may be fixedly or slidably attached to the end of post 12 which lower jaw has a resilient friction engaging surface 24 which can be any type of resilient pad, which in the present case is held by rivets 25, even though it should be clear that the pads 24 could be glued or attached by any other means to the lower jaw 23. The upper jaw is angled to provide an acute angle between the upper jaw resilient pad 27 and the post 12 so that the angled upper jaw 26 concentrates its grip at the outer ends of the jaw yet maintains contact along its entire gripping surface when forced tight against a concrete slab. The padding 24 and 27 on the upper and lower jaws prevents spalling of concrete and provides necessary friction against the slab to hold the jaws firmly. The movable jaw 26 is attached to the concrete slab by setting the post in place and the inserting a wedge member 30 through a slot 31 and driving the wedge member to drive the movable jaw 26 against the slab for clamping the slab between the jaws 23 and 26. The wedge shaped member 30 is attached with a chain or similar flexible member 31 to the upper jaw 26 so that it will always be handy for attaching the post to the slab, and since the upper jaw 26 is a channel shaped member it requires a surface 32 for driving the wedge 30 against. This clamp not only provides a firm grip against the slab but is easily attached by driving a single wedge member 30 with a hammer. The post 12 may have a plurality of slots or openings 31 for adjusting the upper jaw 26 for different size slabs, or alternatively, could have just a single slot for a standard size slab being used on a single large building. Post 12 has one or more openings 33 in the upper part thereof and adapted for a hook 34 to swing out for engaging a guard rail such as chain 16 in FIG. 1, and then swinging back into the slot 33 for holding the chain or cable against the front surface 35 of the post 12. The hook 34 swings on a bar 36 which bar is attached between a pair of channels 37 and 38 connected to the front 35 of the channel shaped post 12.

Turning now to FIGS. 3 and 4, a better view of the operation of the guard rail holding system is provided in which a swing-out hook 34 has been swung out in FIG. 3 to engage the chain 16. The hook has an eye portion 40 connected around the bar 36 allowing it to swing on the bar 36 and through the slot 33 in the front portion 35 of the post 12. The channel 38 can also be seen in these views. FIG. 4 has the hook 34 engaging the chain 16 swung back through the slot 33 in its holding position and has a washer 41 and opening 42 therein slipped over the end of the hook 34 so that the hook is locked by the washer 34 from pulling back through the slot 33.

Turning now to FIG. 5, the toe board holding bracket is more clearly illustrated for holding toe boards 18 to the bracket 20 which has an elongated top member 21 with openings 22 therein for driving nails through the bracket elongated member 21 into the toe boards 18. The toe board bracket 20 has a post engaging member 43 fixedly attached at 44 to the elongated member 21 and adapted to wrap around the post 12 for engaging the post and holding the toe boards 18 to prevent removal or overturning of the toe boards once the toe boards are nailed in place. This bracket advantageously allows the upper jaw 26 to extend through the toe boards 18 while attaching the toe boards with a relatively simple bracket and nails. The wedge shaped member 30 and its holding chain 31 are also illustrated attaching the clamping system 13 pad 27 against the concrete slab 11.

FIGS. 6, 7 and 8 more clearly illustrate the operation of the clamping system, with FIG. 6 showing the post being placed on the concrete slab 11 with the fixed lower jaw 23 having its pad 24 against the slab 11 being fixedly attached to the post 12. The upper jaw 26 has been slid along the post 12 until its pad 27 is engaging the surface of the concrete slab 11. Note that the upper jaw 26 forms an acute angle of approximately 87 degrees between the pad 27 and the post 12 which is important to the operation of the clamp. The wedge shaped member 30 has been inserted in place through a slot and is ready to be driven to lock the clamp onto the slab 11, as shown in FIG. 7, which has the clamp 13 firmly locked against the slab illustrating how, by the angled upper jaw, the largest and greatest force is exerted at the end of the jaw. Thus the jaw will not loosen even it slipped partially off the concrete slab 11, as would be the case if the jaw 26 extended perpendicular to the post 12. That is to say, the main force will continue to be applied against the slab by the jaws until the jaws are almost pulled from the slab, in contrast to a system in which the main force is applied at the opposite end of the jaws and would loosen very rapidly if the post were slipped a short distance. The angle of the upper jaw 26 wedges points 45 and 46 against the guard post 12, locking the jaw firmly to the post.

FIG. 8 illustrates the ease with which the clamping system can be disconnected for removing the post 12 from the slab 11, in which the upper wedge member 30 is knocked from the slot in the post 12 for loosening the upper jaw 26 with its pad 27 from the top of the slab 11, and thus freeing the lower jaw 23 with its pad 24 for sliding the post off of the slab.

It should be clear at this point that a perimeter guard rail system has been provided which is inexpensive to manufacture, easy to use without requiring special tools, but which provides a secure temporary safety barriet system. However, it should also be clear that other embodiments are contemplated as being within the scope of the invention, which includes a movable lower jaw for adjusting the height of the post, but if desired, might also be used with a very short post in the case of a clamping system attached to vertical walks or

columns for blocking an elevator shaft, or the like, where a post would not be needed. The system would typically be made of steel except for the friction pads which could be made or a brake lining material or any firm resilient material having a good friction or non-slipping surface when applied to a concrete surface. For instance, a portion of a webbed heavy belt could be cut up or riveted or glued to the jaws to provide a frictional surface. It should be course be clear any material desired could be utilized in the invention without departing from the spirit and scope thereof and while a channel shaped post has been utilized, posts having other shapes such as I-beams, or any shape desired, could be used within the scope of the invention.

Accordingly, this invention is not to be construed as limited to the particular forms disclosed herein, since these are to be regarded as illustrative rather than restrictive.

I claim:

1. A movable guard rail clamp system, comprising in combination:

an elongated post member having two ends and at least one opening therethrough between said ends and means for attaching a rail thereto to form a protective guard rail between pairs of elongated post members when anchored to a concrete slab;

clamp means located on said elongated member, said clamp means having a pair of jaws extending from said elongated member, each said jaw having resilient friction gripping surfaces thereon to form the gripping surfaces of said jaws, and at least one said jaw being movably mounted on said elongated member and extending at an acute angle between said elongated member and said gripping surface of said movable jaw;

anchoring means for locking said clamp means to a slab with said jaws attached to either side of the slab, said anchoring means including a wedge-shaped member to force said jaws into engagement with a concrete slab to hold said elongated member in position on said slab by driving said wedge shaped member into an opening in said elongated member and against said movable jaw; and said wedge shaped member being movably attached to said clamp means, whereby said elongated member may be rapidly attached to a flat surface between a pair of jaws.

2. The apparatus in accordance with claim **1** in which said wedge shaped member is connected to said movable jaw by a flexible member.

3. The apparatus in accordance with claim **2** in which said flexible member is a chain.

4. The apparatus in accordance with claim **1** in which said movable jaw has an opening therein with said elongated member passing therethrough.

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