April 5, 1932. H. W. ROOS 1,852,823

CLAMP FOR CONCRETE FORMS

Filed March 25, 1927 2 Sheets-Sheet 1

Fig. 1

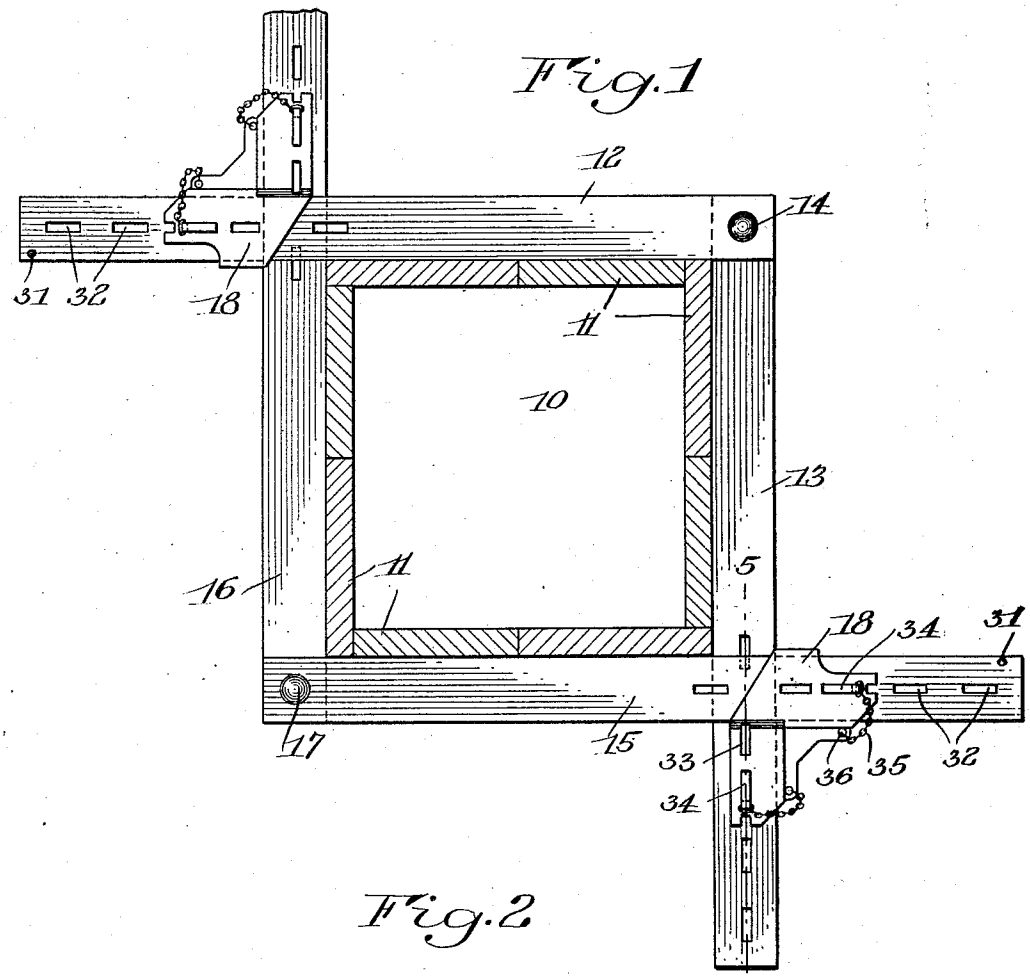
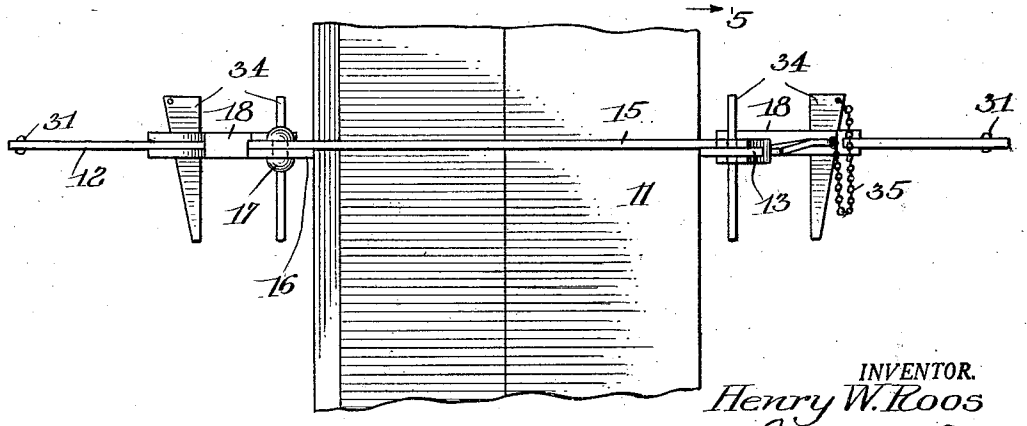


Fig. 2



INVENTOR.
Henry W. Roos
BY Harold R. Stonebraker
his ATTORNEY

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Fig. 8.

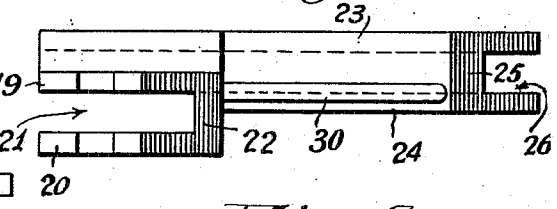


Fig. 4

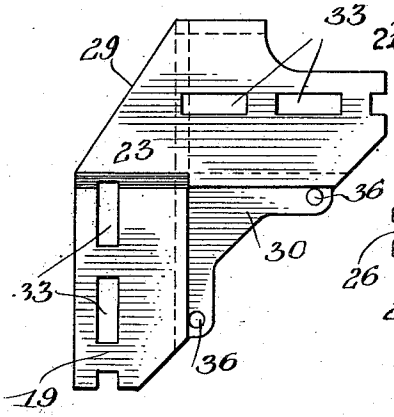


Fig. 3

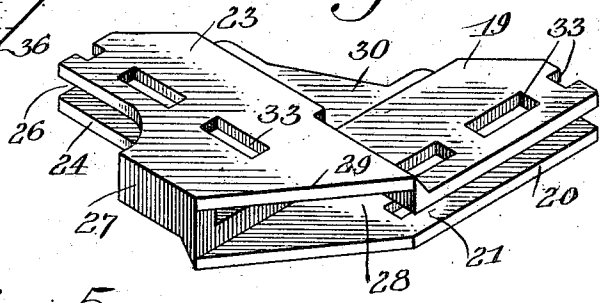


Fig. 5

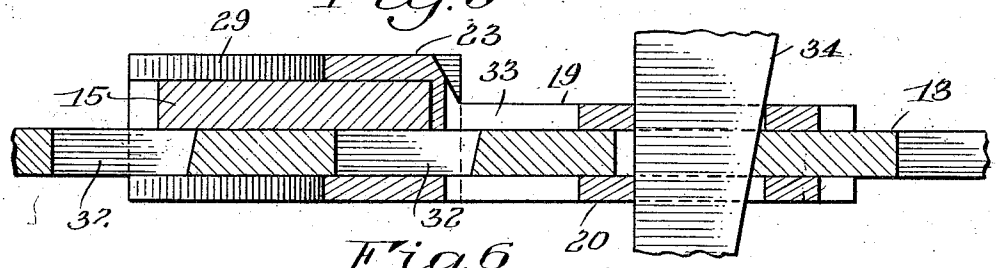


Fig. 6

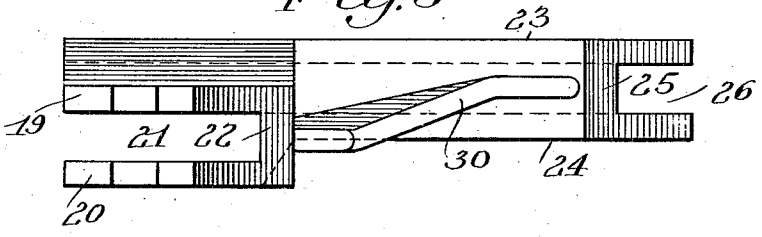
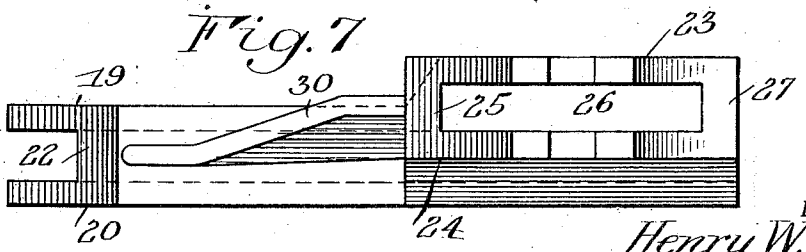


Fig. 7



INVENTOR.
Henry W. Roos
BY
Harold R. Stonebraker
his ATTORNEY

Patented Apr. 5, 1932 1,852,823

UNITED STATES PATENT OFFICE

HENRY W. ROOS, OF CINCINNATI, OHIO

CLAMP FOR CONCRETE FORMS

Application filed March 25, 1927. Serial No. 178,426.

This invention relates to a clamp especially adapted for use in connection with molds or forms for concrete or other similar construction, and has for its principal object to afford a simple and practical construction which lends itself readily to quick application and convenient portability.

The invention is especially applicable to holding planks or forms in place for molding a column of polygonal form. Clamps for use in this connection are usually constructed of two clamping bars hinged together at one end and overlapped and crossed at the corners of the column with other bars. An angle piece is usually employed at the corners for holding the clamping bars in proper position and for adjusting them relatively to the form.

The present invention relates especially to an improved form of angle piece and has for its objects the production of a stronger, more durable and more practical angle piece and one in which the various parts are not liable to be lost.

The invention will be more fully understood by reference to the annexed drawings, in which

Figure 1 is a plan view of the clamp in use upon a rectangular column, the column being shown in cross-section;

Figure 2 is a side view of the same;

Figure 3 is a perspective view of the angle piece;

Figure 4 is a plan view of the angle piece;

Figure 5 is a section through the angle piece and clamping bars taken on the line 5—5 of Figure 1;

Figure 6 is an elevation of one end of the angle piece;

Figure 7 is an elevation of the other end thereof, and

Fig. 8 is a view similar to Fig. 6 but illustrating a slightly modified form of the invention.

Like reference numerals are used for corresponding parts throughout the various figures.

Referring now to Figure 1, the numeral 10 designates generally a rectangular column form, the sides of which are composed of planks 11. Arranged around the outside of these planks and holding them in place is a clamp comprising two arms 12 and 13 pivotally connected near one end at 14, and two similar arms 15 and 16 pivoted to each other at 17. These arms are of proper length for use in connection with various sizes of columns, being slightly longer than the diameter of the largest column with which they are to be used. Where the free ends of the clamping bars cross each other, they are connected together by angle pieces designated generally at 18, these angle pieces being identical with each other in all respects.

As will be best seen from Figures 3 to 7, each angle piece comprises walls 19 and 20 forming upper and lower walls of a passageway 21, these walls being connected by a vertical wall 22. Extending at an angle to the walls of this passageway, are walls 23 and 24 which together with a rear wall 25 form a passageway 26. It will be noted that the passageway 21 is in the nature of a channel, being entirely open at one side. The other passageway 26 is of channel formation throughout part of its length, as is plainly shown in Figure 3, but has a wall 27 partially closing the open side of the passage, thus making this portion of the passage of tubular form. Since the clamping bars which pass through the passageways 21 and 26 lie one on top of another where they cross, it is obvious that the passages for them must be in different planes. Preferably the top of the passage 21 is in approximately the same plane as the bottom of the passage 26. The two passages therefore open into a common passage or chamber 28 at the point where they cross each other. The upper and lower walls of this common passage are cut away at 29, as shown

clearly in Figures 3 and 4. This avoids all possibility of contact between the angle piece and the corner of the column form. It should be pointed out that these passageways extend for a considerable distance along the clamping bars away from the point where they cross and toward the free ends of the respective bars, and thus hold the bars more rigidly and firmly than if they were held only at their intersection.

With an integral angle piece of this type, it is essential that proper strengthening and stiffening means be provided so as to give great rigidity, since otherwise the two arms of the angle piece are apt to bend, which would throw the clamping bars out of proper alinement. To overcome this difficulty, I employ a stiffening member, preferably in the form of a web 30 connecting the side walls 22 and 25 of the passageways 21 and 26. The web 30, as will be seen from Figure 4, extends approximately the full length of each of these walls and fills the angle between them. Preferably the web is connected to the walls 22 and 25 approximately midway of the depth of each of these walls, and as these walls are slightly offset from each other, as is seen in Figures 6 and 7, it follows that the web must be somewhat oblique or skewed, as is shown in these figures. The web may therefore be said to connect the central plane of one passageway with the central plane of the other. If desired, however, it could be constructed flat as shown in Fig. 8 rather than skewed, but in this case the web 30′ would necessarily be connected to the walls 22 and 25 near the top of one wall and near the bottom of the other. The web 30′ connects the walls 22 and 25 and is arranged substantially between the passageways 21 and 26 and in a plane substantially parallel therewith.

It will be obvious from the structure so far described that the angle piece in use completely encircles one of the clamping bars, such as 15, and receives the other clamping bar, such as 13 in the open channel. The object of encircling one of the bars is so that the angle piece will always be attached thereto and will not become lost or mislaid. To prevent the angle piece from sliding off the end of the bar, a stop or lug may be employed near the end of the bar. The rivet 31, shown in Figures 1 and 2, may be used for this purpose, though it is obvious that a removable stop member, such as a bolt and nut, might be employed advantageously, as this would permit removal of a broken angle piece from the clamping bar and the substitution of a new one therefor.

The clamping bars each have a series of longitudinal slots 32 formed therein, and the upper and lower walls of the two portions of the angle piece have corresponding slots 33. The spacing of the slots in the angle piece is different from that of the slots in the clamping bars so that one of the slots in the angle piece will always be opposite one of the slots of the clamping bars no matter in what position the angle piece may be, relative to the clamping bar. In order to hold the clamping bars and angle piece tightly together, locking devices such as wedges 34 may be inserted through the slots. When these wedges are driven into the slots, they tend to draw the clamping bars lengthwise through the passageways of the angle piece, thus tightening the clamp in a manner well known in the art.

It should be borne in mind that clamps of this nature are portable articles intended for use at one place only for a limited time. They are constantly being moved around from point to point in one construction job, and from one job to another. Under such conditions, small parts are very apt to become lost in handling. For this reason it is desirable to connect small loose parts together so that all the parts of a complete device will be at hand when it is desired to use it. The wedges 34 are therefore attached to flexible members such as the chains 35, though it is obvious that cords or ropes or any similar members could be used. The other ends of the chains 35 are attached to holes 36 formed near the ends of the web 30.

It will now be seen that I have disclosed a simple and efficient clamp which is at the same time strong and durable. Each clamp comprises two pairs of clamping bars and the angle piece and wedges attached thereto. All of the parts are connected together, the angle piece being prevented from sliding off the clamping bar by the stop 31 and the wedges being secured to the angle piece by the chains 35. When two pairs of these clamping bars and their connected parts are at hand, all the parts necessary for one complete clamp are immediately available and it is not necessary to spend time hunting for lost wedges, loose angle pieces, etc.

It will be seen that I provide the stiffening web 30 for a double purpose. It not only strengthens the angle piece, making the two arms thereof more rigid and less liable to be broken, but it also forms a means for attaching the locking devices or wedges 34 to the angle piece at the most convenient points.

While I have described a particular embodiment of my invention, it should be understood that obvious changes and modifications can be made without departing from the spirit or scope thereof, and I do not desire to be limited to the precise details set forth. This application is intended to cover such equivalents or departures as may come within the underlying purposes of the invention or the scope of the following claims.

I claim:

1. A clamp comprising two members crossing each other at an angle, both of said members having longitudinal slots therein, and

an angle piece for connecting said two members where they cross, said angle piece comprising walls forming a channel portion extending along one of said members for a substantial distance between the crossing point and the free end of said member and being open at one side and additional walls forming a tubular portion extending along the other of said members for a substantial distance between the crossing point and the free end of said member and encircling the member for a portion of its length, and longitudinal slots through opposite walls of said channel portion and of said tubular portion, said slots being formed and arranged to permit a continuous clamping action of the angle piece along said members.

2. A clamp comprising two members crossing each other at an angle, and an angle piece for connecting said two members where they cross, said angle piece comprising walls forming passageways, one extending along each of the crossed members for a substantial distance between the crossing point and the free end of said member and adapted to receive the member within it, the bottom of one passageway being in substantially the same plane as the top of the other passageway, spaced parallel walls connecting the inner ends of the passageways and an oblique stiffening member extending from a side wall of one passageway to the adjacent side wall of the other passageway.

3. An angle piece for connecting two crossed members of a clamp, said angle piece comprising walls forming two passageways in different parallel planes and at an angle to each other and acting to embrace said crossed members between the crossing point and the free ends of the members, and a stiffening member in the angle between said passageways, connecting one side wall of one passageway with the adjacent side wall of the other passageway.

4. An angle piece for connecting two crossed members of a clamp, said angle piece comprising walls forming two passageways in different parallel planes and at an angle to each other and acting to embrace said crossed members between the crossing point and the free ends of the members, and a stiffening member in the angle between said passageways, connecting one side wall of one passageway with the adjacent side wall of the other passageway, said stiffening member extending obliquely from the plane of one passageway to the plane of the other passageway.

5. An angle piece for connecting two crossed members of a clamp, said angle piece comprising walls forming two passageways at an angle to each other and acting to embrace said crossed members between the crossing point and the free ends of the members, one passageway being open on one side throughout its length, the other passageway being open on one side for a portion of its length and closed on said side for a portion of its length, the bottom of one passageway being in substantially the same plane as the top of the other passageway, and an oblique stiffening web connecting the adjacent side walls of the two passageways.

6. An angle piece for connecting two crossed members of a clamp, said angle piece comprising walls forming two passageways extending in different directions and in different planes from a common point, said angle piece being cut away at the corner adapted to be located in proximity to the clamped body, and a stiffening member connecting one side wall of one passageway to the adjacent side wall of the other passageway.

7. An angle piece for connecting two crossed members of a clamp, said angle piece comprising walls forming two passageways extending in different directions and in different planes from a common point, said angle piece being cut away at the corner adapted to be located in proximity to the clamped body, a stiffening web connecting one side wall of one passageway to the adjacent side wall of the other passageway, and locking means for said angle piece, said web including means for attaching said locking means to said angle piece.

8. A clamp comprising two members crossing each other, an angle piece having walls forming passageways for receiving said members, said passageways extending along said members from the point where they cross toward the free ends of the members, a stiffening member in the angle between said passageways and connecting the side walls of the passageways, a locking device for locking said angle piece to one of said crossed members, and a flexible member attached to said locking device, one end of said flexible member being attached to the stiffening member.

9. An angle piece comprising two bar embracing portions arranged at an angle to each other and positionable between the crossing of a pair of clamping bars and the free ends of such bars, one of said bar embracing portions having a passageway open on one side throughout its length and the other having a passageway open for a part of its length and closed for a part of its length, and a stiffening web integrally connecting the side walls of said bar embracing portions and occupying the angular space between them and the free ends of the clamping bars.

10. An angle piece comprising two bar embracing portions arranged at an angle to each other, one having a passageway open on one side throughout its length and the other having a passageway open for a part of its length and closed for a part of its length, said bar embracing portions extending from the crossing point of the bars toward the free ends of

the respective bars, and a stiffening web integrally connecting said bar embracing portions and occupying the angular space between them and the free ends of the clamping bars.

11. In a clamp of the character described, the combination of a pair of bars, the ends of which overlap and are each provided with a longitudinal series of slots, a one-piece bracket for holding the ends of the bars in their overlapped position comprising a pair of arms adapted to be associated with the bars respectively and extend outwardly from the overlapping parts toward the extremities of said ends of the bars, one of the arms having an elongated chamber formed therein in which the lowermost bar fits and is longitudinally slidable only, the other arm being provided with an elongated open-sided chamber in which the uppermost bar fits edgewise and is longitudinally slidable, said arms being provided with slots, and wedges extending through the slots in the arms and bars for holding the bracket and bars in their operative position.

12. In a clamp of the character described, the combination of a pair of bars, the ends of which overlap and are each provided with a longitudinal series of slots, a one-piece bracket for holding the ends of the bars in their overlapped position comprising a pair of arms adapted to be associated with the bars respectively and extend outwardly from the overlapping parts toward the extremities of said ends of the bars, one of the arms having an elongated chamber formed therein in which the lowermost bar fits and is longitudinally slidable, the other arm extending outwardly from the outer edge of said lowermost bar and being provided with an elongated open-sided chamber in which the uppermost bar fits edgewise and is longitudinally slidable, said arms being provided with slots and being reenforced and held in rigid relation by an integral substantially triangular web positioned between the outer side portions of said arms, and wedges extending through the slots in the arms and bars for holding the bracket and bars in their operative position.

13. In a clamp of the character described, the combination of a pair of bars, the ends of which are adapted to intersect each other and are provided with slots, a one-piece bracket for holding said bars in their operative position consisting of a pair of arms, each of said arms consisting of an upper and a lower wall, one of the arms having a pair of side walls which form with its upper and lower walls an elongated chamber in which one of the bars fits and is longitudinally slidable only, the other arm having but a single wall which forms with its upper and lower walls, an elongated open-sided chamber in which the uppermost bar fits edgewise and is longitudinally slidable, the upper and lower walls of the arms being provided with slots, and wedges extending through the slots in the walls and bars for holding the bracket and bars in their operative position.

14. In a clamp of the character described, the combination of a pair of bars, the ends of which overlap each other and are provided with slots, a one-piece bracket for holding said bars in their overlapped position consisting of a pair of arms extending at right angles to each other, each of said arms consisting of an upper and a lower wall, one of the arms having a pair of side walls which form with its upper and lower walls an elongated chamber in which the lowermost bar fits and is longitudinally slidable, the other arm having but a single side wall which forms with its upper and lower walls an elongated open-sided chamber in which the uppermost bar fits edgewise and is longitudinally slidable, the upper and lower walls of the arms being provided with slots, and wedges extending through the slots in the walls and bars for holding the bracket and bars in their operative position, said bracket also including a web positioned coplanar and formed integrally with the upper wall of said one arm and the lower wall of said other arm and extending therebetween.

15. In a clamp of the character described, the combination of a pair of bars, the outer ends of which overlap each other and are provided with slots, a one-piece bracket for holding said bars in their overlapped position comprising a pair of arms extending at right angles to each other, each of said arms consisting of an upper and a lower wall, one of the arms having a pair of side walls which form with its upper and lower walls an elongated chamber in which the lowermost bar fits and is longitudinally slidable, the other arm having a side wall which forms with its upper and lower walls an elongated chamber in which the uppermost bar fits and is longitudinally slidable, the inner end of the upper wall of said one arm being coplanar with and forming a continuation of the side wall of said other arm, the upper and lower walls of the arms being provided with slots, and wedges extending through the slots in the walls and bars for holding the bracket and bars in their operative position.

16. In a clamp of the character described, the combination of a pair of bars, the ends of which overlap each other and are provided with slots, a one-piece bracket for holding said bars in their overlapped position consisting of a pair of arms extending at right angles to each other, each of said arms consisting of an upper and a lower wall, one of the arms having a pair of side walls which form with its upper and lower walls an elongated chamber in which the lowermost bar fits and is longitudinally slidable, the other arm having but a single side wall which

forms with its upper and lower walls an elongated open-sided chamber in which the uppermost bar fits edgewise and is longitudinally slidable, the inner end of the upper wall of said one arm being coplanar with and forming a continuation of said single side wall, the upper and lower walls of the arms being provided with slots, and wedges extending through the slots in the walls and bars for holding the bracket and bars in their operative position.

17. In a clamp of the character described, the combination of a pair of bars, the ends of which overlap each other and are provided with slots, a one-piece bracket for holding said bars in their overlapped position comprising a pair of arms extending at right angles to each other, each of said arms consisting of an upper and a lower wall, one of the arms having a pair of side walls which form with its upper and lower walls an elongated chamber in which the lowermost bar fits and is longitudinally slidable, the other arm having a side wall which forms with its upper and lower walls an elongated chamber in which the uppermost bar fits and is longitudinally slidable, the inner end of the lower wall of said other arm being coplanar with the outer side wall of the said one arm and forming a continuation thereof against which the lowermost bar abuts, the upper and lower walls of the arms being provided with slots and wedges extending through the slots in the walls and bars for holding the bracket and bars in their operative position.

18. In a clamp of the character described, the combination of a pair of bars, the outer ends of which overlap each other and are provided with slots, a one-piece bracket for holding said bars in their overlapped position comprising a pair of arms extending at right angles to each other, each of said arms consisting of an upper and a lower wall, one of the arms having a pair of side walls which form with its upper and lower walls an elongated chamber in which the lowermost bar fits and is longitudinally slidable, the other arm having but a single side wall which forms with its upper and lower walls an elongated open-sided chamber in which the uppermost bar fits edgewise and is longitudinally slidable, the inner end of the lower wall of said other arm being coplanar with the outer side wall of the said one arm and forming a continuation thereof against which the lowermost bar abuts, the upper and lower walls of the arms being provided with slots, and wedges extending through the slots in the walls and bars for holding the bracket and bars in their operative position.

19. In a clamp of the character described, the combination of a pair of bars, the outer ends of which overlap each other and are provided with slots, a one-piece bracket for holding said bars in their overlapped position comprising a pair of arms adapted to be associated with the bars respectively and extend outwardly from the overlapping parts toward the extremities of said ends of the bars, each of said arms consisting of an upper and a lower wall, one of the arms having a pair of side walls which form with its upper and lower walls an elongated chamber in which the lowermost bar fits and is longitudinally slidable, the other arm having a side wall which forms with its upper and lower walls an elongated chamber in which the uppermost bar fits and is longitudinally slidable, the inner end of the lower wall of said one arm being extended to form a comparatively long bearing surface for said lowermost bar, the upper and lower walls of the arms being provided with slots, and wedges extending through the slots in the walls and bars for holding the bracket and bars in their operative position.

20. In a clamp of the character described, the combination of a pair of bars, the outer ends of which overlap each other and are provided with slots, a one-piece bracket for holding said bars in their overlapped position comprising a pair of arms adapted to be associated with the bars respectively and extend outwardly from the overlapping parts toward the extremities of said ends of the bars, each of said arms consisting of an upper and a lower wall, one of the arms having a pair of side walls which form with its upper and lower walls an elongated chamber in which the lowermost bar fits and is longitudinally slidable, the other arm having but a single side wall which forms with its upper and lower walls an elongated open-sided chamber in which the uppermost bar fits edgewise and is longitudinally slidable, the inner end of the lower wall of said one arm being extended and connected to the inner end of the lower wall of said other arm to form a relatively long bearing surface for said lowermost bar, the upper and lower walls of the arms being provided with slots, and wedges extending through the slots in the walls and bars for holding the bracket and bars in their operative position.

21. In a clamp of the character described, the combination of a pair of bars, the ends of which overlap each other and are provided with slots, a one-piece bracket for holding said bars in their overlapped position comprising a pair of arms extending at right angles to each other, each of said arms consisting of upper and lower walls and side walls forming an elongated longitudinal chamber in which one of the bars fits and is slidable, the arms being arranged so that the chambers are disposed at different levels, the bracket also comprising a substantially triangular web positioned coplanar and formed

integrally with the upper wall of one arm and the lower wall of the other arm and extending therebetween, the upper and lower walls of the arms being provided with slots, and wedges extending through the slots in the walls and bars for holding the bracket and bars in their operative position.

In witness whereof, I have hereunto signed my name.

HENRY W. ROOS.