July 21, 1931. J. M. WILLARD 1,815,336

CLAMPING DEVICE

Filed March 19, 1930

Fig. 1.

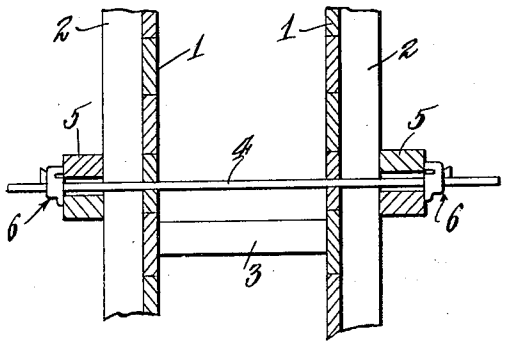


Fig. 2.

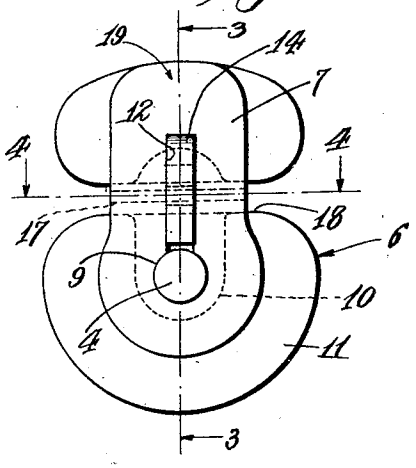


Fig. 3.

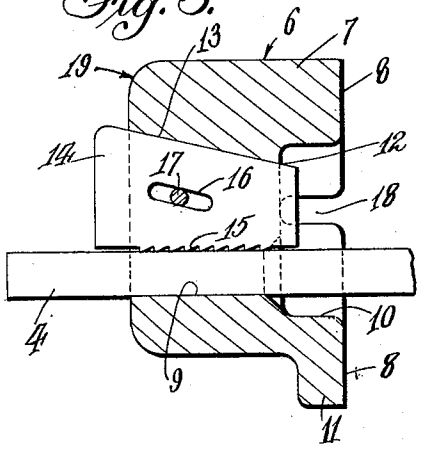


Fig. 4

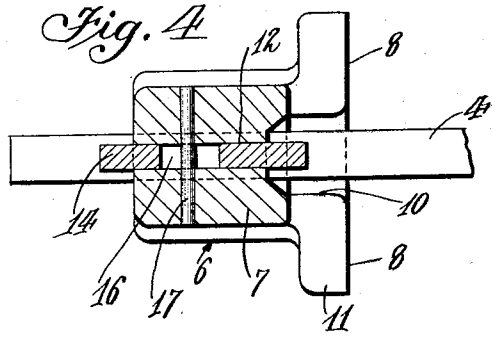


Fig. 7.

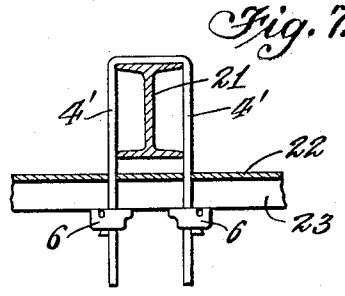


Fig. 6.

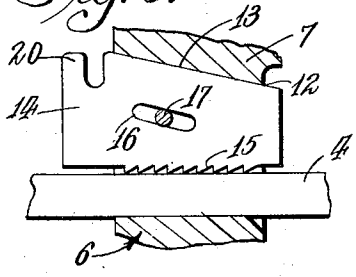
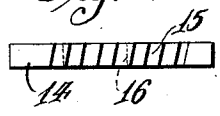


Fig. 5.



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UNITED STATES PATENT OFFICE

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CLAMPING DEVICE

Application filed March 19, 1930. Serial No. 437,019.

This invention relates to an adjustable clamp and more especially to a clamp adapted to be employed on tie rods for the retention of moulds or forms in which concrete or other cementitious material is to be poured.

One of the particular objects of this invention is to disclose and provide a clamp of extremely simple construction which may be adjusted, positioned and released without employing special devices.

Another object of this invention is to disclose and provide a clamping device which may be adjustably positioned along a rod by the application of light blows directed upon a wedge slidably held by said device and upon the device itself alternately, and which may be released from gripping contact on a rod by blows applied to the device itself.

In describing the invention, reference will be had to the appended drawings which illustrate one preferred form of the device. It is to be understood that the device shown in the attached drawings is merely illustrative of the general construction and mode of operation of the device, and that the invention is not limited to the specific form there shown, but instead embraces all such changes and modifications as come within the skill of the art.

In the drawings:

Fig. 1 is a transverse section through wall forms adapted to receive and retain a cementitious material during pouring and setting of said material, said forms being held together by means of a tie rod and clamping device of this invention.

Fig. 2 is a plan view of the clamping device.

Fig. 3 is a longitudinal section taken through the device illustrated in Fig. 2, along the plane 3—3.

Fig. 4 is a transverse section taken through the device illustrated in Fig. 2, the said section being taken along the plane 4—4.

Fig. 5 is an elevation of a serrate face used on the wedge member employed in the device.

Fig. 6 is a modified form of wedge.

Fig. 7 is a diagrammatic representation showing the adaptation of the clamping device to a hanger or soffit clamp.

As shown in Fig. 1, the sheathing 1 may be held together in the form of panels by means of ribs 2. Suitable spacing members, such as the member 3, may be positioned between the sheathing so as to properly space it and furnish a mould or form of the required thickness. The panels constituting the sheathing and ribs may then be held together by means of tie rods 4 passing through suitable apertures in the sheathing, said tie rods preferably passing between wales 5 extending transversely to the ribs 2. The tie rod 4 is then placed under tension by means of the clamping device 6 longitudinally movable on the tie rod 4 and adjustably positioned thereon.

It will be seen that if motion toward the sheathing is permitted, whereas the motion of the clamping devices 6 away from the sheathing is prevented, the wales 5 and the ribs 2 will be placed in compression, while the tie rod 4 will be placed in tension. One of the main objects of this invention is to disclose and provide a clamping device which will be readily adjustable along a tie rod and not necessitate the use of special equipment or tools in moving the clamping devices towards the sheathing or form and positioning said devices at a proper point on the tie rods. Furthermore, as stated hereinabove, an object of this invention is to disclose a clamping device which may be readily caused to release its grip on the tie rod, as for example, when it is desired to remove the forms and sheathing.

The clamping device (shown in more detail in Figs. 2 to 4) may comprise a body portion 7. The body portion 7 is preferably provided with a bearing surface 8 and with an aperture 9 extending through the body portion 7 substantially at right angles to the plane of the bearing surface 8. The opening or aperture 9 extending through the body portion 7 is preferably adapted to slidably receive a tie rod 4. It is to be understood that the tie rod 4 may be of any desired shape or size, and will vary with the use to which said tie rod is to be put. The

tie rods 4 may be cylindrical, octagonal or rectangular in shape, for example.

A recess 10 may be provided in the bearing surface 8 of the body portion 7, the opening 9 opening into said recess. The purpose of said recess will be described hereinafter. A footing 11 may extend from the body portion 7 contiguous with that portion of the body 7 which contains the aperture or opening 9 adapted to receive the tie rod, thereby increasing the area of the bearing surface 8 at or about the point through which the tie rod 4 will protrude from the body portion, by the area 8′ of such footing.

A longitudinal slot 12 is formed in the body portion 7, said slot leading away from the opening 9 and away from the bearing surface 8. Said slot is preferably provided with a wall 13 away from the opening 9, said wall 13 being inclined to the longitudinal axis of the opening 9 and preferably making an angle of less than ninety degrees with the plane of the bearing surface 8.

A wedge 14 is slidably received in the slot 12 formed in the body portion 7, said wedge 7 having its apex directed toward the bearing surface 8, the faces of said wedge being at an angle complementary to the angle of the wall 13 of the slot. Preferably, one of the faces of the wedge 14, such as for example, the face 15 is serrated, said serrations being adapted to grip a tie rod in the opening 9 so as to prevent the movement of the tie rod 4 toward the bearing surface 8. The serrations may be inclined to the plane of the wedge 14 as indicated in Fig. 5, thereby imparting a shearing grip or bite to the wedge into the tie rod.

The serrated face 15 may be concave if the tie rod 4 is cylindrical, or said face may be plane. The wedge 14 is of a size sufficient to permit its upper portion to extend beyond the body portion 7 when it is in operative engagement with a tie rod in the opening 9.

In order to permit the wedge to be movable in the slot 12 but irremovably held therein the wedge 14 may be provided with a slot 16. The slot 16 may be parallel to the wall 13 of the slot 12. A pin 17 may pass through the body portion 7 transversely to the slot 12, said slot being adapted to cooperate with the slot 16, thereby preventing the complete removal of the wedge 14 from the device.

An opening 18 may be provided in the wall of the body portion 7, said opening leading into the recess 10 at a point beneath the wedge 14. As shown in the drawings, the opening 18 forms a groove in the bearing surface 8.

In employing this device, the tie rod 4 is passed through the sheathing and the clamping devices slipped upon the protruding ends of the rod 4, the rods 4 passing through the openings 9 in the body portion 7 of the device. The bearing surfaces 8 preferably face the sheathing, wales, ribs or other portion of the mould in which the cementitious material is to be poured.

In order to force the sheathing together, as for example the sheathing 1 shown in Fig. 1, the protruding portion of the wedge 14 is then lightly tapped with a hammer alternating with light taps on the upper portion of the body 7. It will be found that the body portion 7 may be advanced along the tie rod 4 by such blows, but will not return to its original position, as the serrated edge of the wedge will bite into the tie rod 4, thereby positioning the body portion 7 on the tie rod. Inasmuch as the teeth on the surface 15 of the wedge point outwardly, that is, away from the sheathing, a blow on the wedge will cause said teeth to slide upon the rod in one direction only. In this manner the sheathing may be compressed and the tie rod 4 placed under tension very readily and held in this position firmly because of the grip of the wedge against the tie rod, and the expansive force of the sheathing against the bearing surface, which in turn is transmitted to the wedge by the wall 13.

If it is desired to release the device from the tie rod (as for example after the cementitious material within the sheathing has been poured and set), it is only necessary to strike the body portion 7 of the device a sharp blow, for example, at the point indicated at 19. A blow struck at 19 upon the body portion 7 will cause the bearing surface 8 to press into the sheathing to a very minute extent, but sufficiently so that the pressure on the wedge 14 is released by the minor movement of the wall 13 away from said wedge.

The release of pressure along the wall 13 causes the wedge to fly out and release its grip on the tie rod 4, thereby permitting the entire body portion 7 to move away from the sheathing along the tie rod 4. If by any manner the wedge 14 becomes jammed or locked into the rod 4, then an instrument such as a drift or punch may be introduced through the opening 18 in the body portion 7, thereby permitting leverage to be exerted upon the wedge simultaneously with a blow applied to the body portion 7 and thus cause the wedge 14 to loosen in the body portion 7.

In order to facilitate the removal of the wedge from the opening 12 in the body portion 7, the wedge may be provided with a lug 20, as shown in Fig. 6. Leverage may be applied in any suitable manner to the wedge by means of the lug and thus remove the wedge from engagement with the rod, such removal being in all instances greatly facilitated by the application of blows to the body portion 7.

It is to be understood that the device embodied in this invention is not limited to the use described hereinabove. For example, the clamping devices may be employed as illus-

trated in Fig. 7, where one continuous tie rod 4′ bent into the form of a hanger over an I-beam or ceiling beam 21 carries two of the clamping devices 6. The ends of the hanger 4′ pass through a suitable bottom portion 22 of the falsework and between ribs or walls 23. Similarly, the device may be employed wherever it is desired to retain forms in position, as for example, around girders, pillasters, and the like or whenever it is desired to support members or units by means of a tie rod.

The recess 10 formed in the bearing surface 8 is not essential, but it permits a certain amount of shifting or adjustment to take place between the body portion 7 of the device and the tie rod 4.

It will thus be seen that an adjustable clamp has been provided which may be employed at any position upon a rod, and is not limited to use upon a particular portion thereof. The clamping device is readily installed and is self-locking in character, that is, it will grip the rod whenever a sufficient tension exists in the rod 4 to cause the wedge 14 to operatively engage with the rod. Furthermore, the clamping device may be readily caused to release its grip on the rod without necessitating the use of any instrumentalities not normally found on any construction job.

As has been stated before, the invention is not limited to the specific construction described hereinabove, but includes all such changes and modifications as come within the scope of the appended claims.

I claim:

1. In a clamping device, the combination of a tie rod and a clamping device longitudinally adjustable thereon, said clamping device comprising a body portion provided with an opening adapted to slidably receive a rod, a slot in said body portion leading away from said opening, and a wedge slidably but irremovably retained in said slot and extending beyond said body portion in one direction only, retaining means for holding said wedge in said body portion and preventing said wedge from projecting beyond said body portion in one direction, said wedge being provided with teeth adapted to grip said rod and normally prevent motion of said clamping device in one direction, but permitting motion of the device on said rod in another direction.

2. A clamping device comprising a body portion provided with a bearing surface, an opening extending through said body portion at right angles to the plane of said bearing surface, a slot in said body portion leading off from said opening, the wall of said slot away from said opening being at an angle of less than 90° to the plane of said bearing surface, and a wedge provided with one serrated edge slidably received but irremovably retained in said slot and adapted to grip and position said body portion upon a rod slidably received in said opening, said wedge extending beyond said body portion in one direction only, and retaining means for irremovably holding said wedge in said body portion and preventing said wedge from projecting beyond said bearing surface of said body portion.

3. A clamping device comprising a body portion provided with a bearing surface, an opening extending through said body portion at right angles to the plane of said bearing surface, a slot in said body portion leading off from said opening and away from said bearing surface, said slot being provided with a wall inclined to the longitudinal axis of said opening, a serrated wedge slidably received in said slot and extending beyond said body portion, and means for irremovably retaining said wedge in said slot and preventing said wedge from projecting beyond said body portion and bearing surface thereof.

4. A clamping device comprising a body portion provided with a bearing surface, an opening extending through said body portion at right angles to the plane of said bearing surface, a slot in said body portion leading off from said opening and away from said bearing surface, said slot being provided with a wall inclined to the longitudinal axis of said opening, a serrated wedge slidably received in said slot and extending beyond said body portion away from said bearing surface, and means for irremovably retaining said wedge in said slot, said means including a slot in said wedge and a pin carried by said body portion and cooperating with said wedge slot to prevent said wedge from projecting beyond said bearing surface of said body thereof.

5. A clamping device comprising a body portion provided with a bearing surface, a recess in said bearing surface, an opening through said body portion into said recess, the longitudinal axis of said opening being at right angles to the plane of said bearing surface, said opening being adapted to receive a tie rod, a slot through said body portion and into said recess, said slot leading away from said opening and provided with a wall inclined from said bearing surface, a wedge slidably received in said slot, said wedge being adapted to operatively grip a rod in said opening, and a second opening in the wall of said body portion leading to said recess, said second opening being substantially transverse to said wedge slot.

6. A clamping device comprising a body portion provided with a bearing surface, a recess in said bearing surface, an opening through said body portion into said recess, the longitudinal axis of said opening being at right angles to the plane of said bearing surface, said opening being adapted to receive a tie rod, a slot through said body portion

and into said recess, said slot leading away from said opening and provided with a wall at an angle to said bearing surface, a wedge slidably received in said slot, said wedge being adapted to operatively grip a rod in said opening, and a slot in the bearing surface leading to said recess.

7. A clamping device comprising a body portion provided with a bearing surface, an opening extending through said body portion at right angles to the plane of said bearing surface and adapted to slidably receive a rod, a slot in said body portion leading off from said opening, said slot being narrower than said opening, the wall of said slot away from said opening being inclined to the plane of said bearing surface, a wedge slidably received in said slot, said wedge being adapted to grip and position said body portion upon a rod slidably received in said opening, said wedge extending beyond said body portion away from said bearing surface, retaining means for irremovably holding said wedge in said body portion and preventing said wedge from projecting beyond said body portion and bearing surface thereof, and a lug carried by said wedge beyond said body portion.

Signed at Los Angeles, California, this 31st day of January, 1930.

JOHN MELVILLE WILLARD.