United States Patent

[11] 3,589,666

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[54] **CLAMP FOR USE WITH CONCRETE FORMS**
3 Claims, 6 Drawing Figs.

[52] **U.S. Cl.** **249/219,** 249/213
[51] **Int. Cl.** **E04g 17/06**
[50] **Field of Search** ..... 25/131 CM, 131 T, 131 P; 249/45, 46, 219, 219 W, 190, 191, 192

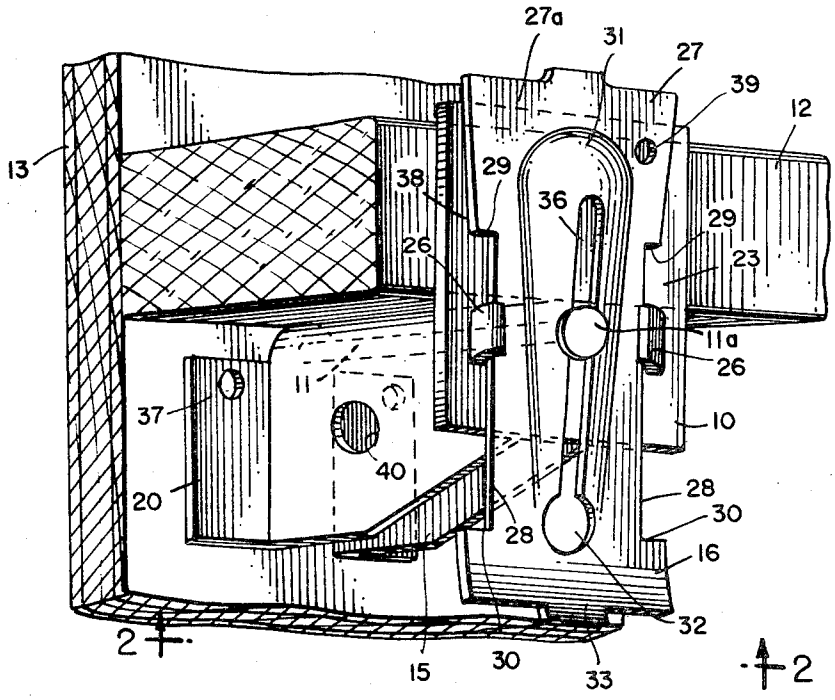
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ABSTRACT: An improved clamp for use in joining reinforcing beams and concrete forms having tie rods therethrough. The clamp includes a generally channel-shaped body having a web portion and a pair of depending sidewalls. A front plate extends transversely between the front ends of the sidewalls and extends upwardly above the web portion for holding the reinforcing beam against the concrete form. The front plate is provided with an opening therethrough adjacent to and below the web portion for receiving the end of a tie rod, and a pair of retainer flanges on the front plate slidably receive a slide plate. The slide plate includes an inclined, raised central portion which is provided with a longitudinally extending slot terminating in an opening for receiving the end of a tie rod.



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FIG. 1

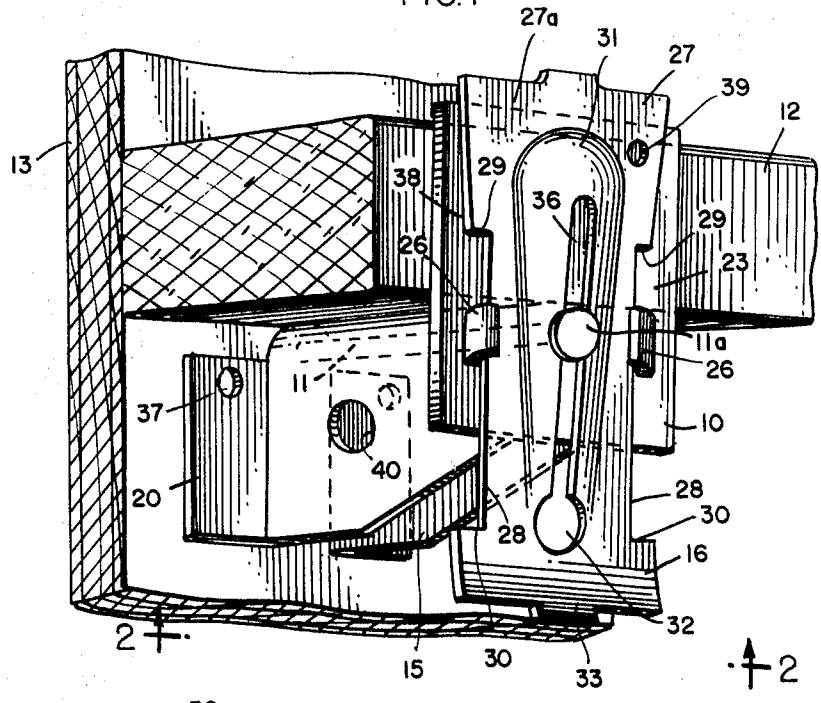


FIG. 2

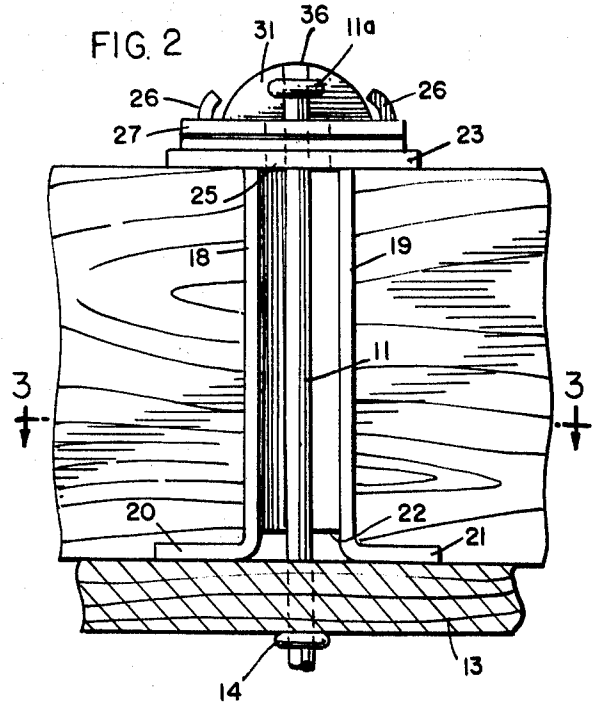
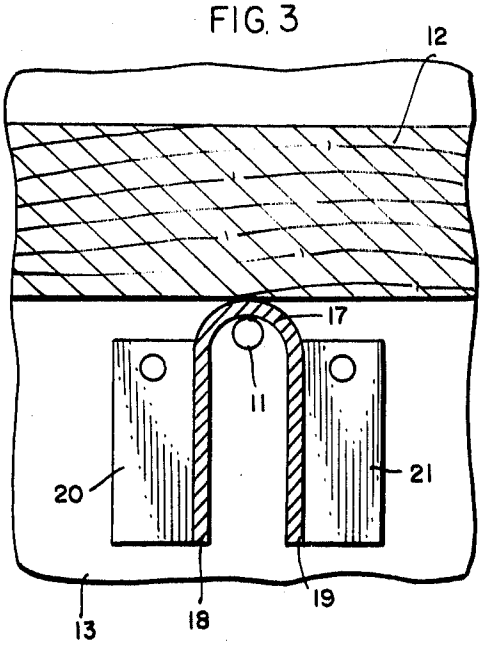


FIG. 3



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FIG. 4

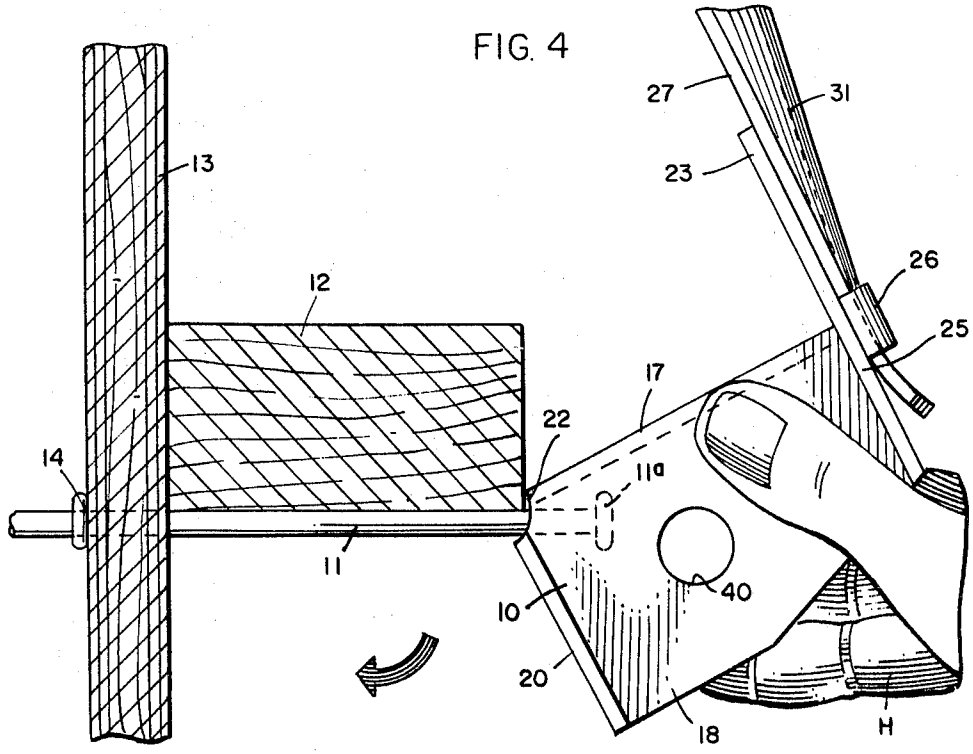


FIG. 5

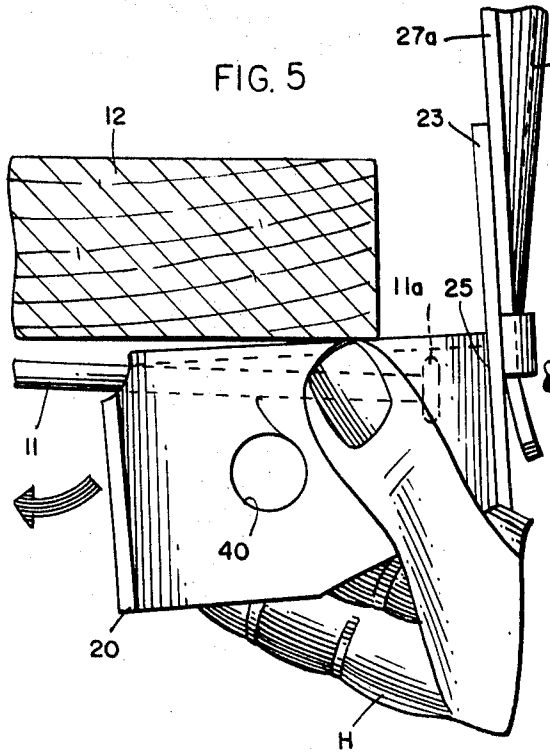
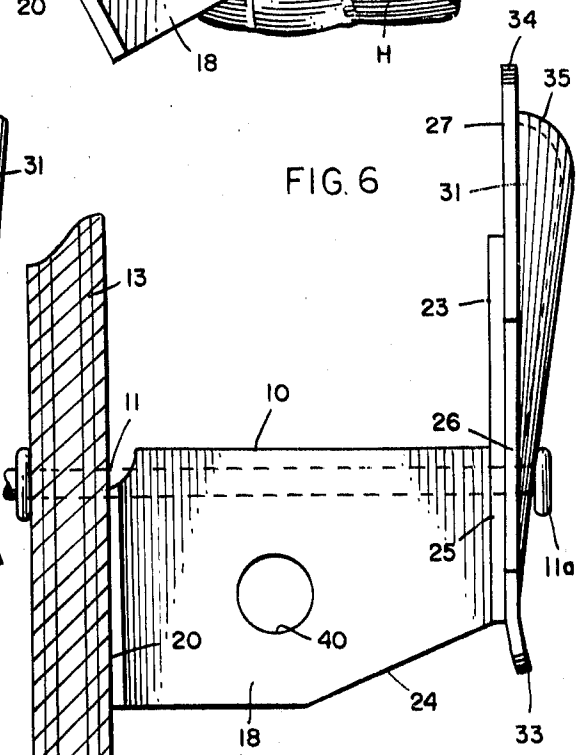


FIG. 6



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CLAMP FOR USE WITH CONCRETE FORMS

This invention relates to clamps, and, more particularly, to clamps for use with concrete forms.

The invention is an improvement over the type of clamp illustrated in U.S. Pat. No. 3,174,203 and which is used to join and reinforce plywood panels which are used as concrete forms. Tie rods extend between spaced-apart plywood panels between which the concrete is poured, and reinforcing beams or walers are laid across the tie rods on the outside of the panels. The walers are then pressed firmly against the panels by clamps which fit over the ends of the tie rods and push the walers inwardly away from the tie rod ends.

Although such clamps have been available in the past, these clamps have suffered from a certain degree of lack of versatility. For example, depending upon manpower needs or construction progress in a given situation, it may be desirable first to lay all of the walers over the tie rods and subsequently position the clamps on the tie rods to secure the walers against the forms. Alternatively, it may be desirable first to position the clamps on the tie rods and at a later time position the walers for clamping.

Clamps heretofore available have generally permitted only one of the aforementioned assembly methods. For example, the clamp illustrated in U.S. Pat. No. 3,174,203 is designed to be positioned on the tie rod for clamping engagement with the waler only after the waler is laid over the tie rods. Other clamps can be conveniently used only when they are positioned on the tie rods prior to the positioning of the waler.

SUMMARY

The inventive clamp can be readily positioned on the tie rods either before or after the walers are laid out. If the clamp is to be positioned before the waler, the unique channel-shaped body of the clamp holds the clamp in a stable manner on the tie rod in such a position that the waler may be readily inserted between the clamp and the form. If the walers are positioned before the clamps, the channel-shaped body of the clamp can be inserted over the end of the tie rod and pushed toward the form so that the clamp can engage the waler. The design of the clamp also results in a more durable and stronger construction.

DESCRIPTION OF THE DRAWING

The invention is explained in conjunction with an illustrative embodiment shown in the accompanying drawing, in which:

FIG. 1 is a fragmentary perspective view of the clamp holding a waler against a concrete form;

FIG. 2 is a bottom plan view taken along the line 2–2 of FIG. 1;

FIG. 3 is a sectional elevational view taken along the line 3–3 of FIG. 2;

FIG. 4 is a view showing the clamp being positioned on the tie rod after the waler is laid out;

FIG. 5 is a view similar to FIG. 4 showing the clamp in a subsequent position; and

FIG. 6 illustrates the clamp positioned on the tie rod before the waler is positioned.

DESCRIPTION OF SPECIFIC EMBODIMENT

Referring to FIG. 1, clamp 10 is shown positioned on a tie rod 11 and holding a reinforcing beam or waler 12 against a concrete form 13. The concrete form 13 may advantageously be a laminated plywood panel, and the walers 12 may be 2×4 wood beams.

Although only a single panel 13 is illustrated in the drawing, it will be understood that another panel is spaced behind the panel shown and the concrete is poured therebetween. The panels are generally 4'×8, and the tie rods are advantageously spaced about 2 feet apart in both the horizontal and vertical directions. The tie rods extend between the spaced-apart concrete forms, and the desired minimum spacing between the forms is maintained by washers 14 which are positioned inwardly of the forms and are secured to the tie rods.

Thereafter, the walers 12 are laid horizontally across the tie rods of adjacent panels, and the clamps 10 urge the walers against the panels by a wedge action against the enlarged ends 11*a* of the tie rods to join the adjacent panels and to reinforce the panels as the concrete is poured.

The clamp 10 includes a generally channel-shaped body portion 15 and an elongated slide plate 16 which is slidably mounted on the body 15 for vertical movement. The body 15 includes a web portion 17, which may be somewhat rounded or arcuate in horizontal cross section (FIG. 3), and a pair of depending sidewalls 18 and 19 which extend downwardly from the web portion 17 to provide a generally U-shaped channel extending axially with respect to the tie rod 11. The spaced-apart sidewalls preferably extend parallel to each other, and bracing flanges or backwalls 20 and 21 extend transversely outwardly from the rear ends of the sidewalls 18 and 19, respectively. The web portion 17 terminates slightly forwardly of the rear ends of the sidewalls and the backwalls 20 and 21 as at 22.

A front plate 23 is secured to the front ends of the sidewalls 18 and 19 and extends generally transversely to the parallel sidewalls. If desired, the forward portion of the bottom edge of each of the sidewalls 18 and 19 may be inclined forwardly and upwardly as at 24 (FIG. 6), and the front plate 23 may extend from the forward end of the inclined edge 24 upwardly above the web portion 17 for approximately the vertical dimension of the waler 12. For example, if 2×4's are used as the walers, the front plate 23 may extend above the web portion 17 for approximately 2 inches.

The front plate 23 is provided with an opening 25 located centrally between the sidewalls 18 and 19 (FIG. 2), and the upper edge of the opening is positioned approximately level with or slightly above the bottom surface of the web portion 17 (FIG. 6). A pair of hook-shaped retaining flanges 26 extend outwardly from the front wall 23 away from the sidewalls 18 and 19, and the flanges 26 may advantageously be formed by punching through the front plate prior to the attachment of the front plate to the sidewalls.

An elongated slide plate 27 is received between the retaining flanges 26 for sliding vertical movement, and the retaining flanges curve inwardly over the slide plate to prevent separation of the slide plate from the body 15. The slide plate 27 is provided with a pair of longitudinally extending recesses 28 in the sides thereof which provide a pair of upper shoulders 29 which are engageable with the tops of the retaining flanges 26 and limit downward sliding movement and a pair of lower shoulders 30 which are engageable with the bottoms of the retaining flanges 26 and limit upward sliding movement.

The slide plate 27 is formed with a longitudinally extending raised central portion 31 which extends away from the generally planar peripheral portion 27*a* of the plate. The central portion inclines from an opening 32 provided through the slide plate 27 adjacent the lower end 33 thereof and curves back toward the planar portion 27*a* adjacent the upper end 34 of the slide plate as at 35 (FIG. 6). A longitudinally extending slot 36 is provided centrally of the raised portion 31 and communicates with the opening 32.

Referring to FIGS. 4 and 5, the brackets 10 may be inserted on the tie rods 11 with one hand H after the walers 12 have been laid horizontally across the tie rods. The channel-shaped body 15 is inserted over the outer end 11*a* of the tie rod, and the rear walls 20 and 21 are positioned below the waler 12. Even though the waler is being supported by the tie rod 11, the backwalls 20 and 21 can be positioned below the waler because the rear end 22 of the web portion 17 terminates forwardly of the rear walls. The clamp may then be rotated clockwise so that the rear walls 20 and 21 lift the waler 12 sufficiently to allow the web portion 17 to slide between the waler and the tie rod. The clamp may then be pushed toward

the panel **13** as illustrated in FIG. **5** until the enlarged outer end of the tie rod is received by the openings **25** and **32** provided in the front plate **23** and slide plate **27**, respectively.

The slide plate **27** may then be forced downwardly, as by pounding the upper end **34** of the slide plate with a hammer, and the raised central portion **31** of the slide plate acts as a wedge to urge the front plate **23** and the waler **12** toward the panel **13** away from the enlarged outer end **11***a* of the tie rod. The distance between the front plate **23** and the bracing flanges **20** and **21** is slightly less than the front-to-back dimension of the waler, 4 inches in the case of 2×4's, and the waler is clamped firmly against the panel. It will be appreciated that the clamp **10** may be inserted between the waler and the tie rod and clamped against the waler with the use of only one hand.

The bracing flanges **20** and **21** prevent an excessive clamping force on the waler and help center the bracket with respect to the tie rod and the waler by preventing excessive swinging of the bracket with respect to the axis of the tie rod.

The clamp **10** may also be positioned on the tie rod before the walers are positioned, as illustrated in FIG. **6**. The sidewalls **18** and **19** straddle the reinforcing rod and the outer end **11***a* of the reinforcing rod is inserted through the openings **25** and **32** in the front plate and slide plate. The upper periphery of the opening **25** is level with, or slightly above, the bottom surface of the web portion **17**, and the rounded web portion positions the bracket centrally with respect to the tie rod as illustrated in FIG. **3** so that the bracket is carried stably by the tie rod and tilting or tipping of the bracket is substantially prevented. Thereafter, the waler **12** may be inserted between the panel **13** and the front plate **23**, and the slide plate **27** may be forced downwardly to clamp the waler against the panel.

If desired, the various parts of the clamp **10** may be provided with nail holes so that these parts may be securely attached to the panel or waler. For example, the backwalls **20** and **21** may be provided with nail holes **37**, the front plate **23** with nail holes **38** and the slide plate **27** with nail holes **39**.

I have found it advantageous to form the metal clamps by stamping the web portion, sidewalls, and backwalls integrally and then forming them into the configuration illustrated. The remaining flanges **26** are then punched from the front plate **23**, and the slide plate **27** is positioned therebetween. The retaining flanges are then bent over the slide plate, and the front plate is welded to the front ends of the sidewalls.

The depending sidewalls **18** and **19** may be provided with 1 inch diameter holes **40**, if desired, to accommodate a scaffold jack. As is well known in the art, scaffold jacks are used to support walking planks, and are supported by the walers and extend outwardly therefrom. The scaffold jacks include a rod which may be inserted through the openings **40** in a pair of adjacent clamps **10** to anchor the scaffold jack against rotation of the jack away from the panels **13**.

While in the foregoing specification, a detailed description of a specific embodiment of my invention was set forth for the purpose of explanation, it is to be understood that many of the details hereingiven may be varied considerably by those skilled in the art without departing from the spirit and scope of my invention.

I claim:

1. A clamp for use in joining reinforcing beams and concrete forms having tie rods comprising:

a generally channel-shaped body having a curved web portion, a pair of sidewalls depending downwardly from the web portion and having front and rear ends, the web portion terminating slightly forwardly of the rear ends of the sidewalls, a front plate extending generally transversely between the front ends of the sidewalls and extending upwardly above the web portion, said front plate having an opening therethrough adjacent to and below said web portion for receiving the end of a tie rod, and a pair of retainer flanges on the front plate,

and an elongated slide plate slidably mounted on said front plate between said retainer flanges, said slide plate including an inclined raised central portion provided with longitudinally extending slot terminating in an opening for receiving the end of a tie rod.

2. A clamp for use in joining reinforcing beams and concrete panel forms having tie rods extending transversely outwardly therefrom comprising:

a generally channel-shaped body having an elongated arcuately formed web portion and a pair of spaced-apart parallel sidewalls having front and rear ends and extending downwardly from the web portion to form a channel for receiving a tie rod, a bracing flange extending generally perpendicularly from the rear end of each sidewall and away from said channel, the web portion terminating forwardly of the bracing flanges, a front plate secured to the front ends of the sidewalls and extending upwardly above the web portion, said front wall having an opening therethrough extending below the web portion for receiving the end of a tie rod, and a pair of retainer flanges extending from the front plate away from the sidewalls,

and an elongated slide plate slidably mounted on said front plate between said retainer flanges, said slide plate including an inclined raised central portion provided with longitudinally extending slot terminating in an opening for receiving the end of a tie rod.

3. A clamp for use in joining reinforcing beams and concrete forms having tie rods comprising:

a generally channel-shaped body having a web portion, a pair of sidewalls depending downwardly from the web portion and having front and rear ends, a pair of oppositely extending flanges, each flange extending from the rear end of one of the sidewalls and away from the other sidewall, each flange having a top edge spaced slightly below the web portion, a front plate extending generally transversely between the front ends of the sidewalls and extending upwardly above the web portion, said front plate having an opening therethrough adjacent to and below said web portion for receiving the end of a tie rod, and a pair of retainer flanges on the front plate,

and an elongated slide plate slidably mounted on said front plate between said retainer flanges, said slide plate including an inclined raised central portion provided with longitudinally extending slot terminating in an opening for receiving the end of a tie rod.