March 17, 1931. A. H. SYMONS 1,796,771

FORM CLAMP

Filed March 12, 1928

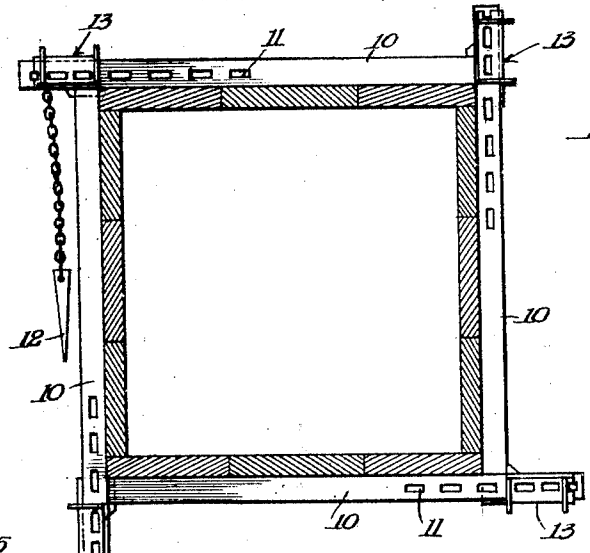


Fig. 1

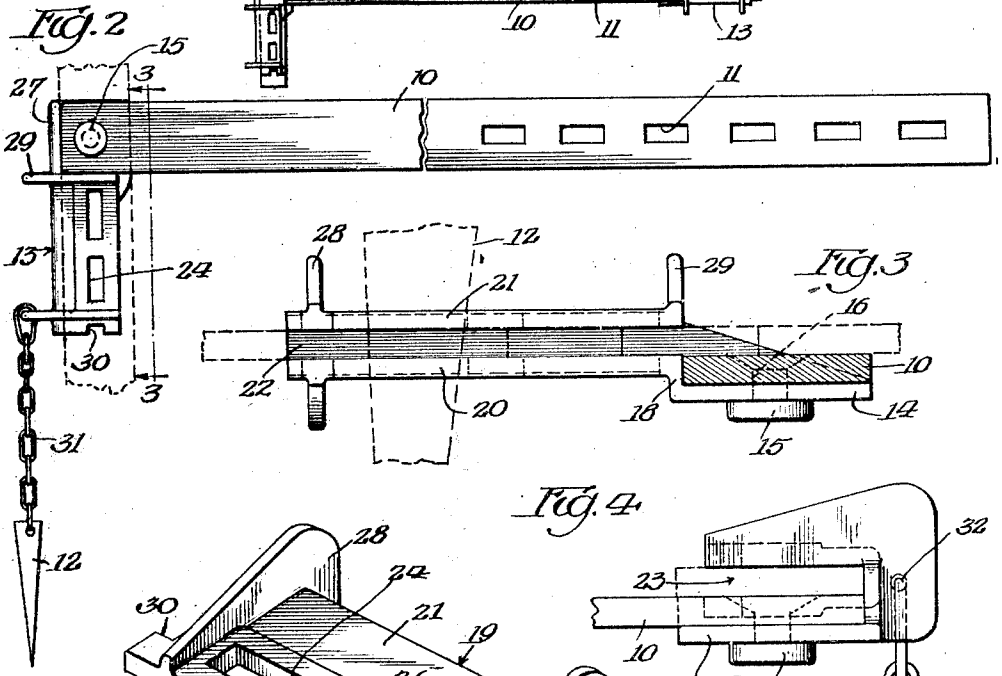


Fig. 2

Fig. 3

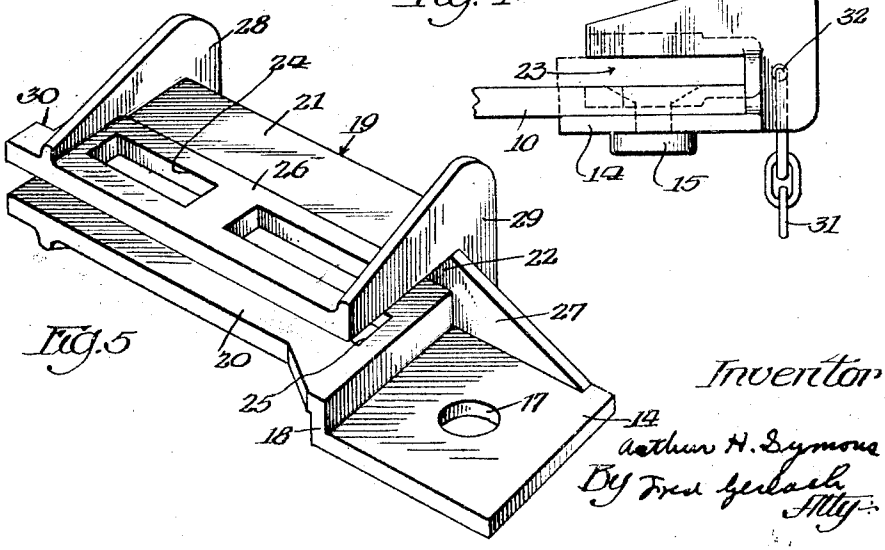


Fig. 4

Fig. 5

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UNITED STATES PATENT OFFICE

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FORM CLAMP

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The invention relates generally to clamps for holding together the separable sections or frames that form a mold into which concrete or other plastic material is poured and set in the construction of buildings and other concrete structures. More particularly the invention relates to that type of clamp which comprises a set of independent or separate bars each having a series of spaced wedge-slots at one end thereof and a bracket or block at the other end which is adapted to receive and hold against lateral displacement the slotted and intersecting end of the adjacent bar and to cooperate with a wedge to effect movement which operates to clamp or draw the two bars against the sides of the mold-sections so as to hold the latter in connected relation during the pouring and setting periods.

The primary object of the present invention is to provide a clamp of this type in which the blocks or brackets have integral sockets whereby they are rigidly secured to the unslotted ends of the bars and project to one side thereof so as to form elongated holding members for supporting the wedges and effectively maintaining the slotted and intersecting ends of the bars in rigid relation.

Another object of the invention is to provide a bracket of the aforementioned character which is of new and improved construction and is reinforced so as to withstand in an efficient manner the comparatively great pressures or forces to which it is subjected during use thereof.

A further object of the invention is to provide a form or column clamp which is efficient in operation, may be readily adjusted into its operative position and embodies interchangeable parts so that no fitting or selection is necessary preparatory to assembly.

A still further object of the invention is to provide a clamp for use in building concrete structures which is of new and improved construction and may be easily and economically manufactured.

Other objects of the invention and the various advantages and characteristics of the present clamp construction will be apparent from a consideration of the following detailed description.

The invention consists in the several novel features hereinafter set forth and more particularly defined by the claims at the conclusion hereof.

In the drawing which accompanies and forms a part of this specification and in which like numerals of reference denote corresponding parts throughout the several views:

Figure 1 is a transverse sectional view of a mold to which is applied a clamp embodying the invention;

Figure 2 is a plan view of one of the clamp elements, that is, one of the bars and the bracket attached thereto;

Figure 3 is an enlarged section taken on the line 3—3 of Figure 2, showing in dotted lines the manner in which the intersecting end of the adjacent bar is held and rigidly locked to the bracket;

Figure 4 is an end view of the bracket shown in Figure 3; and

Figure 5 is a perspective view of one of the brackets.

The invention is exemplified in a clamp for securing together in squared relation the four sides or sections of a mold for forming a column of concrete, cement, or any other plastic material. The sections are separable and together form a rectangular mold in which the concrete is poured and allowed to set, as well understood in the art. The clamp which forms the subject matter of the present invention comprises four bars 10 which are made of any desired length and are preferably formed of strap iron. One end of each bar is provided with a longitudinal series of transverse openings or slots 11 which are spaced equidistantly and are adapted to receive a V-shaped wedge 12. The other ends of the bars are provided with brackets 13 which are adapted to receive and hold the slotted ends as shown in Figure 1. In applying the clamp to a mold, the bars 10 are positioned against the sides or sections respectively and in such a manner that the slotted ends intersect the ends bearing the brackets 13 at the corners of the mold. The slotted ends of the bars are held against outward movement by the brackets and the latter co-

operate with the wedges 11 to effect relative movement of the bars and urge them into clamping relation.

Each bracket 13 is formed of a one-piece casting and comprises a substantially square plate 14 which fits against one face of the extreme unslotted end of the bar with which the bracket is associated. The plate is rigidly held in this position by a rivet 15 which extends through aligned holes 16 and 17 punched in the bar and plate respectively. At one margin of the plate 14 is an end wall 18 which abuts against one of the side edges of the bar and operates to prevent the plate from rotating or turning relatively to said bar. Projecting laterally from the upper end of the side wall 18 and parallel to the plane of the bar and the plate 14 is a holding member or arm 19 for receiving the slotted end of the adjacent bar. This arm comprises a lower wall 20 and an upper wall 21 which are spaced apart by a side wall 22 to form an open-ended elongated chamber 23 into which the intersecting bar-end is edgewise or laterally insertable.

The upper wall 22 has formed therein a pair of longitudinally extending slots 24 which are aligned with a pair of slots 25 formed in the lower wall 20 and form therewith sockets for one of the wedges 12. The slots 24 and 25 are spaced apart respectively distances which are different than the spaces between the slots 11 with the result that there is practically always one combination of slots (24, 11, 25) through which the operator may insert the wedge and upon driving the same down, effect relative movement of the arm and bar for clamping purposes. The outer faces of the walls 20 and 21 are provided adjacent the wedge slots with a pad or reinforced portion 26 which operates to strengthen the parts that contact with the wedge. The inner face of the lower wall 20 is coplanar with respect to the upper face of the riveted end of the bar so that the two faces together form a comparatively large bearing upon which the uppermost bar rests and is slidable. The side wall 22 is disposed at the so-called outer part of the arm and bracket and forms an abutment for the outer edge of the bar which extends through the chamber 23. The inner end of the side wall projects beyond the end wall 18 and forms an extension 27 which is integral with the end of the plate 14. This extension together with said plate and the end wall 18 forms a socket in which the unslotted end of the bar that is associated with the bracket fits and is locked against relative movement. By having the arm project laterally with respect to this socket the slotted end of the adjacent bar is effectively and securely held in place. Furthermore the arm supports and offers a two-point bearing for the wedge.

To prevent the upper and lower walls of the bracket from being forced apart or broken and to strengthen generally the bracket so that it will be rigid and capable of withstanding great outward pressure or force, a pair of reinforcing members 28 and 29 are provided. The member 28 is U-shaped and is positioned adjacent the outer end of the arm. This member is integral with and extends around the lower, side and upper walls, as illustrated in Figures 3 and 5. The member 29 is L-shaped, one leg being formed integral with the inner end margin of the upper wall 25. The other leg of member 29 is joined to the side wall 22 adjacent the juncture of extension 27 and to the outer end of the end wall 18 (Figure 4). The member 28 is positioned inwardly of the extreme ends of the walls 20 and 21 and the latter are cut-away to form slots 30 which may be used to receive and cooperate with wedge 12 in the event that the slots 24 and 25 do not register with the slots 11.

In actual practice it is only necessary to use one wedge with each bracket. To prevent this wedge from being lost it is connected to the bracket by a chain 31. The end link of this chain passes through a hole or opening 32 which is formed in the connecting or intermediate leg of the U-shaped reinforcing member 28. By securing the chain to the reinforcing member in this manner the operative parts of the bracket are not weakened and no extra anchoring means is necessary.

To permit the bars and brackets to be used in an inverted position, i. e. a position in which the arms of the brackets 13 project inwardly instead of outwardly as shown in Figure 1, the walls 20 and 21 are formed so that their inner edges are disposed between the side edges of the bar that extends through the chamber 23 (Figure 2). Thus said inner edges do not contact with the sections or sides of the mold. Since each bar and bracket is the same, the parts of the clamp are interchangeable and it is unnecessary to make any selection preparatory to assembly.

The clamp is operated as follows: The bars 10 are arranged against the sides of the mold respectively in such a manner that the slotted ends lap or intersect the unslotted ends at the corners of the mold or form and project through the chambers 23 of the brackets as illustrated in Figure 1. The slotted ends are then manually shifted in a longitudinal direction as far as possible to jam the bars into close contact or abutting relation with the mold-sections. Thereafter the wedges 12 which are connected by the chains 31 to the brackets are inserted into the wedge slots to lock the bars against outward movement. These wedges are then driven down as far as possible to urge the inner edges of the bars which extend between the overlapped ends into their clamping position against the

mold-sections. In this manner the mold is held together while the concrete or plastic material is poured and allowed to set. When it is desired to remove the clamp, slight tapping on the small ends of the wedges operates to release the latter so that they may be withdrawn and the bars dismantled.

The clamp herein disclosed operates to hold effectively together the separable sections of a column mold, includes a bracket of new and improved construction, and may be manufactured at a reasonable and comparatively low cost.

Although the clamp has been shown and described as consisting of four bars and utilizing brackets which have holding arms extending at right angles to the rivet bearing ends of the bars it is to be understood that more or less bars may be used depending upon the shape of the mold or form and that the angle of the arms may be changed accordingly. It is also to be understood that the invention is not to be restricted to the details set forth, since these may be modified within the scope of the appended claims, without departing from the spirit and scope of the invention.

Having thus described the invention, what I claim as new and desire to secure by Letters Patent, is:

1. A form clamp consisting of a series of independent units adapted to be placed against the sides of the form respectively, each unit comprising a bar having slots adjacent one end thereof and an arm rigidly secured to its other end and projecting from one side thereof, said arm having an elongated transversely extending chamber formed therein, the slotted ends of the bars fitting in the chambers of the arms when the units are assembled, and wedge means extending through the slots and bearing against portions of the arms to clamp the bars around the form.

2. A form clamp consisting of a series of independent units adapted to be placed against the sides of the form respectively, each unit comprising a bar having slots adjacent one end thereof and an arm rigidly secured to its other end and projecting from one side thereof, said arm having slots and an elongated transversely extending chamber formed therein, the slotted ends of the bars fitting in the chambers of the arms when the units are assembled, and wedges extending through the slots in the arms and bars operative to clamp said bars around the form.

3. A form clamp consisting of a series of independent units adapted to be placed against the sides of the form respectively, each unit comprising a bar having slots adjacent one end thereof and a one-piece bracket having a socket formed therein in which the other end of the bar fits and is rigidly secured, said bracket embodying an arm projecting laterally from the bar and having an elongated transversely extending chamber formed therein, the slotted ends of the bars fitting in the chambers of the arms when the units are assembled, and wedges extending through the slots and bearing against portions of the arms to clamp the bars around the form.

4. In a clamp of the character described, the combination of a pair of bars, the ends of which adjoin each other, the end of one of the bars having formed therein a longitudinal series of slots, and means for holding the bars in clamping relation comprising a bracket rigidly secured to the end of the other bar and having a transversely extending arm projecting from one side of said other bar, said arm having an elongated chamber formed therein in which the slotted bar-end fits and is longitudinally slidable, and a wedge extending through one of the slots and bearing against the arm.

5. In a clamp of the character described, the combination of a pair of bars, the ends of which adjoin each other, the end of one of the bars having formed therein a longitudinal series of slots, and means for holding the bars in clamping relation comprising a one-piece bracket rigidly secured to the end of the other bar and having a transversely extending arm projecting from one side of said other bar, said arm consisting of upper and lower walls and a single side wall extending between said upper and lower walls and forming therewith an elongated open sided chamber in which the slotted bar-end fits edgewise and is longitudinally slidable, the upper and lower walls having slots therein and being of such width that the unconnected side edges thereof extend between the sides of the slotted bar when the latter is in the chamber and positioned against said side wall, and a wedge extending through the slots in the walls and said one bar.

6. In a clamp of the character described, the combination of a pair of bars, the ends of which lap each other, the end of one of the bars having formed therein a longitudinal series of slots, and means for holding the bars in clamping relation comprising a one-piece bracket embodying a plate secured to the end of the other bar, a wall connected to the plate and fitting against one side of said other bar to lock said plate and bar against relative movement, and an arm connected to the wall and extending transversely with respect to said other bar, said arm having an elongated chamber formed therein in which the slotted bar-end fits and is longitudinally slidable, and wedge means extending through one of the slots and bearing against the arm.

7. In a clamp of the character described, the combination of a pair of bars, the ends of which lap each other, the end of one of the bars having formed therein a longitudinal series of slots, and means for holding the bars

in clamping relation comprising a one-piece bracket embodying a plate secured to the end of the other bar and an arm connected to the plate and extending transversely with respect to said other bar, said arm comprising upper and lower walls and a side wall, said walls forming together an elongated chamber in which the slotted bar-end fits and is longitudinally slidable, said side wall being extended so as to abut against the end of said one bar to lock the bracket and bar against relative movement, and wedge means extending through one of the slots and bearing against the arm.

8. A one-piece bracket for use in securing together the crossed ends of a pair of form clamping bars, comprising means at one end thereof forming a plate for receiving the end of one of the bars and a shoulder or abutment for engaging the end edge of said one bar and an arm projecting from said means so as to extend laterally with respect to said one bar, said arm having an elongated chamber formed therein for receiving the end of the other bar and embodying slots through which a wedge may be inserted to hold said other bar in connected relation with the arm.

9. A one-piece bracket for use in securing together the crossed ends of a pair of form clamping bars, comprising means at one end thereof forming a socket for receiving the end of one of the bars, an arm projecting from said means so as to extend laterally with respect to said one bar, said arm comprising upper and lower walls and a side wall forming an elongated chamber for receiving the end of the other bar, and a U-shaped reinforcing member connected to and extending around said walls.

10. A unit for a form clamp, comprising a bar, and a one-piece cast metal bracket rigidly secured to one end of the bar and provided with an elongated arm projecting laterally from the bar and having a longitudinal chamber therein for receiving a second bar and slots through which a wedge may be inserted to hold said other bar in connected relation with the arm.

Signed at Chicago, Illinois, this 3rd day of March, 1928.

ARTHUR H. SYMONS.