G. H. T. Schaefer
Clamping Device for Molds.
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Inventor:
George, H. T. Schaefer

[Diagram and patent details]
To all whom it may concern:

Be it known that I, GEORGE H. T. SCHAEFER, a citizen of the United States, residing at Atchison, in the county of Atchison and State of Kansas, have invented new and useful Improvements in Clamping Devices for Molds, of which the following is a specification.

This invention relates to a clamping device for holding together and in position the boards, plates or frames that form a mold into which cement is poured in the process of building concrete structures. Therefore in forming structures of this kind, particularly columns, piers and the like, especially those of rectangular or other polygonal shape in cross section, the mold-boards, plates or frames of suitable form have been placed together edgewise to produce a hollow space of the proper shape of the column or other object to be formed, and secured together by various means.

As an improvement upon such structures, the object of my invention is to provide a simple, convenient and easily applied securing means or clamping device that will permit of quick application to the mold and attachment thereto, and when so applied will hold the mold-boards, plates or frame firmly and accurately in position and prevent their movement or warping while the concrete is hardening.

In the accompanying drawing, Figure 1 is a side elevation of a portion of a rectangular column mold, the plates or frames of which are connected by the improved clamping device. Fig. 2 is a horizontal sectional view of the same on the line 2—2 of Fig. 1. Fig. 3 is an enlarged sectional view of one corner of the mold and portions of two of the clamping devices showing how the mold elements are held in place. Fig. 4 is an elevation of one of the clamping elements. Fig. 5 is a plan view of an angle or corner plate for causing the mold to be drawn true when the clamping devices are tightened. Fig. 6 is an edge view of the angle plate. Fig. 7 shows a modification.

10 indicates a vertical mold for forming a rectangular column, the walls 11 of which are securely held together by the improved clamping device forming the subject of the present invention. Each clamping device, of which a number are used on each mold, comprises a pair of bars 12 overlapping 55 each other at one end and connected by a pin 13. These bars are made of any length desired, and are preferably flat, the free end of each being provided on one edge with a number of transverse notches 14. Slidable 60 on each bar 12 is a locking block 15 through which is formed an opening 16 of such size as to permit the free passage therethrough of the bar 12. The opening 16 at one side of the block is made to fit the bar 12 somewhat closely while permitting sufficient freedom of movement of the block on the bar. At the opposite side of the block the opening is wider transversely as shown at 17, while between the two sides there is a cut away portion 18 by means of which a lug 19 is formed that projects into the opening on the closely fitting side of the block, a stop being formed at the part indicated at 17. The lug 19 is adjacent to the side of the bar 20 in which are notches 14, and when the opposite side of the opening 16 is in contact with the other edge of the bar, the block 15 may be moved on the bar 12 without the engagement of the lug 19 with the notches 14. But should pressure in the proper direction be brought to bear upon the block 15 or the bar 12 when the lug 19 is opposite one of the notches 14 the lug will enter said notch and lock the block against further movement. By this means the locking block may be secured to the bar 12 at any point desired within the length of the bar provided with such notches. A rivet 120 other projection at the end of each bar prevents the locking blocks from slipping from the bars when free to slide thereon.

Projecting outwardly from the locking block 15 and from the side on which the lug 19 is formed are two ears 20 which lie in parallel relation to each other, and are spaced apart to receive between them a cam lever 21 secured to said ears by a pivot pin 22. The cam lever 21 is pivoted eccentrically to the ears 20 in such manner as to provide a binding surface 23 which when the lever is turned on its pivot to clamp the device, bears upon the bar 12 of a second and cooperating clamping device and forces the latter against one side of the mold to secure the mold-board or frame in place, and also acts to force one of the notches 14 of the same bar into engagement with the lug.
19 of the locking block mounted thereon. Each cam lever 21 is formed with a handle piece 24 by means of which the lever is manipulated. Preferably the lever 21 is provided on each side of its cam surface 23 with a projecting flange 25 which engages the rear or outer edge of the cooperating bar 12, as shown.

Between the connected ends of the bars 12 of each clamping device, is an angle or corner plate 30 designed to draw the walls of the mold into true form and hold the corners of the mold square. The plate 30 is thin and made of metal, the two arms 31 of which when employed with rectangular columns form a right angle. Each arm of any suitable length has a flange 32 on one side at its outer edge. Through the corner of the plate 30 is a hole 33 for the pin 13 which joins the bars 12, while an external flange 34 in the plane of the arms stiffens and squares the corner. When assembled, one of the bars 12 lies on the upper side of one arm 31 of the corner plate with its outer edge against the flange 32 and its inner edge in line with the inner edge of the arm. The other bar 12 lies against the lower side of the other arm, its outer edge in contact with the depending flange 32 and its inner edge in line with the inner edge of the arm. The pin 13 passes through the overlapping ends of the bars and the corner plate.

In using the invention on rectangular molds such as are represented in the drawings, two of the devices are employed cooperatively. Each clamping device is placed with the angle plate 30 in contact with one corner of the mold 10 and the inner edges of the bars 12 against adjacent sides of the mold, their free ends projecting beyond the mold and overlapping each other, the bars being sufficiently long to permit this. The cam lever on each bar is then turned so that the handle 24 lies parallel with the overlapping bar. This places the cam surface 23 in such position that the flat surface 25 of the cam lies parallel to said bar. In this position the locking blocks may be moved on their supporting bars until the flat surfaces 26 bear against the edges of the opposite bars. The locking blocks of the two overlapping bars thus moved press the cooperating bars against the mold. Now by turning the cam lever outwardly the cam surface 23 of each lever will bear upon the edge of the cooperating bar 12, said bars being firmly pressed against the sides of the mold and at the same time drawing the angle plates 30 against the corners of the mold, trueing and squaring the walls thereof, forcing them together and holding them firmly in place.

This movement also tends to force one of the notches 14 in each bar to engage the lug 19 of its locking block and so hold said locking block in place on the bar and prevent its moving endwise under the force exerted by the cam lever. After securing the locking blocks at one corner of the mold, those at the opposite corner are fixed in the same way, and in this manner the parts of the mold are rigidly united and, through the angle plate 30, made perfectly square. As many pairs of these locking clamps may be employed one above the other as is necessary to prevent displacement of the mold-boards or frames. After the mold has been filled with concrete and the latter has hardened sufficiently, it is only necessary to press the handles of the cam levers inwardly toward the mold to free the clamping devices and permit them to be removed.

While this device is shown in use on a rectangular mold, it may be employed with molds of other angular shape, the number of cooperating clamping devices used being in accordance with the number of sides to the mold and the angle of the arms 31 of the corner plates 30 depending on the angle of the mold corners. This device may also be used in constructing walls by making the bars 12 of sufficient length and with such slight changes as would suggest themselves to a person skilled in the art.

Among the desirable features of this clamping device is the absence of loose parts which may be dropped or lost when applying them or at other times. The locking blocks 13 which slide freely on the bars and are the parts most liable to be lost, are held on the bars by the rivets 12 in the ends thereof.

Having thus described my invention, I claim:

1. Means for securing in position the boards or plates of a mold comprising a plurality of clamping devices each formed of a pair of bars connected at one end, the free end of each bar crossing the similar bar of a cooperating clamping device, an angle plate having arms at each connected angle of said bars, said armed plate being placed between the bars of its pair and pivoted thereto, there being a flange on each arm to bear against the outer edge of the coincident bar, and a movable clamping device on each bar for holding the same and the cross bar of the cooperating device against the mold.

2. An angle plate for insertion between the bars of a mold clamping member comprising a plate having two projecting arms at an angle to each other with a pivotal opening therethrough at the angle, a flange on the upper side of one arm at its outer edge and a like flange on the lower side of the other arm also at the outer edge.

3. An angle plate for insertion between the bars of a mold clamping member comprising a metal plate having two projecting arms at an angle to each other, a flange on
the upper side of one arm at its outer edge, a like flange on the opposite side of the other arm also at its outer edge, and an exterior strengthening flange at the junction of the two arms, a pivotal opening being formed through the plate at said junction.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE H. T. SCHAEFER.

Witnesses:

JOHN H. KRUSEMARK,

JOHN J. FROUNSER.